ODISHA POWER TRANSMISSION CORPORATION LTD

OFFICE OF THE SENIOR GENERAL MANAGER,

CENTRAL PROCUREMENT CELL,

JANPATH, BHUBANESWAR - 751022

TENDER SPECIFICATION FOR

UPGRADATION OF EXISTING ACSR PANTHER CONDUCTORS BY EQUIVALENT SIZE HTLS (HIGH TEMPERATURE LOW SAG) CATEGORY CONDUCTOR IN THE FOLLOWING EHT LINES OF OPTCL.

Name of the Package	Name of the Line.	Circuit KM of the Line.
HTLS Package	132KV Chandaka- Nimapara. Single circuit (S/C)	56.28
	132 KV Ranasingpur- Kesura. Single circuit (S/C)	24.04
	132 KV Kesura- Nimapara. Single circuit (S/C)	42.55

E-Tender Notice No.40/2016-17

(E tendering mode only)

BID SPECIFICATION NO

Sr.G.M-CPC-TENDER-UPGRADATION OF CONDUCTOR-

40/2016-17.

PART – I

SECTION – I : INSTRUCTION TO TENDERERS

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

SECTION – III SPECIAL CONDITION OF CONTRACT. (SCC)

SECTION – IV: SCHEDULE OF FORMATS (COMMERCIAL)

SECTION – V : TECHNICAL SPECIFICATION &GTP

PART – II PRICE BID.

Request for online tender documents – From dt-20.10.2016 (16.00 Hrs) to dt-18.11.2016(12.30Hrs)

Last date of submission of online tender - dt-18.11.2016(13.00Hrs)
Date of opening of Tender - 18.11.2016(15.00 Hrs

ODISHA POWER TRANSMISSION CORPORATION LTD.

REGD. OFFICE: JANPATH, BHUBANESWAR – 751022,

ODISHA

E-TENDER NOTICE NO. 40 / 2016-17

For and on behalf of ODISHA POWER TRANSMISSION CORPORATION LIMITED, Sr. G.M. (C.P.C.) invites Tenders from manufacturers of HTLS conductor having experience of stringing of EHT conductor at 110KV or above voltage class either of their own or as joint venture for replacement of the existing ACSR panther conductor by equivalent size HTLS (High Temperature low sag) conductor except GAP conductor in the following EHT lines of OPTCL. The weight/Km, of the HTLS conductor must not exceed the weight/Km of existing ACSR panther conductor.

Sl.No	Name of the Package	Name of the Line.	Circuit KM of the Line.
1	HTLS Package	132KV Chandaka- Nimapara. Single circuit (S/C)	56.28
2		132 KV Ranasingpur- Kesura. Single circuit (S/C)	24.04
3		132 KV Kesura- Nimapara. Single circuit (S/C)	42.55

The interested bidders would be required to enroll themselves on the tender portal **www.tenderwizard.com/OPTCL** .Complete set of bidding documents are available at **www.tenderwizard.com/OPTCL** from 20.10.2016 **(16.00 Hrs) to dt-18.11.2016(12.30Hrs).** Interested manufacturers may visit OPTCL's official web site **http://www.optcl.co.in** and **www.tenderwizard.com/OPTCL** for detail specification.

N.B. All subsequent corrigendum / addendums to the tender notice shall be floated in the OPTCL's official web site **http://www.optcl.co.in** and **www.tenderwizard.com/OPTCL** only.

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

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

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

The bidders shall have to submit non-refundable amount of Rs.5750/- (Rupees Five thousand & seven hundred Fifty) only including Service Tax @ 15%) towards the tender processing fee to K.S.E.D.C.Ltd, in e-payment mode. The e-payment of above amount is to be made to enable the bidder to down load the bid proposal sheets & bid document in electronic mode.

The bidder shall deposit the tender cost, tender processing fee & EMD BG prior to last date & time for submission of bid as notified in tender notice.

The demand draft/pay order for tender cost , processing fees are to be submitted along with the EMD at the office of the undersigned on or before the last date & time of submission of tender.

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

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

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

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

SENIOR GENERAL MANAGER,

CENTRAL PROCUREMENT CELL

Sl. No	Tender Specification No.	Description of work	Quantity	Earnest Money Deposit (In Rs.)	Cost of Tender document	Tender processing fees.	Last date of receipt & opening of tender
1	Sr.G.M-CPC-TENDER-UPGRADATION OF CONDUCTOR-/40/2016-17	Up gradation of existing ACSR panther conductor by equivalent size of HTLS conductor except GAP conductor after dismantling the existing ACSR panther conductor in the above mentioned EHT lines of OPTCL, with supply of hardware and accessories, tools & tackles and stringing by HTLS conductor which include the survey of the EHT lines	132KV Chandaka-Nimapara. Single circuit (S/C)= 56.28 Ckt. KMs.	Rs 24,24,847/-	Rs10000/- + VAT 5% = Rs10500/-	Rs5000/- +Service Tax@15%=Rs 5750/-	Receipt on dt **18.11.2016 (13.00Hrs)** & opened on dt **18.11.2016 (15.00Hrs)**
			132 KV Ranasingpur-Kesura. Single circuit (S/C))= 24.04 Ckt. KMs.	Rs 10,35,773/-			
			132 KV Kesura-Nimapara. Single circuit (S/C))= 42.55 Ckt. KMs.	Rs 18,33,284/-			

SENIOR GENERAL MANAGER

CENTRAL PROCUREMENT CELL

COMMERCIAL SPECIFICATION.

P A R T – I

S E C T I O N - I

INSTRUCTIONS TO TENDERER

1. Submission of Bids:-

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

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

1. For all the users it is mandatory to procure the Digital Signatures of Class-III.
2. Contractors / Vendors / Bidders / Suppliers are requested to follow the below steps for Registration:

a. Click "Register", fill the online registration form.

b. Pay the amount of Rs. 2300/- in favour of K S E D C Ltd .

c. Send the acknowledgment copy for verification.

d. As soon as the verification is being done the e-tender user id will be enabled.

3. After viewing Tender Notification, if bidder intends to participate in tender, he has to use his e-tendering User Id and Password which has been received after registration and acquisition of DSCs.
4. If any Bidder wants to participate in the tender he will have to follow the instructions given below:

a. Insert the PKI (which consist of your Digital Signature Certificate) in your System.

(Note: Make sure that necessary software of PKI be installed in your system).

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

c. Go to Start > Programs > Internet Explorer.

d. Type **www.tenderwizard.com/OPTCL** in the address bar, to access the Login Screen.

e. Enter e-tender User Id and Password, click on "Go".

f. Click on "Click here to login" for selecting the Digital Signature Certificate.

g. Select the Certificate and enter DSC Password.

h. Re-enter the e-Procurement User Id Password

5. To make a request for Tender Document Bidders will have to follow below mentioned steps.

- Click "Un Applied" to view / apply for new tenders.
- Click on Request icon for online request.

6. After making the request Bidders will receive the Tender Documents which can be checked and downloaded by following the below steps:

- Click to view the tender documents which are received by the user.
- Tender document screen appears.
- Click "Click here to download" to download the documents.

7. After completing all the formalities Bidders will have to submit the tender and they must take care of following instructions.

- Prior to submission, verify whether all the required documents have been attached and uploaded to the particular tender or not.
- Note down / take a print of bid control number once it displayed on the screen

8. Tender Opening event can be viewed online.

9. Competitors bid sheets are available in the website for all.

10. **For any e-tendering assistant contact help desk number mentioned below.**

- Bangalore – 080- 40482000.

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

CONTENTS

A. INTRODUCTION

1.0 General Information & Scope

1.1 **General Information.**

1.1.1 The **ODISHA POWER TRANSMISSION CORPORATION LIMITED**, hereinafter called 'OPTCL'/'OWNER' will receive bids for replacement of the existing ACSR Panther conductor by HTLS Conductor as set forth in the technical specification at section-V. All bids shall be prepared and submitted in accordance with these instructions. The tender is invited in **two-part** basis i.e. (1) Techno-commercial bid consisting all the documents except price bid & (2) Price Bid. Both the bids duly sealed separately shall be kept inside the third sealed cover with super scribed "Tender specification No. & Date of Opening".

Sl.No	Name of the Package	Name of the Line.	Circuit KM of the Line.
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3		132 KV Kesura- Nimapara. Single circuit (S/C)	42.55

1.2 **Scope**

1.2.1 The scope of work inter-alia includes:

(i) Design, manufacturing, testing & supply of High Temperature Low Sag (HTLS) conductor except GAP conductor as well as required associated hardware fittings and accessories viz. suspension clamps, dead end clamps, mid-span compression joints, repair sleeves, T-Connectors, vibration dampers, etc.

(ii) Survey & profiling of existing line route using Total stations, verification of availability of statutory electrical clearances using PLS-CADD software; de-stringing of existing Conductor including dismantling of associated fittings & accessories from the above lines and stringing of each circuit with HTLS conductor except GAP conductor along with associated fittings and accessories.

1.2.2 The material to be supplied on final destination at site basis as covered in the bidding documents shall be designed, manufactured, tested, supplied and installed as per the requirements specified in this volume. The requirements, conditions, appendices etc. as specified in other Sections of bidding documents shall also apply to.

1.2.3 The standard type disc insulators (90 & 120 KN) along with hardware fittings (except suspension clamps at suspension tower and dead end clamps at tension tower) of the existing line shall be used for re-conductoring of line with HTLS conductor. The existing insulators and hardware fittings shall be inspected by the contractor for any defects and those found defective shall be replaced after approval of engineer-in-charge with fresh items to be supplied by Owner.

1.2.4 The ACSR PANTHER conductor removed from the existing line is envisaged for re-use/ utilization by the Owner in other projects. Proper handling and safety of the conductor during de-stringing, storage at site, measurement of conductor lengths, rewinding on drums at site and safe transportation to Owners designated stores along the transmission line shall be included in the scope of work.

1.2.5 The Owner shall arrange shut down of one circuit at a time and the other circuit shall be kept under charged condition. The contractor shall de-string the existing conductor and restring the circuit with the HTLS conductor section by section and restore the line in original conditions as per program finalized in co-ordination with site. **Shut down will be allowed form 5 AM to 5 PM on daily basis for the replacement work.** The contractor has to do the stringing within this interval so that line can be charged at 5 PM every day. However the guaranteed shut down period for each day is eight hours.

Appropriate safety measures along with necessary safety tools and equipment's to carry out de stringing and stringing operations under the above conditions including mechanical/ structural safety of the towers, shall be the responsibility of the contractor. Necessary calculations shall be carried out by the contractor to ensure that by replacing the existing ACSR PANTHER conductor with the HTLS conductor offered, the

loadings on the towers due to conductor tensions as well as loads on account of the re-conductoring activities shall be within specified limits. These calculations shall be submitted by the bidder along with bid. The calculations will be checked by PLS CADD software, if found wrong the bid will be rejected.

1.2.6 The materials covered in this package shall be supplied complete in all respects, including all components, fittings and accessories which are necessary or are usual for their efficient performance and satisfactory maintenance under the various operating and atmospheric conditions. Such parts shall be deemed to be within the scope of the Contract, whether specifically included or not in the Specification or in the Contract Schedules. The Supplier shall not be eligible for any extra charges for such fittings, etc.

1.2.7 The entire stringing work of conductor shall be carried out by tension stringing technique except where geography/ topographical or other site constraints do not permit use of tension stringing equipment. In such cases manual stringing along with other appropriate tools and equipments may be employed with the approval of Owner's site in charge. The contractor shall indicate in their offer, the sets of tension stringing equipment he is having in his possession and the sets of stringing equipment he would deploy exclusively for this package which under no circumstance shall be less than the number and capacity requirement indicated in Qualifying Requirements for Bidder.

2. MINIMUM QUALIFYING REQUIREMENTS OF BIDDERS

2.0 TECHNICAL REQUIREMENTS

2.1 (a) The Qualified Manufacturer shall be a manufacturer of conductor for the last five years. The Qualified Manufacturer's experience should include the following:

(i) The Qualified Manufacturer should have manufactured, tested and supplied at least 100% of the tendered quantity of ACSR/ AAAC/ High Temperature Low Sag (HTLS) conductor except GAP conductor having at least same or more number of strands as that of the conductor being offered in the package during last five (5) years as on the date of bid opening,

and

(ii) The Qualified Manufacturer should have manufactured, tested and supplied at least 50% of High temperature low sag conductor (HTLS) **except GAP** conductor of same technology as that of the conductor being offered in this package having minimum 19.5 sq. mm. Aluminum cross section area, in last five (5) years as on the date of bid opening and the same should have been in satisfactory operation for a period of at least two (2) years as on the date of bid opening**. (OR)**

"In case manufacture not having facility to manufacture HTLS conductor, they can have authorization from principal manufacturer to import & supply the HTLS conductor. In that case 2.1 (c) is applicable.

2.1 (b) To be qualified for award of contract, Bidder shall provide evidence to the satisfaction of the Owner of their capability and adequacy of resources to carry out the contract effectively.

2.1(C)In case of bid by a Qualified Licensee /approved strander of a Qualified Manufacturer (Licensor)/ **Qualified Technology supplier** meeting the qualification requirements set forth in para 2.1(a) (i) & (ii), the Licensee should meet the following conditions:

i) Qualified Licensee shall meet the qualification requirement set forth in para 2.1(a)(i) and shall have adequate design infrastructure and manufacturing facility and capacity and procedures including quality control.

ii) A Qualified Licensee of a Qualified Manufacturer shall comply with all of the following requirements and furnish a joint undertaking by the licensor along with the bidder in its bid as per pro-forma enclosed in **Annexure-XXII**.

a) Any design undertaken by the Licensee shall be approved by the Licensor.

b) Manufacturing by the Licensee shall be done with the approval of the Licensor under a quality assurance programme approved and monitored by the Licensor.

c) ----------.

d) Licensor must guarantee sequential and timely supply of materials and submission of technical information and data as desired by the Owner so as to meet the overall construction schedule and

e) The agreement between Licensee and Licensor (copy to be submitted along with the bid) shall be valid for a period of at least five (5) years after the guarantee period of equipment and materials under supply is over.

