ORISSA POWER TRANSMISSION CORPORATION LTD

OFFICE OF THE SR. GENERAL MANAGER, CENTRAL PROCUREMENT CELL, JANPATH, BHUBANESWAR - 751022

TENDER SPECIFICATION

NO. SR.G.M.-CPC –O&M-CONST.- CONDUCTOR-AAAC- 60 /11-12

FOR
PROCUREMENT OF

LOT-I-AAAC 'ZEBRA'(37/4mm) -664 KMs
LOT-II- AAAC 'PANTHER'(37/3.15mm)-596.7KMs

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

TENDER NOTICE NO. 51 /11-12

For and on behalf of ORISSA POWER TRANSMISSION CORPORATION LTD., Sr. G.M. [C.P.C.] invites Tenders from reputed manufacturers for supply of AAAC 'Zebra' Conductors; & AAAC 'Panther' conductor Tender papers shall be sold from dt.30.09.2011 to dt-22.10.2011---. Interested manufacturers may visit OPTCL's official web site **http://www.optcl.co.in** for detail specification.

SR. GENERAL MANAGER [C.P.C.]

NOTICE INVITING TENDER

ORISSA POWER TRANSMISSION CORPORATION LTD.,

REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022, ORISSA, INDIA.

TENDER NOTICE NO- 51 /11-12

For and on behalf of the ORISSA POWER TRANSMISSION CORPORATION LTD., the undersigned invites bids under two-part bidding system in double-sealed cover, duly super scribed with tender specification number and date of opening, from manufacturers for supply of the following equipments/materials, as required under the following specifications.

Sl. No	*Tender Specification No.*	*Description of equipments/materials*	*Quantity*	*Earnest Money Deposit (In Rs.)*	*Cost of Tender Spec. document (in Rs.)*	*Last date of receipt & opening of tender*
1.	Sr.GM-CPC-O&M-CONST.-CONDUCTOR-AAAC- 60/11-12.	LOT-I-.AAAC 'ZEBRA' Conductor(37/4mm) LOT-II-AAAC 'PANTHER'Conductor (37/3.15mm)	LOT-I-664kms LOT-II-596.7Kms	LOT-I-17.5 lakhs LOT-II-12 Lakhs	10,000/- +400/- (VAT)	**22.10.2011**

The tender specification documents can be had from the office of the undersigned on payment of non-refundable cost of tender specification documents in the shape of cash from **10 A.M to 1 P.M** during any working day from **dt.30.09.2011 to dt.22.10.2011** (both days inclusive) either in person or by remitting demand draft payable to Drawing & Disbursing Officer, ORISSA POWER TRANSMISSION CORPORATION LTD., Regd. Office: Janpath, Bhubaneswar- 751 022. No tender documents will be sold on any other day except as indicated.

The specification can also be down loaded from OPTCL'S official web site and the same may be submitted alongwith the cost of tender document by way of demand draft/pay order payable to D.D.O., OPTCL Ltd. Janapath, Bhubaneswar at the time of submission of tender document. In case, any deviation is found in the tender document, submitted by the tenderer from the content mentioned in our web site and/or non-

submission of the cost of tender documents, the tender shall be liable to be rejected at any stage of the contract. The tenderer has to indemnify OPTCL for any loss accruing due to such alteration in the terms and conditions of the tender document &/ or for such alternation, resulting, in the cancellation of the contract.

The intending bidders, who want to get a copy of the tender specification document by post, are required to deposit an additional amount of Rs.100/- (Rupees one hundred) only over and above the cost of the tender specification, mentioned against each Tender Specification under heading "Cost of tender specification". **Complete bids for different items will be received upto 1.00 P.M. only on dt. 22.10.2011 and the same will be opened at 03.30 P.M. on dt.22.10.2011**. Date and time of opening of price bids shall be intimated to the techno-commercially responsive bidders only. In the event of any specified date for the sale, submission or opening of bids being declared a holiday for purchaser, the bids will be sold/ received/ opened up to the appointed times on the next working day. Only one representative of each bidder will be allowed to participate in the bid opening with valid identification certificate. OPTCL also reserves the right to accept or reject any or all tenders without assigning any reason thereof, if the situation so warrants. OPTCL shall not be responsible for any postal delay or loss at any stage.