2.2 On a separate page, using the following format, each Bidder is requested to list the contracts of a nature similar to the proposed contract(s) for which the Bidder wishes to qualify, undertaken during the last five (05) years. The information is to be summarized for each such contract separately.

(The bidder shall attach documentary evidence, such as copies of utility certificates etc., in support of its general experience as listed in the following Pro-forma for each experience/ Contract just below it)

Format A: Format for the bidders who wish to qualify through route 2.1(a) or (c):

Name of the Bidder (as per 2.1 (a) above) or Qualified Manufacturer for bidders who wish to qualify through route 2.1 (c) above		
1.	No. of years the bidder is a manufacturer of Conductor of similar nature	Last _____ years.
2.	Name of Contract	
3.	Contract Reference No. & Date of Award	
4.	Name and Address of the Purchaser/Utility for whom the Contract was executed by bidder/Partner e-mail ID	

	Telephone No. Fax No.	_____ _____ _____
4.1	***Scope of work involved in the supply of ACSR/AAAC/High Temperature Low Sag(HTLS) Conductor (having at least same or more number of strands as that of the conductor being offered in the package) under the above Contract as per 2.1(a)(i).***	□ Manufacture □Testing □ Supply - for the above Contract for Conductor. (Tick only whichever is/are applicable)
4.1.1	Total no. of Kms. of ACSR/AAAC/High Temperature Low Sag(HTLS) Conductor supplied in the above Contract No. of strands supplied in the Contract detailed above (Bidder to furnish details of only ACSR/AAAC/ High Temperature Low Sag(HTLS) Conductor having at least same or more number of strands as that of the conductor being offered in the package supplied in the Contract)	_____ Kms. _____ Nos.
5.	***Scope of work involved in the supply of High Temperature Low Sag(HTLS) Conductor of same technology as that of the conductor being in the package under the above Contract having 19 or more number of strand as per 2.1.(a)(ii).***	□ Manufacture □Testing □ Supply - for the above Contract for Conductor. (Tick only whichever is/are applicable)

5.1.1	Total no. of Kms. of High Temperature Low Sag(HTLS) Conductor supplied in the above Contract No. of strands supplied in the Contract detailed above Aluminium Cross Section Area of the Conductor detailed above (Bidder to furnish details of only 37 or more number of strands or having minimum 200 sq. mm. Aluminum cross section area supplied in the Contract)	_____ Kms. _____ Nos. _____ sq. mm.
6.	***Date of completion of the above Contract***	_____ (dd/mm/yyyy)
7.	***No. of years the above referred Conductor is in operation as on the date of bid opening***	_____ years
8.	Details of documents submitted in support of stated experience/Contract/ design, infrastructure and manufacturing facilities and capacity and procedures including quality control	

(Use separate sheet for each experience/ Contract)

Format B: Format for the bidders (Manufacturers) who wish to qualify through route 2.1(b):

Name of Licensee of a qualified manufacturer		
1.	Name of Contract	
2.	Contract Reference No. & Date of Award	
3.	Name and Address of the Purchaser/Utility for whom the Contract was executed by bidder/Partner	

	e-mail ID Telephone No. Fax No.	_____ _ _____ _ _____ _
4.	***Scope of work involved in the supply of ACSR/AAAC/High Temperature Low Sag(HTLS) Conductor (having at least same or more number of strands as that of the conductor being offered in the package) under the above Contract***	□ Manufacture □Testing □ Supply - for the above Contract for Conductor. (Tick only whichever is/are applicable)
5.	Total no. of Kms. of ACSR/AAAC/High Temperature Low Sag(HTLS) Conductor supplied in the above Contract No. of strands supplied in the Contract detailed above (Bidder to furnish details of only ACSR/AAAC High Temperature Low Sag(HTLS) Conductor having at least same or more number of strands as that of the conductor being offered in the package supplied in the Contract)	_____ Kms. _____ Nos.
6.	***Date of completion of the above Contract***	_____ (dd/mm/yyyy)
7.	Details of documents submitted in support of stated experience/Contract/ design, infrastructure and	

	manufacturing facilities and capacity and procedures including quality control	
8.	Whether the Manufacturer/Licensee has adequate design infrastructure and manufacturing facility and capacity and procedures including quality control.	□ Yes □ No
9.	Whether Licensee of a qualified manufacturer complies with all of the following requirements:	
10	a) Whether any design undertaken by the Licensee shall be approved by the Licenser.	□ Yes □ No
	b) Whether Manufacturing by the Licensee shall be done with the approval of the Licenser and Owner under a quality assurance programme approved and monitored by the Licenser.	□ Yes □ No
	c) Whether Licensee will furnish back-up guarantee from the licenser for individual and overall performance of all materials supplied under the contract.	
	d) Whether Licenser guarantees sequential and timely supply of materials and submission of technical information and data as desired by the Owner so as to meet the overall construction schedule and	□ Yes □ No
	e) Whether copy of agreement between Licensee and Licenser is submitted along with the bid	
	f) No. of years, after the guarantee period of equipment and materials under supply is over, the agreement between Licensee and Licenser is valid.	□ Yes □ No
	g) Whether Joint Undertaking by the Licensor along with the Licensee (bidder) is submitted along with the bid	
		□ Yes □ No

		_____ Years. □ Yes □ No
11	Details of documents submitted in support of stated experience / Contract / design, infrastructure and manufacturing facilities and capacity and procedures including quality control	

(Use separate sheet for each experience/ Contract)

FINANCIAL CRITERIA

2.3 The bidder should have an average annual turnover of **50%** of the estimated cost of the project in the best three financial years out of the last five financial years reckoned on the date of bid opening as per the audited accounts of the bidder.(excluding current financial year).

3) **COST OF BIDDING**

3.1 The Bidder shall bear all costs and expenses associated with preparation and submission of its bid and the Owner will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

3.1 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.

B. THE BIDDING DOCUMENTS

4 CONTENTS OF BIDDING DOCUMENT

a. The goods and services required, bidding procedures and contract terms are prescribed in the Bidding Document.

In addition to the Notice Inviting Tender (NIT), the Bidding Document is a compilation of the following sections:

a) Instructions to Bidders –ITB (Section-I)

b) General Conditions of Contract –GCC (Section-II)

c) Special Conditions of Contract – SCC (Section-III)

d) Bid Form and Price Schedules (Section-IV)

e) Technical Specifications & GTP (Section-V)

5 UNDERSTANDING OF BID DOCUMENTS

5.1 A prospective Bidder is expected to examine all instructions, forms, terms and specifications in the Bid documents and fully inform himself as to all the conditions and matters which may in any way affect the scope of work or the cost thereof. Failure to furnish all information required by the Tender documents or submission of a Bid not substantially responsive to the Tender document in every respect will be at the Bidder's risk and may result in the rejection of the bid.

5.2 The tender should not be submitted telegraphically or by Fax.

6 CLARIFICATIONS ON BID DOCUMENTS

6.1 If the prospective Bidder finds discrepancies or omissions, in specifications and document or is in doubt as to the true meaning of any part, he shall at once make a request, in writing or by e-mail for an interpretation/clarification, to the Owner within ten days of issue of Tender call notice. The Owner, then, will issue interpretation(s) and clarification(s) as he may think fit in writing. After receipt of such interpretation(s) and clarification(s), the Bidder may submit his bid but within the time and date as specified in the Invitation to Bid. All such interpretations and clarifications shall form a part of the Bidding Document and shall accompany the Bidder's Proposal. A prospective Bidder requiring any clarification on Bidding Document may notify the Owner in writing. The Owner will respond in writing to any request for such clarification of the Bidding Document, which it receives not later than **ten (10) days** prior to the deadline for submission of bids prescribed by the Owner. Written copies of the Owner's response (including an explanation of the query but without identifying its source) will be sent to all prospective Bidders who have received the Bidding Document before **ten (10)days** to the dead line for submission of Bid. It will also be sent by e-mail if the e-mail address is available.

6.2 Verbal clarification and information given by the Owner or his employee(s) or his representative(s) shall not in any way be binding on the Owner.

7 AMENDMENT TO BIDDING DOCUMENT

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

7.2 The amendment will be notified by e-mail at least before **five (5) days** of last date of submission of Bid to all prospective Bidders, which have received the Bidding Document at the address contained in the letter of request for issue of Bidding Document from the Bidders. Owner will bear no responsibility or liability arising out of non-receipt of the same in time or otherwise.

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

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

C. PREPARATION OF BIDS

8 LANGUAGE OF BID

8.1 The bid prepared by the Bidder and all correspondences and documents relating to the bid, exchanged by the Bidder and the Owner shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its pertinent passages. Failure to comply with this may disqualify a bid. For purposes of interpretation of the bid, the English translation shall govern.

9 LOCAL CONDITIONS

9.1 It will be imperative on each Bidder to fully inform himself of all local conditions and factors which may have any effect on the execution of the Contract covered under these documents and specifications. The owner shall not entertain any request for clarifications from the Bidders, regarding such local conditions.

9.2 It must be understood and agreed that such factors have properly been investigated and considered while submitting the Proposals. No claim for financial adjustment to the Contract awarded under these specifications and documents will be entertained by the Owner. Neither any change in the time

schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Owner, which are based on the lack of such clear information or its effect on the cost of the Works to the Bidder.

10 DOCUMENTS COMPRISING THE BID

10.1 The Bidder shall complete the Bid Forms inclusive of **Bid Proposal Sheets, Guaranteed Technical Parameters etc.** furnished in the Bidding Documents, indicating for the goods to be supplied and services to be rendered, a brief description of goods and services, quantity and prices.

10.2 The Bidder shall also submit **documentary evidence** to establish that the Bidder meets the Qualification Requirements as detailed **in Clause 2 above**.

10.3 The **Bid Guarantee** shall be furnished in a separate cover in accordance with **clause 23.0** of Section ITB.

11 SCOPE OF THE PROPOSAL

11.1 The scope of the Proposal shall be on the basis of the Bidder's responsibility, completely covering all the work and materials/equipment specified in the **accompanying Technical Specifications at section-V**. It will include the following -

a) detailed design of the equipment/conductor/ conductor hardware/ conductor accessories.;

b) complete manufacture including shop testing;

c) providing Engineering drawing, data, operational manual, etc. for the Owner's approval;

d) packing and transportation from the manufacturer's works to the site;

e) receipt, storage, preservation and conservation of materials/equipment at the site;

f) dismantling of existing panther conductor & hardware fittings.

g) pre-assembly, if any, erection, testing and commissioning of all the equipment/conductor/accessories/hardware;

h) performance tests on completion of commissioning; and

i) erection and commissioning procedure

j) erection and commissioning programme.

11.2 Bids containing deviations from provisions relating to the following clauses will be considered as non-responsive:

a) Price Basis: **(Clause 14)** Section **ITB,** Bid Guarantee**: Clause 23.0, Section ITB.**

b) Contract Performance Guarantee: **Clause 41.0, Section ITB.**

c) Liquidated damages: **Clause 14.0, Section GCC.**

d) Guarantee: **Clause 15.0, Section GCC.**

e) Payment: **Clause 34.0, Section GCC.**

However, the Bidders, wishing to propose deviations to any of the above provisions, must provide in the **Deviations schedule (Annexure-VIII)** in their bid, the cost of withdrawal of such deviations. If the deviation to any of these provisions is not priced, the bid will be **rejected**. The evaluated cost of the bid shall include, in addition to the costs described in **ITB Clause 36**, the cost of withdrawal of the deviations from the above provisions to make the bid fully compliant with these provisions.

At the time of Award of Contract, if so desired by the Owner, **the Bidder shall withdraw these deviations listed in Commercial Deviation Schedule (Annexure-VIII) in their Bid at the cost of withdrawal stated by him in the bid**. In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, **his bid will be rejected and his bid security forfeited**.

The Owner's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

11.3 Bids not covering the above entire scope of Works may be treated as incomplete and shall be **summarily rejected**.

12 BID PRICE

12.1 The Bidder shall quote in the Bid Proposal Sheet, the unit cost and total cost as per the schedule of quantity. The unit rates of the goods it proposes to supply under the Contract on a base price with, unless otherwise specified in the Special Conditions of Contract.

12.2 The Bidder shall also furnish the **price break down in Bid Proposal Sheet** of Bid Form to indicate the following:-

i) **Ex-works price of the equipment/materials.**

ii) Packing and Forwarding charges.

iii) Ex-works price Spares

iv) Ex-works price of Tools and tackles for maintenance

iv) Charges for inland transportation (including port handling) and insurance for delivery of the equipment/materials up to their final destinations.

v) Lump sum charges towards port clearance/unloading, storage, insurance, erection, testing and commissioning.

vi) Excise duty /Sales Tax/VAT/turn over tax and any other levies legally payable on the transactions between the Owner and the Bidder.

vii) Unit cost of dismantling of existing conductor / hardware/accessories (insulators if required).

viii) Unit erection and commissioning charges as per the schedule.

13 ALTERNATIVE PROPOSALS

13.1 No alternate proposal will be consider.

14 PRICE BASIS

14.1 The Bidders shall quote the **FIRM Price** on per unit basis in the Bid Proposal Sheet **(Annexure XVI of Section IV).** The price shall remain firm till completion of the work and commissioning of the lines. Any excess quantity shall be billed as per the unit rate quoted by the firm.

14.2 Bidder shall indicate bid prices in Indian Rupees only.

15 TAXES AND DUTIES

15.1 All customs duties, excise duties, sales taxes and other levies payable by the Bidders in respect of the transaction between the Bidders and their vendors/sub-suppliers while procuring any components, sub-assemblies, raw materials and equipment, erection cost shall be included in the bid price and no claim on this behalf will be entertained by the Owner.

15.2 VAT/Custom duty/Sales tax, excise duties, local taxes and other levies should be clearly mentioned in the price schedule.

Whenever ex-works price is quoted exclusive of Excise Duty applicable on the transaction between the Owner and the Contractor, then the due credit under the MODVAT (modified Value Added Tax), scheme as per the relevant

Government policies wherever applicable, shall be taken into account by the Bidder while quoting bid price.

15.3 In respect of transactions solely between the owner and the contractor (for dispatches made from the contractor's works under the Supply Contract), Custom Duties,, Excise Duties, Sales Tax, local taxes and other levies shall be paid/reimbursed by the owner at the applicable rate at the time of despatch, scheduled or actual, whichever is lower(i.e. If delivery is within schedule period, tax variation is applicable, and if delivery is made beyond schedule date, any additional financial implication due to statutory variation in tax shall be to bidder's account). However, in case of advancement of supplies solely at the request of the owner, taxes and duties prevailing at the time of dispatch, shall be payable by the owner. The contractor shall prepare a schedule for dispatch of the materials within 15 days of Letter of Award. This schedule shall be in line with the target dates fixed by the owner in **clause 16 of SCC**.

15.4 Concessional Sales Tax declaration forms, as admissible, would be issued to the contractor, on request, for all items (ad identified in the price schedule of the bid) to be supplied directly by the contractor as well as for the items to be supplied by the sub-suppliers as sale in transit.

15.5 Sales Tax on goods incorporated in the Works:

The Bidder shall include the Sales Tax on Works Contract, Turnover Tax or any other similar taxes under the Sales Tax Act, as applicable in their quoted bid price and OPTCL would not bear any liability on this account. OPTCL shall, however, deduct such taxes at source as per the rules and issue TDS Certificate to the Contractor.

15.6 For payment/reimbursement of Sales Tax, in respect of dispatches made directly from contractor's works, invoices raised by the contractor shall be accepted as documentary evidence. Similarly, pre-numbered invoices duly signed by authorized signatory will be considered as evidence for payment of Excise Duty.

15.7 As regards the Income Tax, surcharge on Income Tax and other corporate taxes the Bidder shall be responsible for such payment to the concerned authorities.

15.8 Sales tax clearance certificate for the previous year should be enclosed with the tender.

15.9 Offer with exemption from excise duty including sales tax shall be accompanied with authenticate proof of such exemption.

16 TIME SCHEDULE

16.1 The basic consideration and the essence of the contract shall be adhering to the time schedule specified in the Special Conditions of Contract.

16.2 The completion schedule shall be one of the major factors in consideration of the bids.

16.3 The owner reserves the right to request for a change in the work schedule during pre-award discussions with successful Bidder.

16.4 The successful Bidder will be required to prepare detailed **PERT network** and finalize it with the owner as per the requirement of **Clause 12 of Section GCC.**

17 SPARE PARTS

The bidders shall quote for certain spare parts as mentioned in the list and the bidder has to provide the item wise price break down of such spares on an Ex-works/FOB basis. **The Bidder shall further indicate item wise price break up on FOR site basis.** In respect of Customs Duties and Taxes, the provisions of **Clause 15** above shall be applicable. **The above prices shall not be included in the lump sum price but indicated separately in the schedules and shall not be subject to escalation**. The prices quoted for these spares will be taken into account for evaluation. The owner, however, reserves the right to vary the quantity of any of the spare and/or to delete any items of spares altogether or add new items of spares during award/detailed engineering stage **limited to a period of one hundred twenty (120) days from date of contract** unless such period is specified otherwise in Special Conditions of Contract.

17.2 The prices of the spares shall be FIRM.

18 CONTRACT QUALITY ASSURANCE

18.1 The Bidder shall include in his Proposal the Quality Assurance Programme containing the overall quality management and procedures, which he proposes

to follow in the performance of the works during various phases as detailed in relevant clause of the General Technical Conditions.

18.2 At the time of Award of Contract, the detailed Quality Assurance Programme to be followed for the execution of the contract will be mutually discussed and agreed to and such agreed programme shall form a part of the contract.

19 INSURANCE

The Bidder's insurance liabilities pertaining to the scope of works are detailed out in clauses titled 'Insurance' in General Conditions of Contract**.** Bidder's attention is specifically invited to these clauses. Bid price shall include all the cost in pursuance of fulfilling all the insurance liabilities under the Contract.

20 MAINTENANCE TOOLS AND TACKLES

The proposal shall include all special tools and tackles required for the operation and maintenance of the lines. The Bidder shall indicate all items in the proposal sheet in the with description and the quantity of each item. **The bidder shall quote the lump sum FIRM price for these tools and tackles**.

21 ERECTION TOOLS & TACKLES

The Bidder, under a separate schedule, in his proposal shall include a list of all special equipment, tools and tackles etc. which he proposes to bring to site for the purpose of erection, handling, testing and commissioning including performance and guarantee tests of the equipment. If any such equipment is listed anywhere else in the proposal and not specially mentioned in the above schedule, it shall be deemed to have been included in the Bidder's proposed scope of supply.

22 BRAND NAMES

22.1 The specific reference in these specifications and documents to any bought out items/tools & tackles by brand name, make or catalogue number shall be construed as establishing standards of quality and performance and not as limiting competition. However, Bidders may offer other similar material/equipment provided they meet the specified standard, design and performance requirements. The Bidder shall furnish adequate technical information about such alternative material/equipment to enable the owner to

determine its acceptability. The owner shall be the sole judge on the acceptability or otherwise of such alternative material/equipment.

23 EMD BID GUARANTEE

23.1 The Bidder shall furnish, as part of its bid, bid guarantee for an amount as specified in the accompanying Special Conditions of Contract. The bid guarantee shall be valid for a period **of Two hundred and forty (240) days** from the date of opening of bids.

23.2 The bid security is required to protect the owner against the risk of Bidder's conduct, which would warrant the guarantee forfeiture, pursuant to **Clause 23.7**. The bid guarantee shall be made payable to the owner without any condition whatsoever.

23.3 The bid guarantee shall be denominated in Indian Rupees only and shall be in one of the following forms: i.e. Demand draft in favour of D.D.O OPTCL, Bhubaneswar/ Bank guarantee. Any bid not secured in accordance with Para **23.1 and 23.3** above will be rejected by the owner as non-responsive.

23.4 Unsuccessful **Bidder's bid guarantee will be discharged/returned** as promptly as possible.

23.5 The successful Bidder's bid guarantee will be discharged upon the Bidder's executing the contract and furnishing the Performance Guarantee pursuant to **Clause 41.0**

23.6 The bid guarantee may be forfeited:

a) If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Bid Form; or

b) In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, or

c) If a bidder does not accept the corrections to arithmetical errors identified during evaluation of his bid pursuant to clause 34.2 of ITB, or

d) In case of a successful Bidder, if the Bidder fails to sign the contract; or

e) in case of a successful bidder, if the Bidder fails to furnish the performance guarantee within 30 calendar days after the date of notice of award of contract or fails to sign the contract agreement in accordance with GCC, the bid guarantee amount will be forfeited by owner without any notice of proof of damages etc.

23.7 The bid guarantee in original is to be submitted in the office of the owner on or before the date & time of submission of techno commercial bid. The scanned copy of the bid guarantee is to be up loaded along with the e-bid. Any bid not accompanied by the required bid security in accordance with provisions of this clause will be **rejected** by the owner and shall not be opened.

23.8 No interest shall be payable by the owner on the above bid security.

23.9 The bid guarantee in the form of bank guarantee from any nationalized / scheduled bank strictly as per the enclosed Pro-forma vide Annexure-XIV to be executed on non-judicial stamp paper worth Rs.29.00 or as applicable as per prevailing laws in force are also to be accompanied by the confirmation letter of the issuing branch.

23.10 The non-judicial stamp paper towards Bank guarantee should be purchased in favour of issuing bank, with banks name and address.

24 PERIOD OF VALIDITY OF BIDS

24.1 Bids shall remain valid for **one hundred and eighty (180) days** after the date of bid opening prescribed by the owner unless otherwise specified in the accompanying Special Conditions of Contract. A bid valid for a shorter period will be **rejected** by the owner as non-responsive.

24.2 In exceptional circumstances the owner may solicit the bidder's consent to an extension of the period of validity. The request and the response thereto shall be made in the tender portal/writing (including FAX). The bid security provided under **clause 23** shall also be extended by the same period as the extension in the validity of the bid. A bidder may refuse the request without forfeiting his bid security. A bidder granting the request will not be required or permitted to modify its bid.

D. SUBMISSION OF BIDS

25 FORMAT OF BID

25.1 The bidder shall submit the bids in electronic mode only.

25.2 The letter of authorization shall be indicated by written Power of Attorney accompanying the bid by up-loading the scanned copy.

25.3 The Bidder's must submit the qualifying data in the format enclosed & the scanned copy of the supporting document is to be up loaded & the reference is to be mentioned in the format.

25.4 The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

25.5 **FORMAT OF BID**. The Price shall be keyed in the bid document provided in the tender portal, which shall only be opened, once the bidder is found to be techno commercially suitable.

25.6 **The original EMD B**.G to be separately submitted in the tender with sealed envelope marking as EMD B G.(BID SECURITY).

26 SIGNATURE OF BIDS

26.1 The bid must contain the name, residence and place of business of the person or persons making the bid in the supplier information sheet.

26.2 Bid by a partnership must be furnished with full names of all partners and be signed with the partnership name, followed by the signature(s) and designation(s) of the authorized partner(s) or other authorized representative(s) & scanned copy is to be up loaded.

26.3 Bids by Corporation/Company must be signed with the legal name of the Corporation/Company by the President, Managing Director or by the Secretary or other person or persons authorized to bid on behalf of such Corporation/Company in the matter.

26.4 A bid by a person who affixes to his signature the world 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

26.5 Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid.

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

26.7 Bids not conforming to the above requirements of signing may be disqualified.

27 .SEALING AND MARKING OF BIDS

27.1 The Bid Guarantee, cost of tender document & tender processing fee must be submitted in a sealed envelope super-scribing the tender specification number, tender notice number & date of opening of tender. The same has to be submitted in the office of the owner on or before the date & time of opening of tender.

27.2

28 DEADLINE FOR SUBMISSION OF BIDS

28.1 The Bidders have to submit the bid in electronic mode only. Bids submitted by telex/telegram will not be accepted. No request from any Bidder to the owner to collect the proposals from airlines, cargo agents etc. shall be entertained by the owner.

28.2 The owner may, at its discretion, extend this deadline for the submission of bids by amending the Tender Document, in which case all rights and obligations of the owner and bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

29 MODIFICATION AND WITHDRAWAL OF BIDS

29.1 After submission of the bid electronically the bidder can modify the bid up to the date & time of closing of tender.

30 INFORMATION REQUIIRED WITH THE PROPOSAL

30.1 The bids must clearly indicate the name of the manufacturer, the type of model of each principal item of equipment proposed to be furnished and erected. The bid should also contain drawings and descriptive materials indicating general dimensions, materials from which the parts are manufactured, principles of operation, the extent of pre-assembly involved, major construction equipment proposed to be deployed, method of erection and the proposed erection organizational structure.

30.2 The above information shall be provided by the Bidder in the form of separate sheets, drawings, catalogues, etc. (By up loading the scanned copies).

30.3 Any bid not containing sufficient descriptive material to describe accurately the equipment proposed may be treated as incomplete and hence rejected. Such descriptive materials and drawings submitted by the Bidder will be retained by the owner. Any major departure from these drawings and descriptive material submitted will not be permitted during the execution of the contract without specific written permission of the owner.

30.4 Oral statements made by the Bidder at any time regarding quality, quantity or arrangement of the equipment or any other matter will not be considered.

30.5 Standard catalogue pages and other documents of the Bidder may be used in the bid to provide additional information and data as deemed necessary by the Bidder.

30.6 The Bidder, along with his proposal, shall submit a list of recommended erection equipment and materials which will be required for the purpose of erection of equipment and materials supplied under the contract.

30.7 In case the 'Proposal' information contradicts specification requirements, the specification requirements will govern, unless otherwise brought out clearly in the Technical/Commercial Deviations Schedule.

E. BID OPENING AND EVALUATION

31 OPENING OF BIDS BY OWNER

31.1 The owner will open bids in the presence of Bidders' representatives (only one person) who choose to attend at the date and time for opening of bids. Only one representative of each bidder shall be present.

31.2 No electronic recording devices will be permitted during bid opening.

32 CLARIFICATION OF BIDS

32.1 To assist in the examination, evaluation and comparison of bids the owner may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

33 PRELIMINARY EXAMINATION

33.1 The owner will examine the bids to determine whether they are complete, whether any computational errors shave been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

33.2 Arithmetical errors will be rectified on the following basis:

If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail

and total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail. If the Bidder does not accept the correction of the errors as above, **his Bid will be rejected** and the amount of Bid guarantee forfeited.