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

SR. GENERAL MANAGER
CENTRAL PROCUREMENT CELL

FAX NO.: 0674 – 2542964

TELEPHONE NO.:0674 – 2541801

ORISSA POWER TRANSMISSION CORPORATION LTD.
OFFICE OF THE SR. GENERAL MANAGER

CENTRAL PROCUREMENT CELL

JANAPATH, BHUBANESWAR – 751022

TENDER SPECIFICATION NO.SR.G.M.-CPC –O&M-CONST.-CONDUCTOR-AAAC-60 /11-12

CONTAINING

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SECTION – II : GENERAL TERMS AND CONDITIONS OF CONTRACT (G.T.C.C.) (COMMERCIAL)

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SECTION-I

INSTRUCTIONS TO TENDERER

1. **Submission of Bids: -**

Sealed tenders in triplicate on two part bid basis, each complete in all respects, in the manner hereinafter specified are to be submitted in the office of Sr.General Manager [Central Procurement cell], OPTCL, Bhubaneswar on or before the date and time specified against the relevant tender Specification in the notice inviting the tenders. Each copy of the bids [Original, duplicate and triplicate] shall be in separate double sealed envelopes, superscribed on each of the covers, the relevant tender specification number and the due date of opening of the bids on the top right hand side of the envelopes. On the top left sides, original/duplicate/triplicate as is relevant, shall be written. The participants to the tender should be registered under Orissa Sales Tax ACT(VAT)/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 each in separate double sealed covers. Part-I shall be superscribed as "E.M.D"., technical and commercial and Part-II shall be superscribed as "Price Bid"

4. Opening of Bids.

[a] The part-I shall be opened in the Office of the Senior General Manager [Central Procurement Cell] in presence of such of the Tenderers or their authorized representatives **[limited to one person only**] on the due date of opening of tender. 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 **10 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'sRight 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. The Senior General manager [C.P.C.] or his authorized representatives will, on opening each bid, read aloud the name of the bidder. He shall also read aloud the attested and unattested corrections and shall record the number of such corrections on each page of the Techno-Commercial Bid over his dated initials and also initial all such corrections.

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. Further, the tender specification can also be downloaded from OPTCL's website and the cost of tender specification in such a case, shall have to be remitted alongwith the submission of tender papers. Tenders submitted by others will be rejected. Also tender specification downloaded from OPTCL website may not be taken as 100% correct due to website technical difficulties. So it is advisable to purchase hard copies from the office of the Sr. General Manager (C.P.C.), OPTCL Bhubaneswar.

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 person or by Registered Post with AD. Any other means of delivery shall not be accepted. When delivered in person, the tenders shall be received by a responsible officer of the office of the Senior General Manager [C.PC.], OPTCL who shall officially acknowledge the receipt of the same. Tenders received after due date and time shall be returned un-opened.

[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 outright and their Part-II envelope will be returned to them, unopened.

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**.

(d)National saving certificate, duly pledged in favour of Senior General Manager [Central Procurement Cell] OPTCL {H.Qrs.Office], Bhubaneswar-751 022.

(e) **The non-judicial stamp paper should be purchased in favour of issuing Bank's Branch name , otherwise the EMD B.G cannot be accepted.**

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 upto 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 ORISSA 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-19 of Section-II**. Suits, if any, arising out of this clause shall be filed in a Court of law to **which the jurisdiction of High Court of Orissa 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: -

(a) The Tenderers are requested to quote**-Ex-works price as 'VARIABLE'** as per IEEMA PVC. No deviation from PV PRICE will be entertained irrespective of deviation **clause No.7** of this part of the specification.

(b) Irrespective of the increase in the prices of raw materials , the price variation (Increase) will be limited to a maximum of 20% over the original quoted Ex-works price .There is no ceiling limit on lower side(Negative)price variation.

(c) If the date of delivery as defined in the P.V formula is beyond the contractual delivery date , the Scheduled delivery date(S.D.D) or the Actual Delivery date (A.D.D) , whichever is advantageous to the purchaser will form the basis for calculation of P.V.

(d) Not withstanding the formula, applicable for regulating the P.V ,if at any time , any documentary evidence proof or certificate in regard to P.V bills is required by the purchaser , the bidder shall have to furnish the same to the purchaser.

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] If required, the tenderers may be asked to extend the validity period of bids under the same terms and conditions as per the original tender except for the change in delivery period. In such an event, the Tenderers are free to change any or all conditions of their bids including price at their own risk.

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 alongwith 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.

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

(a) Part – II of the tender shall consist of the following

Abstract of Price Component, as per **Annexure-IV**

Schedule of prices in the prescribed proforma as per **Annexure-V .**

18. **Conditional Offer**

Conditional offer shall not be accepted.

19. **General: -**

(i) Over writing shall be avoided.

(ii) Erasures and other changes shall bear the dated initial of the person signing the tender.

(iii) 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.

(iv) For evaluation, the price mentioned in words shall be taken if there is any difference in figures and words in the price bid.

(v) Notice inviting tender shall form part of this specification.

(vi) The price bids of the technically and otherwise acceptable bids shall only be evaluated. The price bids of others along with EMD, if any, shall be returned to the bidders un-opened.

(vii) Tenderer can offer any lot or all the lots of the tender, if there are any 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.**

(viii) **The person signing the tender should sign on each page of the Tender paper in acknowledgement of having gone through the entire Tender Specification and in agreement thereof. Tender papers, not signed on each page with official seal by the bidder(s), shall not be considered**.

(ix) ***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.***

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 /materials as per the specification at the consignee's site, and rendering services in accordance with the enclosed technical specification and bill of quantity.