The Bidder should ensure that the prices furnished in various price schedules are consistent with each other. In case of any inconsistency in the prices furnished in the specified price schedules to be identified in Bid Form for this purpose, the owner shall be entitled to consider the highest price for the purpose of evaluation and for the purpose of award of the contract use the lowest of the prices in these schedules.

33.3 Prior to the detailed evaluation, the owner will determine the substantial responsiveness of each bid to the Bidding Document. For purpose of this clause, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bidding Document without material deviations. A material deviation is one which affects in any way the prices, quality, quantity or delivery period of the equipment or which limits in any way the responsibilities or liabilities of the Bidder of any right of the owner as required in these specifications and documents. The owner's determination of a bid's responsiveness shall be based on the contents of the bid itself without recourse to extrinsic evidence.

33.4 If a bid determined is not substantially responsive, will be rejected by the owner and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

33.5 The owner may waive any minor informality or non-conformity or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

34 DEFINITIONS AND MEANINGS

For the purpose of evaluation and comparison of bids, the following meanings and definitions will apply:-

a) 'Bid Price' shall mean the base price quoted by each Bidder in his proposal for the complete scope of works.

b) 'Differential Price' shall mean the summation of the equalizing elements of price for parameter differential or deficiencies in the equipment and services determined from the Bidder's Proposal.

c) 'Cost Compensation for Deviations' shall mean the Rupee value of deviations from the Bidding Documents as determined from the Bidder's Proposal.

d) 'Evaluated Bid Price' shall be the summation of 'Bid Price', 'Differential Price' and 'Cost Compensation for deviations'.

e) Calculation of Differential Price and Cost Compensation for Deviations.

34.1 The Differential Price to be added to the Bid Price of each bid during evaluation and comparison shall be derived as under:

Differential Price (DP) = n1F1 + n2F2....+ nnFn where F1, F2..... Fn are the various factors in Indian Rupees per unit of parameter differential or deficiency in the equipment and services offered as stipulated in these specifications; n1, n2.....nn are the respective parameter differential or deficiency in the corresponding units to be determined from the Bidder's Proposal. The above factors and corresponding units of parameter differential are brought out in the technical Specifications and/or Special Conditions of Contract.

34.2 Deviations from the Bidding Documents in so far as practicable will be converted to Rupee value (D) and added to the bid price to compensate for the deviation from the Bidding Document while evaluating the bids. In determining the Rupee value of the deviations the owner will use parameters consistent with those specified in the specifications and documents and/or other information as necessary and available to the owner.

34.3. Comparison of Bids.

(i) The bid shall be compared on the basis of the total price taking into account the unit cost and the schedule of quantities.

(ii) For comparison purposes all the evaluated bid prices shall be in Indian rupees as under.

W=M+DP+D, where W= Total comparison price.

M= Bid price in Indian rupees (Ex works value of equipment + components of erection cost + mandatory Spares and other components if any)

DP= Difference price in Indian rupees calculated according to para 35.2 above.

D = Cost of compensation for deviations calculated according to para 35.2 above.

All evaluated bid price of all the bidders shall be compared among themselves to determine the lowest evaluated bid as a result of this comparison the lowest bid will be selected for the award of the contract.

35 PROCEDURE FOR EVALUATION OF PRICE BID

(a) An item of the BOQ or any additional new items specified through subsequent Corrigendum for quoting has been reflected in the Bid Proposal Sheet but no price is quoted against the item, either left blank or marked '—'.

Such item(s) is/are to be executed, by the firm, free of cost to OPTCL, irrespective of the amount of financial involvement.

(b) An item(s) content of the BoQ has/have been reflected in the price bid but not quoted any price against the item instead have mentioned-NIL or Zero or free of cost.

The price bid is to be evaluated on the total quoted price only as furnished by the firm in the price bid. No price loading will be done against such item(s) and the firm has to execute the work free of cost as indicated in the price bid of the firm.

(c) Few items in the price bid are found to be partially deviated / partially omitted from the original specification against the items.

OPTCL shall do – the item(s) that/those is/are partially deviated (minor deviations in the statement/unit/qty) from the original specification and does not constitute a material deviation and that does not prejudice or affect the relative ranking of any bidder as a result of the technical and commercial evaluation, that such irregularities are not to be considered as outright rejection. However, the price quoted by the firm will be presumed to be price of the complete item as per bid specification.

(d) The participant firms shall **submit an undertaking** along with the price bid to the effect that any item missing/not quoted in the price bid, shall be executed free of cost by them without any financial liability to OPTCL and that the said undertaking shall cover all the evaluation criterion recommended above. The condition of rejection of incomplete price bid appearing under the outright rejection criterion shall stand deleted.

(e) **Differential price shall be loaded for each bid as per clause 2.3.1 (Evaluation of ohmic losses & differential price loading) of technical specification.**

36 CONTACTING THE OWNER

Bids shall be deemed to be under consideration immediately after they are opened and until such time official intimation of award/rejection is made by the owner to the Bidders. **While the bids are under consideration, Bidders and/or their representatives or other interested parties are advised to refrain from contacting by any means, the owner and/or his employees/representatives on matters related to the bids under consideration.** The owner, if necessary, will obtain clarifications on the bids by requesting for such information from any or all the Bidders, either in writing or through personal contacts as may be necessary. Bidders will not be permitted to change the substance of the bids after the bids have been opened.

37 AWARD CRITERIA

37.1 The owner will award the contract to the successful bidder whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily. The stringing work has to be done jointly with an OPTCL rate contract holder firm. (List of OPTCL rate contract holder is attached as Appendix-VIII) The owner shall be the sole judge in this regard.

37.2 In case of Supply Contract, the award shall be on the basis of FOR destination (site) basis.

37.3 Further, the owner reserves the right to award separate contracts to two or more parties in line with the terms and conditions specified in the accompanying Technical Specifications for both supply and erection.

38 OWNER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

38.1 The owner reserves the right to accept or reject any bid, and to annual the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or any

obligation to inform the affected Bidder or Bidders of the grounds for the owner's action.

39 NOTIFICATION OF AWARD

39.1 Prior to the expiration of the period of bid validity and extended validity period, if any, the owner will notify the successful Bidder in writing by registered letter or by cable or fax, to be confirmed in writing by registered letter, that its bid has been accepted.

39.2 The notification of award will constitute the formation of the Contract.

39.3 Upon the successful Bidder's furnishing of contract performance guarantee pursuant to clause 42.0 the owner will promptly notify each unsuccessful Bidder and will discharge its bid security, pursuant to clause 23.5.

40 SIGNING OF CONTRACT

40.1 At the same time as the owner notifies the successful bidder that its bid has been accepted, the owner will send the bidder the detailed Letter of Award, incorporating all agreements between the parties.

40.2 Within 15 days of receipt of the detailed Letter of Award, the successful Bidder shall sign and date the same and return it to the owner.

40.3 The Bidder will prepare the Contract Agreement as per the Pro-forma enclosed at **Annexure-XVIII** at Section-IV and the same will be signed within 20(Twenty) days of Notification of Award.

41 CONTRACT PERFORMANCE GUARANTEE

41.1 As a Contract Performance Security, the successful Bidder, to whom the work is awarded, shall be required to furnish a Performance Guarantee from (a) a Public Sector Bank or b) a Scheduled Indian Bank having paid up capital (net of any accumulated losses) **or Rs.100 crores or above** (the latest annual report of the Bank should support compliance of capital adequacy ratio requirement) in the form attached as Annexure-XV of section-IV in favour of the owner. The guarantee amount shall be equal to **ten percent (10%) of the Contract Price** shall be furnished from any nationalized/ scheduled bank having a place of business at Bhubaneswar to the office of The senior General Manager (CPC), OPTCL within 15 (fifteen) days from the date of issue of the supply / erection

order and it shall guarantee the faithful performance of the Contract in accordance with the terms and conditions specified in these documents and specifications. The guarantee shall be **valid up to 90 days after the end of guarantee Period.**

41.2 The Performance Guarantee shall cover additionally the following guarantees to the owner:

a) The successful Bidder guarantees the successful and satisfactory operation of the materials furnished and erected under the contract, as per the specifications and documents including the erection work.

b) The successful Bidder further guarantees that the equipment provided/ and erection work done and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the owner fully remedy free of expenses to the owner such defects as developed under the normal use of the said equipment within the period of guarantee specified in the relevant clause of the General Terms and Conditions and/or Special Conditions of Contract.

41.3 The Contract Performance Guarantee is intended to secure the performance of the entire Contract. However, it is not to be construed as limiting the damages under clause entitled "Equipment and erection Performance Guarantee" in Technical Specifications, Vol. . . .II and damages stipulated in other clauses in the Bid documents.

41.4 The Performance Guarantee will be returned to the Contractor without any interest at the end of guarantee period, unless otherwise specified in the Special Conditions of Contract.

41.5 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 90 days after the end of guarantee 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.

41.6 No interest is payable on any kind of Bank Guarantee.

41.7 In case of non-fulfillment of contractual obligation, as required in the detailed purchase order/Specification, the composite Bank guarantee shall be forfeited.

END OF SECTION – ITB

SECTION – II

GCC

GENERAL CONDITIONS OF CONTRACT

CONTENTS

C. Contract Security and Payments

A. INTRODUCTION

1.0 DEFINITION OF TERMS

1.1 The 'Contract' means the agreement entered into between the owner and the Contractor as per the Contract Agreement signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

1.2 'Owner' shall mean the ORISSA POWER TRANSMISSION CORPORATION LIMITED Bhubaneswar and shall include its legal representatives, successors and assigns.

1.3 'Contractor' or 'Manufacturer' shall mean the Bidder whose bid will be accepted by the owner for the award of the works and shall include such successful Bidder's legal representatives, successors and permitted assigns.

1.4 'Sub-Contractor' shall mean the person named in the Contract for any part of the works or any person to whom any part of the contract has been sublet by the Contractor with the consent in writing of the Engineer and will include the legal representatives, successors and permitted assigns of such person

1.5 'Engineer' shall mean the officer appointed in writing by the owner to act as Engineer from time to time for the purpose of the Contract**.**

1.6 'Consulting Engineer'/'Consultant' shall mean any firm or person duly appointed as such from time to time by the owner.

1.7 The terms 'Equipment', 'Stores' and 'Materials' shall mean and include equipment, stores and materials to be provided by the Contractor under the Contract.

1.8 'Works' shall mean and include the furnishing of material/equipment, labour and services, as per the Specifications and complete erection, testing and putting into satisfactory operation including all transportation, handling, unloading and storage at the Site as defined in the contract.

1.9 'Specifications' shall mean both technical as well as commercial part of the Specifications and Bidding Document forming a part of the Contract and such other schedules and drawings as may be mutually agreed upon.

1.10 'Site' shall mean and include the land and other places on, into or through which the works and the related facilities are to be erected or installed and any adjacent land, paths, street or reservoir which may be allocated or used by the owner or contractor in the performance of the contract.

1.11 The term 'Contract Price' shall mean the lump sum price quoted by the contractor in his bid with additions and/or deletions as may be agreed and incorporated in the Letter of Award, for the entire scope of works.

1.12 The term 'Equipment Portion' of the contract price shall mean the ex-works value of the material/equipment.

1.13 The term 'Erection Portion' of the contract price shall mean the value of field activities of the works including erection, testing and putting into satisfactory operation including successful completion of performance and guarantee tests to be performed at Site by the Contractor including cost of insurances.

1.14 'Manufacturer's Works' or 'Contractor's Works', shall mean the place of work used by the manufacturer, the Contractor, their collaborators/associates or Sub-Contractors for the performance of the Contract.

1.15 'Inspector' shall mean the owner or any person nominated by the owner from time to time, to inspect the equipment; stores or works under the contract and/or the duly authorized representative of the owner.

1.16 'Notice of Award of Contract'/'Letter of Award'/'Telex of Award' shall mean the official notice issued by the owner notifying the contractor that his bid has been accepted.

1.17 'Date of Contract' shall mean the date on which Notice of Award of Contract/Letter of Award has been issued.

1.18 'Month' shall mean the calendar month. 'Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of 24 hours each.

1.19 A 'Week' shall mean continuous period of seven (7) days.

1.20 'Writing' shall include any manuscript, type written or printed statement, under or over signature and/or seal as the case may be.

1.21 When the words 'Approved', 'Subject to Approval', 'Satisfactory', 'Equal to', 'Proper', 'Requested', 'As Directed', 'Where Directed', 'When Directed', 'Determined by', 'Accepted', 'Permitted', or words and phrases of like importance are used the approval, judgment, direction etc. is understood to be a function of the Owner/Engineer.

1.22 Test on completion shall mean such tests as prescribed in the Contract to be performed by the Contractor before the work is taken over by the owner.

1.23 'Start up' shall mean that time period required to bring the equipment covered under the Contract from an inactive condition, when construction is essentially complete, to the state ready for trial operation. The startup period shall include preliminary inspection and check out of equipment and supporting sub-system, initial operation of the complete equipment covered under the Contract to obtain necessary pre-trial operation data, perform calibration and corrective action, shut down, inspection and adjustment prior to the trial operation period.

1.24 'Initial Operation' shall mean the first integral operation of the complete equipment covered under the Contract with the sub-system and supporting equipment in service or available for service.

1.25 'Trial Operation', 'Reliability Test', 'Trial Run', 'Completion Test', shall mean the extended period of time after the startup period. During this trial operation period the unit shall be operated over the full load range. The length of trial operation shall be as determined by the Engineer, unless otherwise specified elsewhere in the Contract.

1.26 'Performance and Guarantee Tests' shall mean all operational checks and tests required to determine and demonstrate capacity, efficiency, and operating characteristics as specified in the Contract Documents.

1.27 The term 'Final Acceptance'/'Taking Over' shall mean the Owner's written acceptance of the works performed under the contract, after successful commissioning/completion of performance and guarantee tests, as specified in the accompanying Technical Specifications or otherwise agreed in the contract.

1.28 'Commercial Operation' shall mean the condition of operation in which the complete equipment covered under the Contract is officially declared by the owner to be available for continuous operation at different loads upto and including rated capacity. Such declaration by the owner, however, shall not relieve or prejudice the Contractor of any of his obligations under the Contract.

1.29 'Guarantee Period'/'Maintenance Period' shall mean the period during which the Contractor shall remain liable for repair or replacement of any defective part of the works performed under the Contract.

1.30 'Latent Defects' shall mean such defects caused by faulty designs, materials or workmanship which cannot be detected during inspection, testing etc. based on the technology available for carrying out such tests.

1.31 'Drawing', 'Plans" shall mean all:

a) Drawings furnished by the owner/consultant as a basis of Bid/Proposals.

b) Supplementary drawings furnished by the owner/consultant to clarify and to define in greater detail the intent of the contract.

c) Drawings submitted by the contractor with his bid provided such drawings are acceptable to the owner/consultant.

d) Drawings furnished by the owner/consultant to the contractor during the progress of the work; and

e) Engineering data and drawings submitted by the contractor during the progress of the work provided such drawings are acceptable to the Engineer/Owner.

1.32 'Codes' shall mean the following including the latest amendments and/or replacements, if any:

a) Indian Electricity Act, 2003 and Rules and Regulations made thereunder.

b) Indian Factory Act, 1948 and Rules and Regulations made thereunder.

c) Indian Explosives Act, 1884 and Rules and Regulations made thereunder.

d) Indian Petroleum Act, 1934 and Rules and Regulations made thereunder.

e) ASME Test Codes.

f) Institute of Electrical & Electronics Engineers (IEEE) Test Codes

g) American Society of Testing & Materials (ASTM) Codes.

h) American National Standard Institute (ANSI) Codes

i) Standards of the Indian Standards Institution/Bureau of Indian Standards.

j) Other Internationally approved standards and/or rules and regulations touching the subject matter of the contract. Words imparting the singular only shall also include the plural and vice-versa where the context so requires.

1.33 Worlds imparting 'Person' shall include firms, companies, corporations and associations or bodies of individuals, whether incorporated or not.

1.34 Terms and expressions not herein defined shall have the same meaning as are assigned to them in the Indian Sale of Goods Act (1930), failing that in the Indian Contract Act (1872) and failing that in the General Clauses Act (1897) including amendments thereof, if any.

The various Acts and Regulations are normally available for sale from the following addresses:

i) Deputy Controller

Publication Department, Government of India,Civil Lines, New-DELHI-110 006.

ii) Deptt. of Publication, Government of India, KitabMahal

Unit No.21, Emporia Building,

Baba Kharak Singh Marg,

NEW DELHI-110 001.

OR

With leading authorized Government of India Book – Sellers.

1.35 In addition to the above the following definitions shall also apply.

a) 'All equipment and materials' to be supplied shall also mean 'Goods'.

b) 'Constructed' shall also mean 'erected and installed'.

c) 'Contract Performance Guarantee' shall also mean 'Contract Performance Security'.

2.0 APPLICATION

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

3.0 STANDARDS

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

4.0 LANGUAGE AND MEASURES

All documents pertaining to the contract including specifications, schedules, notices, correspondences, operating and maintenance instructions, drawings or any other writing shall be written in English language. The Metric System of measurement shall be used exclusively in the contract.

5.0 CONTRACT DOCUMENTS

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

a) Notice Inviting Tender including letter forwarding the Bidding Documents, Instructions to Bidders, General Conditions of Contract and all other documents included in section-IV and the Special Conditions of Contract.

b) Specifications of the equipment to be furnished and erected under the contract as brought out in the accompanying Technical Specifications & GTP.

c) Contractor's Bid Proposal and the documents attached there to including the letters of clarifications thereto between the Contractor and the Owner/Consultant prior to the Award of Contract except to the extent of repugnancy.

d) All the materials, literature, data and information of any sort given by the Contractor along with his bid, subject to the approval of the owner/consultant.

e) Letter of Awards for Supply and Erection along with any agreed variations of the conditions of the documents and special terms and conditions of contract, if any.

5.2 In the event of any conflict between the above-mentioned documents the matter shall be referred to the Engineer whose decision shall be considered as final and binding upon the parties.

6.0 USE OF CONTRACT DOCUMENTS AND INFORMATION

6.1 The contractor shall not, without the owner's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of the owner in connection therewith, to any person other than a person employed by the contractor in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for the purpose of such performance.

6.2 The contractor shall not, without the owner's prior written consent, make use of any document or information enumerated in various contract documents except for the purpose of performing the contract.

6.3 The contractor shall not communicate or use in advertising, publicity, sales releases or in any other medium, photographs or other reproduction of the works under this contract, or descriptions of the site, dimensions, quantity, quality or other information, concerning the works unless prior written permission has been obtained from the owner.

6.4 Any document, other than the contract itself, enumerated in various contract documents shall remain the property of the owner and shall be returned (in all copies) to the owner on completion of the contractor's performance under the contract if so required by the owner.

7.0 CONSTRUCTION OF THE CONTRACT

7.1 Notwithstanding anything stated elsewhere in the bid documents, the contract to be entered into will be treated as a single contract on turnkey basis.

7.2 Where the owner hands over his equipment to the contractor for executing, then the contractor shall at the time of taking delivery of the equipment/dispatch documents be required to execute an Indemnity Bond in favour of the owner in the form acceptable to **OPTCL** for keeping the equipment in safe custody and to utilize the same exclusively for the purpose of the said contract. Samples of Pro-forma for the Indemnity Bond are enclosed as **Annexure-XVII at section-IV.**

7.3 The contract shall in all respects be construed and governed according to Indian Laws.

7.4 It is clearly understood that the total consideration for the contract(s) has been broken up into various components only for the convenience of payment of advance under the contract(s) and for the measurement of deviations or modifications under the contract(s).

8.0 JURISDICTION OF CONTRACT

8.1 The laws applicable to the contract shall be the laws in force in Orissa. The **Honb'le HIGH Court of Odisha** of Bhubaneswar shall have exclusive jurisdiction in all matters arising under this Contract.

9.0 MANNER OF EXECUTION OF CONTRACT

9.1 The owner, after the issue of the Letter of Award to the Contractor, will send one copy of the final agreement to the Contractor for his scrutiny and approval.

9.2 **The Agreement, unless otherwise agreed to, shall be signed within 15days of the acceptance of the Letter of Award, at the office of the owner at Bhubaneswar, on a date and time to be mutually agreed. The contractor shall provide for signing of the contract, performance guarantee in six copies, appropriate power of attorney and other requisite materials. In case the contract is to be signed beyond the stipulated time, the bid guarantee submitted with the proposal will have to be extended accordingly**.

9.3 The Agreement will be signed in six originals and the contractor shall be provided with one signed original and the rest will be retained by the owner.

9.4 The contractor shall provide free of cost to the owner all the Engineering data, drawings, and descriptive materials submitted with the bid, in **at least six(6) copies** to form a part of the contract immediately after issue of Letter of Award.

9.5 The equipment / material 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.

10.0 ENFORCEMENT OF TERMS

10.1 The failure of either party to enforce at any time any of the provisions of this contract or any rights in respect thereto or to exercise any option therein provided, shall in no way be construed to be a waiver of such provisions, rights or options or in any way to affect the validity of the contract. The exercise by either party of any of its rights herein shall not preclude or prejudice either party from exercising the same or any other right it may have under the contract.

11.0 COMPLETION OF CONTRACT

11.1 Unless otherwise terminated under the provisions of any other relevant clause, this contract shall be deemed to have been completed on the expiry of the guarantee period as provided for under the clause entitled 'Guarantee' in this section.

B. GUARANTEES AND LIABILITIES

12.0 TIME - THE ESSENCE OF CONTRACT

12.1 The time and the date of completion of the contract as stipulated in the contract by the owner without or with modifications, if any, and so incorporated in the Letter of Award, shall be deemed to be the essence of the contract. The contractor shall so organize his resources and perform his work as to complete it not later than the date agreed to. **The entire scope of the work shall be completed as per the clause 16 of SCC.**

12.2 The contractor shall submit a detailed PERT network/bar chart within the time frame agreed consisting of adequate number of activities covering various key phases of the work such as design, procurement, manufacturing, shipment and field erection activities within **fifteen (15) days** of the date of Notification of Award. This network shall also indicate the interface facilities to be provided by the owner and the dates by which such facilities are needed. The contractor shall discuss the network so submitted with the owner and the agreed network shall form part of the contract documents. As provided in the clause of Terms of Payment in this Section, finalisation of the network/bar charts will be pre-condition to release of any initial advance to the contractor. During the performance of the contract, if in the opinion of the Engineer, proper progress is not maintained, suitable changes shall be made

in the contractor's operations to ensure proper progress without any cost implication to the owner. The interface facilities to be provided by the owner in accordance with the agreed network shall also be reviewed while reviewing the progress of the contractor.

12.3 Based on the above agreed network/bar chart fortnightly reports shall be submitted by the contractor as directed by the Engineer.

12.4 Subsequent to the finalization of the network, the contractor shall make available to the Engineer a detailed manufacturing program in line with the agreed contract network. Such manufacturing program shall be reviewed, updated and submitted to the Engineer **once in every month thereafter**.

12.5 The above bar charts/manufacturing program shall be compatible with the owner's computer environment and furnished to the owner on such media as may be desired by the owner.

13. EFFECTIVENESS OF CONTRACT

The contract shall be considered as having come into force from the date of the notification of award unless otherwise provided in the notification of award.

14. LIQUIDATED DAMAGES/PENALTY

14.1 For Equipment Portion (Excluding Spares)

14.1.1 If the contractor fails to successfully complete the supply and commissioning within the time fixed under the contract, the contractor shall pay to the owner as liquidated damages/penalty a sum of 0.5% of the contract price for each calendar week of delay or part thereof for each specified period of delay. The details of such liquidated damages/penalty are brought out in the special conditions of contract.

14.1.2 Equipment and materials will be deemed to have been delivered only when all its components, parts are also delivered. If certain components are not delivered in time the equipment and materials will be considered as delayed until such time the missing parts are also delivered.

14.1.3 The total amount of liquidated damages for delay under the contract will be subject to a maximum of **5%** of the contract price.

14.2 For Spares

14.2.1 Unless otherwise specified in the Special Conditions of Contract, the liquidated damages/penalty for delay in supply of spares, beyond the dates stipulated under **Clause 36.2, Section GCC** shall be **½% (half per cent)** of the price of undelivered spares, per week or part thereof.

14.2.2 The total amount of liquidated damages/penalty for delay under the contract will be subject to a **maximum ten percent (10%)** of the value of spares ordered unless otherwise specifically mentioned in special Conditions of Contract.

14.3 Liquidated damages/penalty for not meeting performance guarantee during the performance and guarantee tests shall be assessed and recovered from the contractor as detailed in Technical Specifications/Special Conditions of Contract. Such liquidated damages shall be without any limitation whatsoever and shall be in addition to damages, if any, payable under any other clause of Conditions of Contract.

14.4 For Erection:

14.4.1 If the contractor fails to successfully complete the erection & commissioning within the time fixed under the contract, the contractor shall pay to the owner as Liquidated damage a sum specified for each specified period of delay. The Liquidated damage shall be ½% (half per cent) of contract price per week of delay or part thereof and the total amount of Liquidated damage for delay under the Contract will be subject to a maximum of 5% of the Contract Price.

15.0 GUARANTEE

15.1 The contractor shall warrant that the equipment / material will be new, unused and in accordance with the contract documents and free from defects in material and workmanship for a period of **sixty (60)** calendar months (as specified in the SCC) commencing immediately upon the satisfactory commissioning. The contractor's liability shall be limited to the replacement of any defective parts in the equipment of his own manufacture or those of his Sub-Contractors under normal use and arising solely from faulty design, materials and/or workmanship, manufacture or during erection. Such replaced/defective parts shall be returned to the contractor unless otherwise arranged. No repairs or replacement shall normally be carried out by the Engineer when the equipment is under the supervision of the contractor's supervisory Engineer. In case of original manufacturer offering guarantee available for longer time, the same should be made available to the owner.

15.2 In the event of any emergency where in the judgment of the Engineer, delay would cause serious loss or damages, repairs or adjustment may be made by the Engineer or a third party chosen by the Engineer without advance notice to the contractor and the cost of such work shall be paid by the contractor. In the event such action is taken by the Engineer, the contractor will be notified promptly and he shall assist wherever possible in making necessary corrections. This shall not relieve the contractor of his liabilities under the terms and conditions of the contract.

15.3 If it becomes necessary for the contractor to replace or renew any defective portions of the works the provision of this clause shall apply to portion of the works so replaced or renewed until the expiry of sixty(60) months from the date of such replacement or renewal. If any defects are not remedied within a reasonable time, the Engineer may proceed to do the work at the contractor's risk and cost but without prejudice to any other rights which the owner may have against the contractor in respect of such defects.

15.4 The repaired or new parts will be furnished and erected free of cost by the contractor. If any repair is carried out on his behalf at the site, the contractor shall bear the cost of such repairs.

15.5 The cost of any special or general overhaul rendered necessary during the maintenance period due to defects in the equipment or defective work carried out by the contractor, the same shall be borne by the contractor.

15.6 The acceptance of the equipment by the Engineer shall in no way relieve the contractor of his obligations under this clause.