2.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/materials 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 equipment/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 release 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 authencity letter of that laboratory alongwith the offer for inspection. A packing list alongwith 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/material 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 alongwith 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 offer due to any reasons during the visit of the inspecting officer at the testing site , the firm have to bear all expenses towards repletion of inspection & testing of the total offered quantity or part there of.

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/material, its erection, commissioning and for it's proper operation and maintenance in service, wherein it is thought necessary by the purchaser.

6.Rejection of Materials.

In the event any of the equipment/materials, 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 contractor on receipt of such notification shall either rectify or replace the defective equipment/material free of cost to the purchase 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 equipment/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:

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/equipment offered as per technical specification executed during the last two years alongwith 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, not withstanding 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/material supplied by the manufacturer. Such indemnity shall also cover any use of the equipment/material, 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/material 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 equipment/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 (i)** 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/material.

[iii] In the event the Purchaser does not terminate the contract as provided in **clause 15(I)** 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/material 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. 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. The above guarantee certificate shall be furnished in triplicate to the purchaser for his approval.

[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 Dispatch 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, 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 & when intimated to the firm 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 PV should arrange to import materials from their own quota. Equipment/material 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 and approval of Composite Bank Guarantee at the rate of 10% (Ten percent) of the cost of supplied materials, as stipulated 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, 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 taxes 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 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/materials 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 percent (0.5 percent) of the Ex-works price of the un-delivered equipment/material 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 percent (5%) of the ex-works price of the unit or units so delayed. Equipment/material will be deemed to have been delivered only when all its components and accessories as per technical Specification are also delivered. If certain components & accessories are not delivered in time, the equipment/material 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 Purchase order amount for each calendar week of delay shall be recovered by the purchaser within the guarantee period. For this purpose, penalty date will start from the 30th. 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.

Not withstanding 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 alongwith 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) Evaluation of bids will be on the basis of the FOR DESTINATION PRICE (By Road Transport) including Excise Duty, sales Tax & other levies as may be applicable. The FORD PRICE shall consist of the following components

Ex-works price.

Packing & Forwarding charges.

Freight

Insurance.

Excise Duty.

Sales Tax.

Other levies.

Mandatory spares, if any for maintenance of equipment/material. (At the discretion of the purchaser)

Test charges, if any. .

Supervision of erection, testing and commissioning charges, if any.

Any other items, as deemed proper for evaluation by the purchaser.

Loading factors will be taken in to account during evaluation if the prices of some of the items, not quoted.

ii)Weightage shall be given to the Following factors in the Evaluation & Comparison of Bids.

In comparing bids and in making awards, the Purchaser will consider other factors such as compliance with Specification, **minimum qualification criteria as per clause-30, outright rejection of tenders clause-34 of this tender**, relative quality, adaptability of Supplies or services, experience, financial soundness, record of integrity in dealings, performance of materials/equipment/materials 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/material and technical organisation.

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 above rated equipment/materials for a minimum period of 2 (two) years as on the date of opening of the tender.

ii) At least 50% of the tendered quantity. of above rated equipment/material should have been supplied within the above-stipulated period.

iii) The above rated equipment/material should have at least 2 (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 equipment/materials in Government approved laboratory within five years from the date of opening of the tender..

31. Jurisdiction of the High Court of Orissa.

`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 Orissa 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 (Procurement)(CPC) OPTCL

Bhubaneswar-751022 (Orissa)

Telephone No. 0674 - 2541801

FAX No. 0674 - 2542964

[ii] **Supplier:** Address

Telephone No.

Fax No.

34. Outright Rejection of Tenders

Tenders shall be **outrightly rejected if the followings are not complied with**:-

[i] The Tenderer should have purchased/obtained the Bid specification document from the office of the Purchaser or downloaded the same from website of OPTCL, but shall deposit the tender cost, while submitting the tender.

[ii] The Tender shall be submitted in person or by Registered Post with A.D.

[iii] The Tender shall not be submitted telegraphically or by FAX.

[iv] The Tender shall be accompanied by the prescribed Earnest Money deposit. The validity of EMD in the form of Bank Guarantee shall be atleast for **240 (Two hundred forty) days** from the date of Tender opening.

[v] The Tender shall be kept valid for a minimum period of **180 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 **2 (two) years** shall be furnished.

[viii] Tender shall be accompanied by Photostat copy of **latest type test certificates** (for the tests, carried out on the tendered equipment/materials, 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 prices 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-4(ii) of Part-II..**

[x] The Tenderer should quote '**Variable'** price as per IEEMA PVC only and the price should be kept valid for a minimum period of **180 days** from the date of opening of the tender.