15.7 In the case of those defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the contractor and the Engineer shall mutually agree to a program of replacement or renewal, which will minimize interruption to the maximum extent in the operation of the equipment.

15.8 At the end of the guarantee period, the contractor's liability ceases except for latent defects. For latent defects, the contractor's liability as mentioned in Clause Nos. 15.1 through 15.7 above, shall remain till the end of 5 years from the date of completion of guarantee period.

15.9 The Contractor shall not stand guaranteed for the materials supplied by OPTCL but shall stand guarantor for the execution of the materials

16.0 TAXES, PERMITS & LICENCES

16.1 The contractor shall be liable and pay all non-Indian taxes, duties, levies lawfully assessed against the owner or the contractor in pursuance of the contract. In addition the contractor shall be responsible for payment of all Indian duties, levies and taxes lawfully assessed against the contractor for his personal income and property only. This clause shall be read in conjunction with Clause 15.0 of Section **ITB.**

16.2 Audited balance sheet & profit & loss account of the bidder for the previous five years should be enclosed to access the financial soundness of the bidders.

17.0 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS

17.1 If during the performance of the contract, the Engineer shall decide and inform in writing to the contractor that the contractor has manufactured any equipment, material or part of equipment unsound and imperfect or has furnished any equipment inferior to the quality specified, the contractor on receiving details of such defects or deficiencies shall at his own expense **within seven (7) days of his receiving the notice**, or otherwise, within such time as may be reasonably necessary for making it good, proceed to alter, reconstruct or remove such works and furnish fresh equipment/materials up to the standards of the specifications. **In case, the contractor fails to do so, the Engineer may, on giving the contractor seven (7) days' notice in writing of his intentions to do so, proceed to remove the portion of the works so complained of and at the cost of the contractor perform all such works or furnish all such equipment/material provided that nothing in this clause shall be deemed to deprive the owner of or affect any rights under the contract which the owner may otherwise have in respect of such defects and deficiencies.**

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

18.0 PATENT RIGHTS AND ROYALTIES

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

19.0 DEFENCE OF SUITS

If any action in court is brought against the owner or Engineer or an officer or agent of the owner, for the failure, omission or neglect on the part of the contractor to perform any acts, matters, covenants or things under the contract, or for damage or

injury caused by the alleged omission or negligence on the part of the contractor, his agents, representatives or his Sub-Contractors, or in connection with any claim based on lawful demands of sub-contractors, workmen, suppliers or employees, the contractor shall in all such cases indemnify and keep the owner, and the Engineer and/or his representative, harmless from all losses, damages, expenses or decrees arising of such action.

20.0 LIMITATION OF LIABILITIES

The final payment by the owner in pursuance of the contract shall mean the release of the contractor from all his liabilities under the contract. **Such final payment shall be made only at the end of the Guarantee/Warranty period, and till such time as the contractual liabilities and responsibilities of the contractor, shall prevai**l. All other payments made under the contract shall be treated as on-account payments.

21.0 ENGINEER'S DECISION

21.1 In respect of all matters which are left to the decision of the Engineer including the granting or with-holding of the certificates, the Engineer shall, if required to do so by the contractor, give in writing a decision thereon.

21.2 If, in the opinion of the contractor, a decision made by the Engineer is not in accordance with the meaning and intent of the contract, the contractor may file with the Engineer, **within seven (7) days** after receipt of the decision, a written objection to the decision. Failure to file an objection within the allotted time will be considered as an acceptance of the Engineer's decision and the decision shall become final and binding.

21.3 The Engineers' decision and the filing of the written objection thereto shall be a condition precedent to the right to request arbitration. It is the intent of the Agreement that there shall be no delay in the execution of the works and the decision of the Engineer as rendered shall be promptly observed.

22. POWER TO VARY OR OMIT WORK

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

22.2 In the event of Engineer requiring any variation, a reasonable and proper notice shall be given to the contractor to enable him to work his arrangement accordingly, and in cases where goods or materials are already prepared or any design, drawings

or pattern made or work done requires to be altered, a reasonable and agreed sum in respect thereof shall be paid to the contractor.

22.3 In any case in which the contractor has received instructions from the Engineer as to the requirement of carrying out the alterations or additional or substituted work which either then or later on, will in the opinion of the contractor, involve a claim for additional payment, the contractor shall immediately and in no case **later than seven (7) days,** after receipt of the instructions aforesaid and before carrying out the instructions, advise the Engineer to that effect. But the Engineer shall not become liable for payment of any charges in respect of any such variations, unless the instructions for the performance of the same shall be confirmed in writing by the Engineer.

22.4 If any variation in the works results in reduction of contract price, the parties shall agree, in writing, so to the extent of any change in the price, before the contractor proceeds with the change.

22.5 In all the above cases, in the event of a disagreement as to the reasonableness of the said sum, the decision of the Engineer shall prevail.

22.6 Notwithstanding anything stated above in this clause, the Engineer shall have the full power to instruct the contractor, in writing, during the execution of the contract to vary the quantities of the items or groups of items in accordance with the provisions of clause 24 entitled 'Change of Quantity' in **GCC.** The contractor shall carry out such variations and be bound by the same conditions as though the said variations occurred in the Contract Documents. However, the contract price shall

be adjusted at the rates and the prices provided for the original quantities in the Contract.

23. ASSIGNMENT AND SUB-LETTING OF CONTRACT

23.1 The contractor may, after informing the Engineer and getting his written approval, assign or sub-let the contract or any part thereof other than for raw material, for minor details or for any part of the plant for which makes are identified in the contract. Suppliers of the equipment not identified in the contract or any change in the identified suppliers shall be subjected to approval by the Engineer. The experience list of equipment vendors under consideration by the contractor for this contract shall be furnished to the Engineer for approval prior to procurement of all such items/equipment. Such assignment/sub-letting shall not relieve the contractor of any obligation, duty or responsibility under the contract. Any assignment as above, without prior written approval of Engineer, shall be void.

23.2 For components/equipment procured by the contractor for the purposes of the contract, after obtaining the written approval of the owner, the contractor's purchase specifications and enquiries shall call for quality plan to be submitted by the suppliers along with their proposals. The quality plans called for from the vendors shall set out, during the various stages of manufacture and installation, the quality practices and procedures followed by the vendors' quality control organization, the relevant reference document/standard used, acceptance level, inspection documentation raised, etc. Such quality plans of the successful vendors shall be discussed and finalized in consultation with the Engineer and shall form a part of the Purchase Order/Contract between the Contractor and the Vendor. Within three weeks of the release of the Purchase Orders/Contracts for such bought

out items/components a copy of the same without price details but together with detailed purchase specifications, quality plans and delivery conditions shall be furnished to the Engineer by the Contractor.

24. CHANGE OF QUANTITY

24.1 During the execution of the contract, the owner reserves the right to increase or decrease the quantities of items under the contract but without any change in unit price or other terms and conditions. Such variations unless otherwise specified in the accompanying Special Conditions of Contract and/or technical Specifications, shall not be subjected to any limitation for the individual items but the total variations in all such items under the contract shall be limited to a percentage of the contract price as specified in the Special Conditions of Contract.

24.2 The contract price shall accordingly be adjusted based on the unit rates available in the contract for the change in quantities as above. The base unit rates, as identified in the contract shall however remain constant during the currency of the contract. In case the unit rates are not available for the change in quantity, the same shall be subjected to mutual agreement.

25. PACKING, FORWARDING AND SHIPMENT

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

25.2.1 The contractor shall notify the owner of the date of each shipment from his works, and the expected date of arrival at the site for the information of the owner.

25.3 The contractor shall also give all shipping information concerning the weight, size and content of each packing including any other information the owner may require.

25.4 The following documents shall be sent by registered post to the owner **within three days** from the date of shipment, to enable the owner to make progressive payments to the contractor:

Application for payment in the standard format (Annexure XIX at Section IV) of the owner (3 copies)

Invoice (6 copies)

Packing list (6 copies)

Pre-despatch clearance certificate, if any (3 copies)

Test Certificate, wherever applicable (3 copies)

Insurance certificate (3 copies)

25.5 The contractor shall prepare detailed packing list of all packages and containers, bundles and loose materials forming each and every consignment dispatched to site.

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

25.6 Further requirements for packing & marking shall be as per clause 5 of Technical Specification.

26. COOPERATION WITH OTHER CONTRACTORS

The contractor shall agree to cooperate with the owner's other contractors Engineers and freely exchange with them such technical information as is necessary to obtain the most efficient and economical design and to avoid unnecessary duplication of efforts. The Engineer shall be provided with three copies of all-correspondence addressed by the contractor to other contractors and Engineers of the owner in respect of such exchange of technical information.

27. NO WAIVER OF RIGHTS

Neither the inspection by the owner or the Engineer or any of their officials, employees, or agents nor any order by the owner or the Engineer for payment of money or any payment for or acceptance of, the whole or any part of the works by the owner or the Engineer, nor any extension of time, nor any possession taken by the Engineer shall operate as a waiver of any provision of the contract, or of any power herein reserved to the owner or any right to damages herein provided nor shall any waiver of any breach in the contract be held to be a waiver of any other or subsequent breach.

28. CERTIFICATE NOT TO AFFECT RIGHT OF OWNER AND LIABILITY OF THE CONTRACTOR

No interim payment certificate of the Engineer, nor any sum paid on account by the owner, nor any extension of time for execution of the works granted by the Engineer

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

29. TRAINING OF OWNER'S PERSONNEL

29.1 The contractor shall undertake to train free of cost, Engineering personnel selected at the works site unless otherwise specified in the Technical Specifications. The period and the nature of training for the individual personnel shall be agreed upon mutually between the contractor and the owner. The details of the number of persons to be trained, period of training, nature of training etc. shall be as outlined in accompanying Technical Specifications/Special Conditions of Contract.

30. PROGRESS REPORTS AND PHOTOGRAPHS

During the various stages of the work in pursuance of the contract, the contractor shall at his own cost submit periodic progress reports as may be reasonably required by the Engineer with such materials as, charts, net-works, photographs, test certificates, etc. Such progress reports shall be in the form and size as may be required by the Engineer and shall be submitted in at least **three (3) copies.**

31. TAKING OVER

Upon successful completion of all the tests to be performed at site on equipment furnished and erected by the contractor, the Engineer shall issue to the contractor a Taking over Certificate as proof of the final acceptance of the equipment. Such certificate shall not unreasonably be withheld nor will the Engineer delay the issuance thereof on account of minor omissions or defects, which do not affect the commercial operation and/or cause any serious risk to the equipment. Such certificate shall not relieve the contractor of any of his obligations which otherwise survive, by the terms and conditions of the contract after issue of such certificate.

C. CONTRACT SECURITY AND PAYMENTS

32. CONTRACT PERFORMANCE GUARANTEE

The contractor shall furnish Contract Performance Guarantee(s) for the proper fulfillment of the contract in the prescribed form **within fifteen (15) days** of "Notice of Award of Contract". The performance guarantee(s) shall be as per terms prescribed in **Section ITB, Conditions of Contract (Section-II).**

33.0 CONTRACT PRICE ADJUSTMENT

The price shall be FIRM and valid till completion of the work.

34.0 PAYMENT

34.1 The payment to the contractor for the performance of the works under the contract will be made by the owner as per the guidelines and conditions specified herein. All payments made during the contract shall be on account

payments only. The final payment will be made on completion of all works and on fulfillment by the contractor of all his liabilities under the contract.

34.2 **Currency of Payment**

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

34.3 **Due Dates for Payments**

Owner will make progressive payment as and when the payment is due as per the terms of payment set forth in the accompanying Special Conditions of Contract. Progressive payments other than those under the letter of credit will become due and payable by the owner within thirty (30) days of the date of receipt of contractor's bill/invoice/debit note by the owner provided the documents submitted are complete in all respects.

34.4 **Payment Schedule**

The contractor shall prepare and submit to the Engineer for approval, a break-up of the contract price. This contract price break up shall be interlinked with the agreed detailed **PERT network** of the contractor setting forth his starting and completion dates for the various key phases of works prepared as per conditions in **clause 12.0of this Section.**

Any payment under the contract shall be made only after the contractor's price break up is approved by the Engineer. The aggregate sum of the contractor's price break up shall be equal to the lump sum contract price. A price break up over valuing those items of supply which will be shipped first will not be accepted.

34.5 **Application for Payment**

34.6 The Contractor shall submit application for the payment in the prescribed Pro-forma of the owner. Pro-forma for application for payment is enclosed as **Annexure-XIX of section-IV.**

34.7 Each such application shall state the amount claimed and shall set forth in detail, in the order of the Payment schedule, particulars of the works including

the works executed at site and of the equipment shipped/brought on to the site pursuant to the contract up to the date mentioned in the application and for the period covered since the last preceding certificate, if any.

34.8 Every interim payment certificate shall certify the contract value of the works executed up to the date mentioned in the application for the payment certificate, provided that no sum shall be included in any interim payment certificate in respect of the works that, according to the decision of the engineer, does not comply with the contract or has been performed, at the date of certificate prematurely.

34.9 **Mode of Payment**

34.10 Payment due on dispatch of equipment shall be made by the owner through owner's Bank or directly to the contractor as per the payment schedule.

34.11 The payment of the taxes and duties (whenever admissible) inland transportation (including port handling), insurance and the erection portion of the works shall be made direct to the contractor by the owner.

34.12 **Terms of Payment**

k) The terms of payments for various activities under the contract are as specified in clause-5 of the special condition of contract.