(xi) Tender shall be accompanied by legibly written **user's certificate** to prove the satisfactory operation of the offered equipment/materials for a **minimum period of 2 (two) years** from the date of commissioning/use 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 & 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. Scheme/Projects

The materials/equipment covered in this specification shall come under "O&M WORKS / CONSTRUCTION WORKS"

SECTION – III

[LIST OF ANNEXURES]

The following schedules and proformas 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 terms and conditions to accompany Section-II of Part-I	ANNEXURE-II
3	Schedule of Quantity and Delivery	ANNEXURE-III
4	Abstract of price component [to accompany Part-II of this specification]	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

ANNEXURE - I

DECLARATION FORM

To

Sr.General Manager, CPC,
OPTCL, Head Quarter Office ,
Bhoinagar,Bhubaneswar

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/equipment/materials 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/equipment/materials 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 purchased/ downloaded a copy of the specification 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 ORISSA 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 `2011

Yours faithfully

Signature of the Tenderer with seal of the company

[This form should be dully filled up by the tenderer and submitted along with the original copy of the tender]

* (Strikeout whichever is not applicable).

ANNEXURE-II

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

1	(a) OPTCL Money Receipt No. & Date towards purchase of Tender. (b) Earnest money furnished. **(A)** Bank Guarantee, **(B)** Bank Draft.	
2	Manufacturer's supply experience including user's certificate furnished or not.[As per clause No.7 of Section-II.]	Yes/No
3	Deviations to the specification if any[list enclosed or not] [As per clause-9 of the Section-II] (a) Commercial (b) Technical.	Yes/No Yes/No
4	**Delivery** (period in months from the date of purchase order)	
5	**Guarantee:-** Whether agreeable to OPTCL's terms. [As per clause-18 of Section-II]	Yes/No
6	Whether agreeable to furnish Composite B.G. in case his tender be successful [As per clause-19 of Section-II]	Yes/No
7.	**Terms of payment:-** Whether agreeable to OPTCL's terms or not [As per clause-21 of Section-II]	Yes/No.
8.	Nature of price:- PV	Yes/No
9.	**Penalty:-** Whether agreeable to OPTCL's terms or not (As per clause-22 of Section-II)	Yes/No
10.	Whether STCC/ P&L A/C, Balance Sheet for the required period are furnished as per clause-25 of Section-II	Yes/No
11.	**Validity: -** Whether agreeable to OPTCL's terms or not [As per clause-28 of Section-II	Yes/No
12.	Whether recent type test certificates from any Government approved laboratory are furnished or not. [As per clause-34[viii] of section-II]	Yes/No
13.	Whether guaranteed technical particulars in complete shape are furnished or not	Yes/No
14.	Whether dimensional design/drawings furnished or not	Yes/No
15.	Whether materials are ISI/ISO marked.	Yes/No
16.	Manufacturer's name and it's trademark.	Yes/No
17.	Whether registered under Orissa Sales Tax Act. 1947/Orissa VAT Act-2005	Yes/No
18.	Whether declaration form duly filled in furnished or not.	Yes/No.

Place **Signature of the Tenderer**

Date:- With seal of the Company

ANNEXURE-III

SCHEDULE OF QUANTITY AND DELIVERY

(To be filled up by the tenderer)

SL No	Description of materials	Quantity required	Desired Delivery	Destination	Remarks.
1	2	3	4	5	6
LOT-I LOT-II LOT-III LOT-IV					

Place:

Date:

Signature of Tenderer
with seal of Company

ANNEXURE-IV

ABSTRACT OF PRICE COMPONENT [TO ACCOMPANY PRICEBID]

1	Price basis	F.O.R. Purchaser's destination Stores/site.
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 on supervision of erection testing and commissioning	
10.	Nature of price.	

Date: **Signature of Tenderer**
With seal of company

Place

NB:- Abstract of price component shall be done for equipment/material offered, for testing & commissioning charges, if any. All the above prices will be taken during bid price evaluation.

ANNEXURE-V.

SCHEDULE OF PRICES TENDER SPECIFICATION No.

Item No.	Description.	Qty (unit)	Unit Ex-factory Price.	Unit Packing & Forwarding.	Unit Freight Charges.	Unit Insurance Charges.	Unit landing cost at destination store/site excluding ST,ED & Entry tax.
1.	2.	3.	4.	5.	6.	7.	8.

Unit E.D.	Unit S.T.	Unit Entry Tax.	Unit landing Cost including All taxes & Duties.	Total landing cost Including all taxes & duties.
9.	10.	11.	12= (8+9+10+11)	13= (3X12)

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 will not be acceptable and the **offer will be rejected.**

7.Test charges (Routine/type) if any, mandatory spares, if any, maintenance equipment/material charges, if any, as per Technical Specification, supervisory charges, if any,(Supervision of erection & commissioning charges per equipment/material & the same charges per day) shall be indicated separately, 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 No: Date Bank Guarantee

1 In accordance with invitation to Bid No. Dated of ORISSA POWER TRANSMISSION CORPORATION LTD. [OPTCL][herein after referred to as the OPTCL for the purchase of _____

Messers_____

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 days [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 Sr. General Manager [Procurement] ORISSA POWER TRANSMISSION CORPORATION LTD_____

[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

[Indicate the name of the bank]

to 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 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 guarantee

[Indicate the Name of the Bank]

herein contained shall remain in full force and effect during the aforesaid period of **240 days [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, ORISSA POWER TRANSMISSION CORPORATION LTD. 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

[Indicate the name of the Bank]

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 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

[Indicate the name of the Bank]

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 invokable at our place of business at Bhubaneswar in the state of Orissa.