34.13 **Inland Transportation and Insurance**

Inland transportation (including port handling) and inland insurance charges shall be paid to the contractor on pro-rata to the value of the equipment received at site and on production of the invoices by the contractor. However, wherever equipment wise inland transportation charges have been called for in the 'Bid Proposal Sheets' and have been furnished by the

contractor, the payment of inland transportation charges shall be made after receipt of equipment at site based on the charges thus identified by the contractor in his Proposal and incorporated in the contract. The aggregate of all such pro-rata payments shall however not exceed the total amounts quoted by the Bidder in his bid and incorporated in the contract.

35.0 DEDUCTIONS FROM CONTRACT PRICE

All costs, damages or expenses which the owner may have paid, for which under the contract contractor is liable, will be claimed by the owner. All such claims shall be billed by the owner to the contractor regularly as and when they fall due. Such bills shall be supported by appropriate and certified vouchers or explanations, to enable the contractor to properly identify such claims. Such claims shall be paid by the contractor within thirty (30) days of the receipt of the corresponding bills and if not paid by the contractor within the said period, the owner may then deduct the amount, from any monies due or becoming due by him to the contractor under the contract or may be recovered by actions of Law or otherwise.

D. SPARES

36.0 SPARES

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

36.2 Spares shall be as per the spare list enclosed. The quality plan and the inspection requirement finalized for the main equipment will also be applicable for the corresponding spares.

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

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

36.5 **Warranty for spares**

The contractor shall warrant that all spares supplied will be new and in accordance with contract documents and will be free from defects in design, materials and workmanship and shall further guarantee for sixty (60) months.

36.7 In addition to the spares as per the list, if the owner further identifies certain particular items of spares, the contractor will submit the prices and delivery quotations for such spares **within 30 days** of receipt of such request with validity period for **6 months** for consideration by the owner and placement of order for additional spares if owner so desires.

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

36.9 Further in case of discontinuance of supply of spares by the contractor or his Sub-Contractors, the Contractor will provide the Owner with full information for replacement of such spares with other equivalent makes, if so required by the Owner.

36.10 The prices of all future requirements of items of spares **beyond 5 years** operational requirement will be derived from the corresponding ex-works price at which the order for such spares have been placed by owner as part of mandatory spares or recommended spares. Ex-works order price of future spares shall be computed in accordance with the price adjustment provisions covered under the main contract excepting that the base indices will be counted from the scheduled date of successful completion of trial operation of the last equipment under the main project and there will be no ceiling on the amount of variation in the prices. The above option for procuring future long term requirement of spares by the owner shall remain valid **for a period of 5 years** from successful completion of commissioning of last unit of equipment.

36.11 The contractor will indicate in advance the delivery period of the items of spares, which the owner may procure in accordance with above sub-clause. In case of emergency requirements of spares, the contractor would make every effort to expedite the manufacture and delivery of such spares on the basis of mutually agreed time schedule.

36.12 In case the contractor fails to supply the mandatory, recommended or long term spares in accordance with the terms stipulated above, the owner shall be entitled to purchase the same from alternate sources at the risk and the cost of the contractor and recover from the contractor, the excess amount paid by the owner over the

rates worked out on the above basis. In the event of such risk purchase by the owner, the purchases will be as per the works and procurement policy of the owner prevalent at the time of such purchases and the owner at his option may include a representative of the contractor in finalizing the purchases.

It is expressly understood that the final settlement between the parties in terms of the relevant clauses of the Bidding Documents shall not relieve the contractor of any of his obligations under the provision of long term availability of spares unless otherwise discharged in writing by the owner.

E.RISK DISTRIBUTION

37.0 TRANSFER OF TITLE

37.1 Transfer of title in respect of equipment and materials supplied by the contractor to OPTCL pursuant to the terms of the contract shall pass on to OPTCL with negotiation of dispatch documents.

37.2 This Transfer of Title shall not be construed to mean the acceptance and the consequent "Taking Over" of equipment and materials. The contractor shall continue to be responsible for the quality and performance of such equipment and materials and for their compliance with the specifications until "Taking Over" and the fulfillment of guarantee provisions of this contract.

37.3 This Transfer of Title shall not relieve the contractor from the responsibility for all risks of loss or damage to the equipment and materials as specified under the clause entitled "Insurance" of this Section.

38.0 INSURANCE

38.1 The contractor at his cost shall arrange, secure and maintain all insurance as may be pertinent to the works and obligatory in terms of law to protect his interest and interests of the owner against all perils detailed herein. The form and the limit of

such insurance as defined herein together with the under-writer in each case shall be acceptable to the owner. However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage at all time during the period of contract shall be of contractor alone. The contractor's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations. The insurance covers to be taken by the contractor shall be in the joint name of the owner and the contractor. The contractor shall, however, be authorized to deal directly with Insurance Company or Companies and shall be responsible in regard to maintenance of all insurance covers. Further the insurance should be in freely convertible currency.

38.2 Any loss or damage to the equipment during handling, transportation, storage, erection, putting into satisfactory operation and all activities to be performed till the successful completion of commissioning of the equipment shall be to the account of the contractor. The contractor shall be responsible for preference of all claims and make good the damages or loss by way of repairs and/or replacement of the equipment, damaged or lost. The transfer of title shall not in any way relieve the contractor of the above responsibilities during the period of contract. The contractor shall provide the owner with copy of all insurance policies and documents taken out by him in pursuance of the contract. Such copies of documents shall be submitted to the owner immediately after such insurance coverage. The contractor shall also inform the owner in writing at least sixty(60) days in advance regarding the expiry/cancellation and/or change in any of such documents and ensure revalidation, renewal etc. as may be necessary well in time.

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

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

39.0 LIABILITY FOR ACCIDENTS AND DAMAGES

Under the contract, the contractor shall be responsible for loss or damage to the plant until the successful completion of commissioning as defined elsewhere in the Bid Document.

40.0 DELAYS BY OWNER OR HIS AUTHORISED AGENTS

40.1 In case the contractor's performance is delayed due to any act of omission on the part of the owner or his authorized agents, then the contractor shall be given due extension of time for the completion of the works, to the extent such omission on the part of the owner has caused delay in the contractor's performance of the contract.

Regarding reasonableness or otherwise of the extension of time, the decision of the Engineer shall be final.

40.2 In addition, the contractor shall be entitled to claim demonstrable and reasonable compensation if such delays have resulted in any increase in cost. The owner shall examine the justification for such a request for claim and if satisfied, the extent of compensation shall be mutually agreed depending upon the circumstances at the time of such an occurrence.

41.0 DEMURRAGE, WHARFAGE ETC.

All demurrage, wharfage and other expenses incurred due to delayed clearance of the material or any other reason shall be to the account of the contractor.

42.0 FORCE MAJEURE

42.1 Force majeure is herein defined as any cause which is beyond the control of the contractor or the owner as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the performance of the contract, such as:

a Natural phenomena, including but not limited to floods, droughts, earthquakes and epidemics;

b Acts of any Government, domestic or foreign, including but not limited to war, declared or undeclared, priorities, guarantees, embargoes.

Provided either party shall within fifteen(15) days from the occurrence of such a cause notify the other in writing of such causes.

42.2 The contractor or the owner shall not be liable for delays in performing his obligations resulting from any force majeure cause as referred to and/or defined above.

The date of completion will, subject to hereinafter provided, be extended by a reasonable time even though such cause may occur after contractor's performance of obligation has been delayed due to other causes.

43.0 SUSPENSION OF WORK

43.1 The owner reserves the right to suspend and reinstate execution of the whole or any part of the works without invalidating the provisions of the contract. Orders for suspension or reinstatement of the works will be issued by the Engineer to the contractor in writing. The time for completion of the works will be extended for a period equal to duration of the suspension.

43.2 Any necessary and demonstrable cost incurred by the contractor as a result of such suspension of the works will be paid by the owner, provided such costs are substantiated to the satisfaction of the Engineer. The owner shall not be responsible for any liabilities if suspension or delay is due to some default on the part of the contractor or his sub-contractor.

44.0 CONTRACTOR'S DEFAULT

44.1 If the contractor shall neglect to execute the works with due diligence and expedition or shall refuse or neglect to comply with any reasonable order given to him, in writing by the Engineer in connection with the works or shall contravene the provisions of the contract, the owner may give notice in writing to the contractor to make good the failure, neglect or contravention complained of. Should the contractor fail to comply with the notice within thirty (30) days from the date of serving the notice, then and in such case the owner shall be at liberty to employ other workmen and forthwith execute such part of the works as the contractor may have neglected to do or if the owner shall think fit, without prejudice to any other right he may have under the contract to take the work wholly or in part out of the contractor's hands and re-contract with any other person or persons to complete the works or any part thereof and in that event the owner shall have free use of all contractors equipment that may have been at the time on the site in connection with the works without being responsible to the contractor for any wear and tear thereof and to the exclusion of any right of the contractor over the same, and the owner shall be entitled to retain and apply any balance which may otherwise be due on the contract by him to the contractor, or such part thereof as may be necessary, to the payment of the cost of executing the said part of the works or of completing the works as the case may be. If the cost of completing of works or executing part thereof as aforesaid shall exceed the balance due to the contractor, the contractor shall pay such excess. Such payment of excess amount shall be independent of the liquidated damages for delay, which the contractor shall have to pay if the completion of works is delayed.

44.2 In addition, such action by the owner as aforesaid shall not relieve the contractor of his liability to pay liquidated damages for delay in completion of works as defined in **clause 14.0** of this Section.

44.3 Such action by the owner as aforesaid the termination of the contract under this clause shall not entitle the contractor to reduce the value of the contract performance guarantee nor the time thereof. The contract performance guarantee shall be valid for the full value and for the full period of the contract including guarantee period.

45.0 TERMINATION OF CONTRACT ON OWNER'S INITIATIVE

45.1 The owner reserves the right to terminate the contract either in part or in full due to reasons other than those mentioned under clause entitled 'Contractor's Default'. The owner shall in such an event give fifteen **(15) days**' notice

45.2 in writing to the contractor of his decision to do so.

45.2 The contractor upon receipt of such notice shall discontinue the work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and contracts to the extent they are related to the work terminated and terms satisfactory to the owner, stop all further sub-contracting or purchasing activity related to the work terminated, and assist owner in maintenance, protection, and disposition of the works acquired under the contract by the owner.

In the event of such a termination the contractor shall be paid compensation, equitable and reasonable, dictated by the circumstances prevalent at the time of termination.

45.3 If the contractor is an individual or a proprietary concern and the individual or the proprietor dies and if the contractor is a partnership concern and one of the partners dies then unless the owner is satisfied that the legal representatives of the individual contractor or of the proprietor of the propriety concern and in the case of partnership, the surviving partners, are capable of carrying out and completing the contract the owner shall be entitled to cancel the contract as to its uncompleted part without being in any way liable to payment of any compensation to the estate of deceased contractor and/or to the surviving partners of the contractor's firm on account of the cancellation of the contract. The decision of the owner that the legal representatives of the deceased the contract shall be final and binding on the parties. In the event of such cancellation the owner shall not hold the estate of the deceased contractor and/or the surviving partners of the estate of the deceased contractor and/or the surviving partners of the contractor's firm liable to damages for not completing the contract.

46. FRUSTRATION OF CONTRACT

46.1 In the event of frustration of the contract because of supervening impossibility in terms of **the Indian Contract Act**, parties shall be absolved of their responsibility to perform the balance portion of the contract, subject to provisions contained in **sub-clause 46.3 below**.

46.2 In the event of non-availability or suspension of funds for any reasons, whatsoever (except for reason of willful or flagrant breach by the owner) and/or contractor then the works under the contract shall be suspended.

Furthermore, if the owner is unable to make satisfactory alternative arrangements for financing to the contractor in accordance with the terms of the contract within three months of the event, the parties hereto shall be relieved from carrying out further obligations under the contract treating it as frustration of the contract.

46.3 In the event referred to in sub-clauses 46.1 and 46.2 above the parties shall mutually discuss to arrive at reasonable settlement on all issues including amounts due to either party for the work already done on "Quantum meruit" basis which shall be determined by mutual agreement between the parties.

47 GRAFTS AND COMMISSIONS ETC.

Any graft, commission, gift or advantage given, promised or offered by or on behalf of the contractor of his partner(s), agent(s), officer(s), director(s), employee(s) or servant(s) or any one on his or their behalf in relation to the obtaining or to the execution of this or any other contract with the owner, shall in addition to any criminal liability which it may incur, subject the contractor to the cancellation of this and all other contracts and also to payment of any loss or damage to the owner resulting from any cancellation. The owner shall then be entitled to deduct the amount so payable from any monies otherwise due to contractor under the contract.

FRESOLUTION OF DISPUTES

48 SETTLEMENT OF DISPUTES

48.1 Any dispute(s) or difference(s) arising out of or in connection with the contract shall, to the extent possible, be settled amicably between the parties.

48.2 If any dispute or difference of any kind, whatsoever, shall arise between the owner and the contractor arising out of the contract for the performance of the works whether during the progress of the works or after its completion or whether before or after the termination, abandonment or breach of the contract, it shall, in the first place, be referred to and settled by the Engineer, who, within a **period of thirty**

(30) days after being requested by either party to do so, shall give written notice of his decision to the owner and the contractor.

48.3 Save as hereinafter provided, such decision in respect of every matters so referred shall be final and binding upon the parties until the completion of the works and shall forthwith be given effect to by the contractor who shall proceed with the works with all due diligence, whether he or the owner requires arbitration as hereinafter provided or not.

48.4 If after the Engineer has given written notice of his decision to the parties, no claim to arbitration has been communicated to him by either party **within thirty (30) days** from the receipt of such notice, the said decision shall become final and binding on the parties.