Dated _____ Day of _____

For_____

[Indicate the name of Bank]

Witness ((Signature, names & address)

1.

2

ANNEXURE-VII

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

This Guarantee Bond is executed this_____day of_____ 2011 by us the _____Bank at _____

P.O._____P.S._____

District_____State_____

1. WHEREAS the ORISSA POWER TRANSMISSION CORPORATION LTD., 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._____

[hereinafter called "The Supplier"] which shall include its successors & 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 contract price of the said agreement.

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 not withstanding 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 do 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, ORISSA POWER TRANSMISSION CORPORATION LTD. 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 these provisions have effect of so relieving us.

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

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,[_____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 invokable at our place of business at Bhubaneswar in the state of Orissa.

Date at _____the, _____day of _____

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 Orissa 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.

ANNEXURE-IX

DATA ON EXPERIENCE

[a] Name of the manufacturer.

[b] Standing of the firm as manufacturer of equipment/material quoted.

[c] Description of equipment/material similar to that quoted [supplied and installed during the last two years with the name of the organizations to whom supply was 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 and present status.

[g] A list of purchase orders, executed during last three years.

[h] A list of similar equipments (as Quoted)of specified rating, voltage class, Impulse level, short circuit rating, / similar material (as quoted)Designed, manufactured, tested and commissioned which are in successful operation for **at least two years from the date of commissioning with legible user's certificate**. User's 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

ANNEXURE-X

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

SL. No	Particulars	Quantity	Unit delivery rate	Total price

P l a c e :

Date:

Signature of Tenderer

Name, Designation, Seal

ANNEXURE-XI

SCHEDULE OF INSTALLATIONS.

Rating of Material	Rated Voltage	Place of installation and complete postal address	Year of commissioning

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

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 PVC.**

(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/materials, 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/materials 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/materials/materials damaged or lost which will be reported by the Consignee within 30 days of receipt of the equipment/materials/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 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 (Annexure-V of Section-III) 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.

ORISSA POWER TRANSMISSION CORPORATION LTD

SECTION - IV

TECHNICAL SPECIFICATION

FOR

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

LOT-II- ALL ALUMINIUM ALLOY CONDUCTOR 'PANTHER' (37/3.15 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 37/4 MM

3.1 GENERAL

This specification covers manufacture, testing supply and delivery at destination of "AAAC ZEBRA (37/4MM)" as per clauses of this section required for Transmission lines.

3.2 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 overhead transmission 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

3.3 TECHNICAL PARTICULARS OF CONDUCTOR :

The guaranteed technical particular of conductor shall be as under :

COMPOSITE CONDUCTOR :-All Aluminium Alloy Conductor of size 37/4mm(Zebra)

Nominal Aluminium Alloy area	-	465 Sq. mm
Stranding and wire diameter	-	37/4 mm Aluminium Alloy
No. of aluminium alloy Strands		
Centre Wire		1
Ist layer		6
2nd layer		12
3rd layer		18
4th layer		-
Sectional area of aluminium alloy		465 mm2
Approximate overall diameter		28 mm
Approximate weight		1280.5 Kg/Km
Calculated D.C. resistance at 20deg. C		0.07130 ohm/km.
Approximate calculated breaking load		136.38 KN(Min)

Co-efficient of linear expansion of Aluminium alloy	23 x $10^{-6 \text{ per deg}}$ C
Final modulus of elasticity	0.5814x10 ^{6}kg/cm^{2}
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
Electrical volume resistivity at 20degC ohms-mm2/meter	0.0325 (max)
Density of aluminium alloy wire at 20deg C	2.7kg/dm3

Lay Ration of Aluminium Alloys Layers

	Maximum	Minimum
Ist layer of 6 wires	17	10
2nd layer of 12 wires	16	10
3rd layer of 18 wires	14	10
4th layer of 24 wires	_	_

Strands :	37/4 mm
Materials	Aluminium alloy
Diameter	
Standard	4 mm
Maximum	4.04 mm
Minimum	3.96 mm
Cross sectional area for nominal diameter of wire	12.57 mm2

Weight	33.93 kg/Km
Minimum breaking load (before stranding) -	3.88KN
(After Stranding)-	3.69KN
D.C. resistance at 20°C	2.663 ohms/km(max)

3.4 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.

AAAC shall comprise of 37 strands of 4 mm dia of aluminium alloy. The standard value of resistivity of aluminium alloy wire shall be maxm 0.0325 ohms-mm2 per meter at 20° C. The electrical conductivity at 20° C shall be 53.5% (standard) of IACS. The conductor shall confirm to IS-398 (Part IV) with it's lattest ammendments and confirm 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**.

3.5 TOLERANCE :

a)The following tolerance shall be permitted on standard dia

Tolerance on standard dia of alloy wire	+_ one percent.

3.6 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 upto 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^2.

3.7 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 fulfill the mechnical 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.

3.8 TORSION :

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

3.9 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.

3.10 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.

3.11 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℃ & current values for conductor temp.of 60deg centigrade(ambient temp. 40° + temperature rise of 20℃ above ambient) & similarly for 65 deg.C ,70deg.C etc 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.**

3.12 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 aluminum 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.

3.13 STANDARD LENGTH : The conductor shall be supplied in the standard length of **1800 meters. Tolerance on standard length permitted is +_ 5% .** in the length of any one conductor length .Further no single conductor length in respect of such +_ 5% supply in random lengths ,shall be shorter than 50% of the standard lengths .

3.14 **TESTS**

3.14.1 **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 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.**

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, Chenai 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.

3.14.1.1 **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.

3.14.1.2 **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.

3.14.1.3 **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.

3.14.1.4 **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.

3.14.1.5 **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 _+ 2℃. Temperature readings shall be taken at the

beginning and end of each held period. Different temperatures can be considered if appropriate corrections are applied. (Correct by a factor (TI-TO x).

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 calipers 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 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. Note : Slack may cause the outer lay wires to bulge outwards by several millimeters. 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.

3.14.1.6- **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.)

3.14.2 **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 equipments/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.

3.14.2.1 **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.

3.14.2.2 **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.

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

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

3.14.2.4 **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.

3.14.2.5 **Elongation Test** :

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

3.14.2.6 **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.

3.14.2.7 **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.

3.14.2.8 **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.

3.14.2.9 -**Wrap test** on aluminium alloy strands will be carried out as per IEC-104.

3.15 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 fulfill 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 of 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 doesnot fulfill any test requirements of this specification & IS then he may reject the entire Lot of conductors ordered on the manufacturer without going for retesting.

3.16 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.

3.17 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 supplier s & 20 days for outside state suppliers) for offer for inspection alongwith the calibration reports of the test equipments to be used during testing for deputing officers for such inspection.

3.18 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.

3.19 GUARANTEED TECHNICAL PARTICULARS :

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

3.20 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.

3.21 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.

3.22. 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.

3.23.1 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.

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

3.23.3 The drums shall be suitable for wheel mounting.

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

3.24 CONSTRUCTION OF DRUMS :

3.24.1 Wooden Components :

3.24.1.1 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.

3.24.2 Flanges :

3.24.2.1 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.

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

3.24.3 SPINDLE HOLE :

3.24.3.1 Spindle hole shall be provided at the centers 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.

3.24.4 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.

3.25 BARREL **:**

3.25.1 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.

3.26 BARREL STUDS **:**

3.26.1 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.

3.27 IRON COMPONENTS **:**

3.27.1 Normally, the butts on the studs shall stand pround 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 buts.

3.28 PROTECTIVE ARRANGEMENT **:**

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

3.28.2 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.

3.28.3 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.

3.28.4 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.

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

3.28.6 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 grains 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.

3.28.7 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.

3.28.8 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.

1. MAKER'S NAME AND ADDRESS
   FOR
   i) Aluminium alloy rods
   ii) Complete conductor

2. SPECIFICATION TO WHICH
   i) Raw materials pertain
   ii) WheatherConductors are to be manufactured as per the relevant Indian standard (IS) & as per the technical specification at section IV above.
   iii) WheatherConductors are to be Tested as stipulated in the technical specification at section IV above.

3. PARTICULARS OF ALUMINIUM

   ALLOY **STRANDS**
   i) Diameter
   a) Standard (mm)
   b) Maximum (mm)
   c) Mininmum (mm)
   ii) dard 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/mm2)

4. <u>Particulars of AAAC of size 37/ 4mm</u>

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/cm2)

b) AAAC size 37/4mm

xiv) Coefficient of linear Expansion.

a) Aluminium alloy Per 0℃

b) AAA Conductor 37/4mm (size per 0℃)

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 percent)

iii) Random length in
percent 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.

8. 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 tention 25% of the
Breaking strength within a
Period of 20 years and
Detail calculation ofCreepage.

14. Other particulars if any

Date :

Place : Full Signature of the Tenderer
With seal

ANNEXURE-III

Sl. No.	Item Description	Quantitiy	Destination	Desired delivery (Months from the date of Placement of Purchase Order)
1.	LOT-I-A.A.A.C. Zebra (37/4mm)	664 kms	Any stores of OPTCL inside the state of Orissa	Four months
2.	LOT-II-A.A.A.C PANTHER (37/3.15mm)	596.7 kms	Any stores of OPTCL inside the state of Orissa	Four months

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 m2
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 dayTemperature and full wind	2.00
	This is as per Indian Electricity Rules, 1956	
5.	Relative Humidity.	
	Maximum	100 percent
	Minimum	60 percernt
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

SECTION - IV

TECHNICAL SPECIFICATION

FOR

LOT-II- ALL ALUMINIUM ALLOY CONDUCTOR

SIZE 37/3.15 MM

3.1 GENERAL

This specification covers manufacture, testing supply and delivery at destination of "AAAC PANTHER (37/3.15mm)" as per clauses of this section required for Transmission lines.

3.2 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 overhead transmission 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

3.3 TECHNICAL PARTICULARS OF CONDUCTOR :

The guaranteed technical particular of conductor shall be as under :

COMPOSITE CONDUCTOR :-All Aluminium Alloy Conductor of size 37/3.15mm(Panther)

Nominal Aluminium Alloy area	-	288 Sq. mm
Stranding and wire diameter	-	37/3.15 mm Aluminium Alloy
No. of aluminium alloy Strands		
Centre Wire		1
Ist layer		6
2nd layer		12
3rd layer		18
4th layer		-
Sectional area of aluminium alloy		288 mm2
Approximate overall diameter		22.05 mm
Approximate weight		794.05 Kg/Km
Calculated D.C. resistance at 20deg. C		0.1182 ohm/km.
Approximate calculated breaking load		84.71 KN(Min)

Co-efficient of linear expansion of Aluminium alloy	23 x $10^{-6 \text{ per deg}}$ C
Final modulus of elasticity	0.5814x10 ^{6}kg/cm^{2}
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
Electrical volume resistivity at 20degC ohms-mm2/meter	0.0325 (max)
Density of aluminium alloy wire at 20deg C	2.7kg/dm3

Lay Ration of Aluminium Alloys Layers

	Maximum	Minimum
Ist layer of 6 wires	17	10
2nd layer of 12 wires	16	10
3rd layer of 18 wires	14	10
4th layer of 24 wires	_	_

Strands :	37/3.15 mm
Materials	Aluminium alloy
Diameter	
Standard	3.15 mm
Maximum	3.18 mm
Minimum	3.12 mm
Cross sectional area for nominal diameter of wire	7.793 mm2

Weight 21.04 kg/Km

Minimum breaking load
(before stranding) -2.41KN
(After Stranding)- 2.29KN

D.C. resistance at 20°C 4.290ohms/km(max)

3.4 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.

AAAC shall comprise of 37 strands of 3.15 mm dia of aluminium alloy. The standard value of resistivity of aluminium alloy wire shall be maxm 0.0325 ohms-mm2 per meter at 20° C. The electrical conductivity at 20° C shall be 53.5% (standard) of IACS. The conductor shall confirm to IS-398 (Part IV) with it's lattest ammendments and confirm 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**.

3.5 TOLERANCE :

a)The following tolerance shall be permitted on standard dia

Tolerance on standard dia of alloy wire +_ one percent.

3.6 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 upto 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^2.

3.7 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 fulfill the mechnical 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.

3.8 TORSION :

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

3.9 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.

3.10 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.

3.11 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℃ & current values for conductor temp.of 60deg centigrade(ambient temp. 40° + temperature rise of 20℃ above ambient) & similarly for 65 deg.C ,70deg.C etc 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.**

3.12 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 aluminum 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.

3.13 STANDARD LENGTH : The conductor shall be supplied in the standard length of **2400 meters. Tolerance on standard length permitted is +_ 5% .** in the length of any one conductor length .Further no single conductor length in respect of such +_ 5% supply in random lengths ,shall be shorter than 50% of the standard lengths .

3.14 **TESTS**

3.14.1 **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 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.**

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, Chenai 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.

3.14.1.1 **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 50%of the minimum specified 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 84.71 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.

3.14.1.2 **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.

3.14.1.3 **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 _+ 2°C. Temperature readings shall be taken at the beginning and end of each held period. Different temperatures can be considered if appropriate corrections are applied. (Correct by a factor (TI-TO x).

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 calipers 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 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. Note : Slack may cause the outer lay wires to bulge outwards by several millimeters. 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.

3.14.1.4- **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.)

3.14.2 **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 equipments/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.

3.14.2.1 **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.

3.14.2.2 **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.

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

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

3.14.2.4 **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.

3.14.2.5 **Elongation Test** :

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

3.14.2.6 **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.

3.14.2.7 **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.

3.14.2.8 **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.

3.14.2.9 -**Wrap test** on aluminium alloy strands will be carried out as per IEC-104.

3.15 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 fulfill 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 of 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 doesnot fulfill any test requirements of this specification & IS then he may reject the entire Lot of conductors ordered on the manufacturer without going for retesting.

3.16 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.

3.17 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 supplier s & 20 days for outside state suppliers) for offer for inspection alongwith the calibration reports of the test equipments to be used during testing for deputing officers for such inspection.

3.18 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.

3.19 GUARANTEED TECHNICAL PARTICULARS :

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

3.20 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.

3.21 MARKING :

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

o) Contract/ Specification No.

p) Name and address of the consignee.

q) Name of the destination store/place.

r) Maker's name and address & trade-mark.

s) Drum number.

t) Name & size of the conductor

u) Length of the conductor in meters.

v) Gross weight of the drum with protective Lagging including conductor.

w) Weight of the empty drum with protective lagging.

x) Net weight of the conductor.

y) Arrow marking for unwinding.

z) Position of the conductor end.

aa) Lot number.

bb) Date of packing.

3.23. 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.

3.24.5 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.

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

3.24.7 The drums shall be suitable for wheel mounting.

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

3.25 CONSTRUCTION OF DRUMS :

3.25.1 Wooden Components :

3.25.1.1 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.

3.25.2 Flanges :

3.25.2.1 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.

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

3.25.3 SPINDLE HOLE :

3.25.3.1 Spindle hole shall be provided at the centers 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.

3.25.4 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.

3.25 BARREL **:**

3.25.2 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.

3.26 BARREL STUDS **:**

3.26.2 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.

3.27 IRON COMPONENTS **:**

3.28.9 Normally, the butts on the studs shall stand pround 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 buts.

3.29 PROTECTIVE ARRANGEMENT **:**

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

3.29.2 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.

3.29.3 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.

3.29.4 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.

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

3.29.6 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 grains 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.

3.29.7 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.

3.29.8 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.

10. MAKER'S NAME AND ADDRESS
FOR
i) Aluminium alloy rods
ii) Complete conductor

2. SPECIFICATION TO WHICH
i) Raw materials pertain
ii) WheatherConductors are to be manufactured as per the relevant Indian standard (IS) & as per the technical specification at section IV above.
iii) WheatherConductors are to be Tested as stipulated in the technical specification at section IV above.

3. PARTICULARS OF ALUMINIUM

ALLOY **STRANDS**

iv) Diameter
a) Standard (mm)
b) Maximum (mm)
c) Mininmum (mm)
v) dard Sectional Area (Sq. mm)

vi) Weight per KM
a) Standard (Kg)
b) Maximum (Kg)
c) Minimum (Kg)

IV) Minimum ultimate Tensile strength (Kg)

VI) Minimum Breaking load For wire of
a) Standard dia (Kg)
b) Minimum dia (Kg)
vi) Final stress in Aluminium alloy Wires (Kg/Sq.mm)

viii) Calculated resistance

Per KM. at 20° C when Corrected to standard Weight.
d) Standard (Ohm)
e) 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.

e) Electrical resistance
f) Elongation
g) Ultimate tensile strength
(in Kg/mm2)

4. <u>Particulars of AAAC of size 37/ 3.15mm</u>

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.)
xiii) Calculated DC resistance
Per km of conductor when
Corrected to standard
Weight at 20° C (Ohm)
xiv) Nominal Aluminum alloy
Area (Sq.mm)
xv) Sectional area of

Aluminium alloy (Sq.mm)

xvi) Total sectional area (Sq. mm)

xvii) Mean Lay-ratio :

a) First aluminium Alloy layer

b) Second Aluminium Alloy layer

c) Third aluminium Alloy layer

d) Fourth aluminium Alloy layer

xviii) 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/cm2)

b) AAAC size **37/3.15mm**

xiv) Coefficient of linear Expansion.

c) Aluminium alloy Per 0℃

d) AAA Conductor **37/3.15mm** (size per 0℃)

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)

h) 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 percent)

iii) Random length in
percent 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.

8. 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 tention 25% of the

Breaking strength within a
Period of 20 years and
Detail calculation ofCreepage.

14. Other particulars if any

Date :

Place : Full Signature of the Tenderer
With seal

ANNEXURE-III

Sl. No.	Item Description	Quantitiy	Destination	Desired delivery (Months from Placement of Purchase Order)
1.	**LOT-I**-A.A.A.C. Zebra (37/4mm)	664 kms	Any stores of OPTCL inside the state of Orissa	Four months
2.	**LOT-II**-A.A.A.C PANTHER (37/3.15mm)	596.7 kms	Any stores of OPTCL inside the state of Orissa	Four months

SCHEDULE – C

1.		conductor.
	c) Nominal area	288 Sq.mm Panther
	d) Stranding	37/3.15 mm
2.	Normal Span	320 meters
	Wind Span	320 meters
2.1	Wind Span	
	a) Max.	500 meters
	f) Min.	50 meters
11.	Wind Pressure on full Projected area.	4/52 kg per m2
12.	Temperature	
	d) Minimum	5°C
	e) Maximum	67°C
	f) Every day	32°C
13.	Factors of safety : Minimum	
	iv) Every day temperature and non wind.	4.00
	v) Minimum temperature and 2/3 maximum wind :	2.00
	vi) Every dayTemperature and full wind	2.00
	This is as per Indian Electricity Rules, 1956	
14.	Relative Humidity.	
	Maximum	100 percent
	Minimum	60 percernt
15.	Isoceramic level	100/Years
16.	Number of rainy days per year	100 days
17.	Average rainfall per year	1150 mm Approx.
18.	Altitude	Less than 350 Meters