48.5 In the event of the Engineer failing to notify his decision as aforesaid **within thirty (30) days** after being requested as aforesaid, or in the event of either the owner or the contractor being dissatisfied with any such decision, or **within thirty (30) days** after the expiry of the first mentioned period of thirty days, as the case may be, either party may require that the matters in dispute be referred to arbitration as hereinafter provided.

49 ARBITRATION

All disputes or differences in respect of which the decision, if any, of the Engineer has not become final or binding as aforesaid shall be settled by arbitration in the manner hereinafter provided.

49.1 The arbitration shall be conducted by three arbitrators, one each to be nominated by the contractor and the owner and the third to be appointed as an umpire by both the arbitrators in accordance with the Indian Arbitration Act. If either of the parties

fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration.

The arbitration shall be conducted in accordance with the provisions of the **Indian Arbitration Act, 1940** or any statutory modification thereof. The venue of arbitration shall be Bhubaneswar of Orissa state.

49.2 The decision of the majority of the arbitrators shall be final and binding upon the parties. The arbitrators may, from time to time with the consent of all the parties enlarge the time for making the award. In the event of any of the aforesaid arbitrators dying, neglecting, resigning or being unable to act for any reason, it will be lawful for the party concerned to nominate another arbitrator in place of the outgoing arbitrator.

49.3 The arbitrator shall have full powers to review and/or revise any decision, opinion, direction, certification or valuation of the Engineer in accordance with the contract, and neither party shall be limited in the proceedings before such arbitrators to the evidence or arguments put before the Engineer for the purpose of obtaining the said decision.

49.4 No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him as being called as a witness or giving evidence before the arbitrators on any matter whatsoever relevant to the dispute or difference referred to the arbitrators as aforesaid.

49.5 During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the contract.

50 RECONCILIATION OF ACCOUNTS

The contractor shall prepare and submit **every six months**, a statement covering payments claimed and the payments received vis-à-vis the works executed, for reconciliation of accounts with the owner. The contractor shall also prepare and submit a detailed account of Owner Issue materials received and utilized by him for reconciliation purpose in a format to be discussed and finalized with the owner before the award of contract.

All other disputes shall come under the jurisdiction of THE HIGH COURT OF ODISHA.

SECTION – III

SPECIAL CONDITIONS OF CONTRACT

1. **Guarantee:** The contractor shall warrant that the HTLS conductors, hardware and accessories are new, unused and in accordance with the contract documents and free from defects in material and workmanship. The contractor shall also guarantee for defect free/trouble free operation of the materials supplied and workmanship towards erection for a period of sixty (60) calendar months commencing immediately upon the satisfactory commissioning as specified in **clause 15 of GCC**.

2. **Quantity Variation:** The extra quantities executed if any shall be billed as per the unit price quoted by the firm & less quantity executed shall be deducted as per unit price. **The total variation in all items shall be limited to 10% of the contract price.**

3. **Nature of Price:** The price quoted by the Firm shall be firm for all items.

4. **Type Test Certificate:** Valid type test certificates of materials during last 5 years are to be furnished by the bidder along with their bid for evaluation.

5. Terms of Payment:-

A. Payment against supply of equipment and materials shall be effected as follows.

Advance Payment:

Ten percent (10%) of the Ex-works price component shall be paid as an initial advance on presentation of the following:

43 Acceptance of the Letter of Award by the Contractor.

44 Contractor's detailed pro-forma invoice for claiming mobilization advance.

45 An unconditional & irrevocable advance payment Bank Guarantee in favour of Odisha Power Transmission Corporation Ltd., for the equivalent amount of advance as per Performa attached. The said Bank Guarantee shall be initially valid up to the end of ninety (90) days after the scheduled date for successful completion of commissioning and shall be extended from time to time until ninety (90) days beyond the actual date of successful completion of supply, as may be required under the contract.

46 An unconditional & irrevocable Bank Guarantee in favour of Odisha Power Transmission Corporation Ltd., for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with the provisions of Clause 41.0, Section-II, INB. The said bank guarantee shall be initially valid up to ninety (90) days after expiry of the Guarantee Period shall be extended from time to time till ninety (90) days beyond successful completion of Guarantee period, as may be required under the Contract.

47 Detailed PERT Network / Bar Chart and its approval by the Owner.

48 The mobilization advance @10% shall be recovered proportionately/progressively from each running bill of the contractor by OPTCL. 10% simple interest per annum shall be charged on the mobilization advance paid to the firm.

Supply Part:

(i) Seventy five percent **(75%)** of the Ex-works price component shall be paid on successful completion of supply and receipt of the materials/items at site along with verification of material at site by the consignee and on submission of documents indicated herein under.

(a) Evidence of dispatch & receipt (R/R of receipted L/R).
(b) Contractor's detailed invoice & packing list identifying contents of each shipment.
(c) Insurance Policy / Certificate.
(d) Manufacturer's / Contractor's guarantee Certificate of Quality.
(e) Material Dispatch Clearance Certificate (MDCC) for dispatch issued by Owner.
(f) Test certificate.

iii) Fifteen Percent **(15%)** payment shall be made after installation of material at site and certification by engineer in-charge.

(iii) The balance ten percent (10%) of the Ex-works price component shall be paid after successful completion of the work and handing over to Odisha Power Transmission Corporation Ltd.

B. Payment for Erection & Commissioning work.

Advance Payment:

An advance of 10% (ten percent) of the total erection price shall be paid as initial advance subject to conditions as below:

(a) Submission of detailed invoice for advance payment.
(b) Establishment of Contractor's site offices and certification by Engineer that satisfactory mobilization for erection exists.
(c) Submission of an unconditional & irrevocable Bank Guarantee in favour of Odisha Power Transmission Corporation Ltd., for the equivalent amount as per pro-forma attached. The said Bank Guarantee shall be initially valid up to the end of ninety (90) days after the scheduled date for successful completion of

commissioning and shall be extended from time to time until ninety (90) days beyond the actual date of successful completion of commissioning, as may be required under the Contract.

(d) Submission of an unconditional & irrevocable Bank Guarantee in favour of Odisha Power Transmission Corporation Ltd., for ten percent (10%) of the total Contract price towards Contract Performance Guarantee (CPG) in accordance with Clause 41.0 of Section – INB. The said Bank Guarantee shall be initially valid up to 90 (ninety) days after the expiry of Guarantee period and shall be extended from time to time ninety (90) days beyond successful completion of Guarantee period, as may be required under the Contract.

(e) Detailed PERT Network / Bar Chart and its approval by the Owner.

(f) The mobilization advance @10% shall be recovered proportionately from each running bill of the contractor by OPTCL. 10% simple interest per annum shall be charged on the mobilization advance paid to the firm.

Erection Part:

ii) 90% (Ninety per cent) of the erection price component will be paid on progressive basis depending on the actual work done i.e. on completion of erection, testing and commissioning of the respective items and on certification of the same by the engineer in-charge.

iii) The balance 10% (ten per cent) of the erection price component shall be paid within sixty (60) days after successful commissioning of the project.

6. The firm should include the work contract tax in their quoted price & the entry tax shall be reimbursable to them, if paid by the firm.

7. Service Tax as applicable shall be paid as per **Service Tax Provisions**.

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

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

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

Important:

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

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

b) Hotel Accommodation:

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

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

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

c) Journey of the inspecting officer:

(i) To and fro travel expenditure from the Head Quarters of the inspecting officer to the place of inspection/testing shall be borne by the contractor/supplier/manufacturer. Journey from the Head Quarters of the inspecting officer to the nearest Air Port by train (Ist/IInd A.C) & A/C Taxi then by Air to the place of inspection/testing or to the nearest place of inspection/testing and then by train (Ist/IInd A.C) & A/C taxi to the place of inspection/testing shall be arranged by the contractor/supplier/manufacturer.

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

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

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

d) Local Conveyance:

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

e) Following points are also to be considered:

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

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

(iii) If required, maximum three (3) officers of the owner will be deputed to witness the acceptance test at the works / third party laboratory..

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

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

9. The contractor has to submit the soft copy of the Bidding documents along with Bid.

10. **Liquidated Damage (LD):** For delay in supply of materials/supply of spares/ completion of project, LD as per the approved schedule shall be imposed on the contractor, at the rate of 0.5% of contract price per week or part thereof of delay subject to maximum of 5% of the total contract price except for spares. **The maximum limit of penalty for spares shall be ten percent (10% of corresponding value).**

11 **INCENTIVE:** 0.25% of the contract price as an incentive, per completed full month (no proportionate for the part thereof) shall be given, for the projects completed before the schedule date of completion but limiting to overall 2.5%.

12. **Engagement of Security:** The contractor shall have to engage his own security at his own cost till final handing over of the entire work to OPTCL.

13. **INDEMNITY BOND:** For the materials/equipment to be provided by the contractor and or for the owner supplied items, it will be the responsibility of the contractor to take delivery, unload and store the materials at site and execute an indemnity bond as per Performa at Annexure – XVII, of section-IV formats in favour of Odisha Power Transmission Corporation Ltd. against loss, damage and risks involved for the full value of the materials. This indemnity bond shall be furnished by the contractor before commencement of the supplies and shall be valid till the schedule date of testing, commissioning and handing over the equipment and line to the owner.

14. **INELEGIBILITY FOR FUTURE TENDERS:**
"Notwithstanding the provisions specified in Section-1, Instruction to Tenderers Clause 39.0, if a bidder after having been issued the Notification of Award / Letter of Award, either does not sign the Contract Agreement pursuant to Instruction to Tenderers Clause 40.0 or does not submit acceptable Contract Performance Guarantee pursuant to Instruction to Tenderers Clause 41.0, and GCC Clause32.0, such bidder may be considered ineligible for participating in future tender of Odisha Power Transmission Corporation Ltd. for a period as may be decided by the owner."

15. **AFTER SALE SERVICE:**
Contractor/subcontractor shall extend all facilities towards after sale / erection service towards the equipments after commissioning of the project at least for 5 years.

16. **Time Schedule:** The work is to be completed as per time schedule given below.

Sl. No	Name of the Package	Name of the Line.	Delivery at owner's store	Erection, testing & commissioning
1	HTLS Package	Package-I. 132KV Chandaka- Nimapara. Single circuit (S/C)= 56.28 Ckt. KMs.	120 days from the date of placement of letter of award	180 days from the date of placement of letter of award i.e. 60 days after 120 days.
2		Package-II. 132 KV Ranasingpur- Kesura. Single circuit (S/C))= 24.04 Ckt. KMs.		
3		Package-III. 132 KV Kesura-Nimapara. Single circuit (S/C))= 42.55 Ckt. KMs.		

SECTION – IV

SCHEDULE OF FORMATS

CONTENTS

XXI Pro-forma for Form of undertaking.

XXII Manufacturer's Authorization Form

ANNEXURE – I

GENERAL INFORMATION

The bidder shall furnish general information in the following format.

1. Name of the Firm:

1. Head office address:

(g) Contact persons:
Telephone No. Office: Residence:

4. Fax No. Telex: E mail ID

5. Place of incorporation/Regn.

Year of incorporation/Regn.

ANNEXURE – II

DECLARATION FORM

Tender Specification No._____/

To

Sr. G.M. (CPC), OPTCL, Bhubaneswar-751022.

Sir,

1. Having examined the above specification together with tender conditions referred to therein, I/We undersigned hereby offer to execute the work contract covered therein complete in all respect as per the specification and general conditions, at the rates entered in the attached contract schedule of prices in the tender. Our offer is valid up to 180 days from the date of tender opening and the prices, which are on firm basis, will remain valid till completion of the work.
2. I/We hereby undertake to have the works completed within the time specified in the tender.
3. I/We certify to have purchased a copy of the specification by remitting cash demand draft and this has been acknowledged by you in your letter No dated
4. In the event of work order being decided in my/our favour, I/We agree to furnish the composite Bank Guarantee in the manner acceptable to ORISSA POWER TRANSMISSION CORPORATION LIMITED and for the sum as applicable to me/us as provided in the general conditions of contract (Section-II) of this specification within 15 days of issue of Letter of Award, failing which I/We clearly understand that the said work order will be liable to be withdrawn by OPTCL.

Signed this ..... Day of .....2013.

Yours faithfully,

Signature with

Seal of Tenderer.

(This form should be duly filled in by the tenderer and submitted along with the original copy of tender)

ANNEXURE – III

ABSTRACT OF TERMS AND CONDITIONS

1.	Earnest Money furnished	(a)	Cash
		(b)	Bank Guarantee
		(c)	Bank Draft
2.	Validity (Whether agreeable to OPTCLterm.		
3.	Whether there is any Commercial deviation(Yes/No)		
4.	Price		
5.	Rate of Sales Tax		
6.	Rate of Exise Duty		
7.	Rate of Sales Tax		
8.	Rate of Service Taxes		
9.	Rate of other taxes/levies/duties		
10.	Nature of price: Firm		
11.	Testing charges, if any.		
12.	Terms of payment :	Whether agreeable to OPTCL'sYes/No terms or not?	
13.	Schedule date of completion of work:	Whether agreeable to OPTCL'sYes/No terms.	

14.	Guarantee:	Whether agreeable to OPTCL's terms.	Yes/No
15.	Penalty:	Whether agreeable to OPTCL's terms.	Yes/No
16.	Whether agreed to furnish 10% composite bank guarantee (in case of outside state firms [@ 8.5% of contract value in case of State SSI units] in case his tender becomes successful:		Yes/No
17.	Whether agreed to Technical Specifications and drawings:		Yes/No
18.	Contractor's name & address:		
19.	Whether agreed for special terms & conditions of OPTCL		Yes/No
20.	Whether agreed to pay interest on Mobilisation Advance		Yes/No
21.	Whether agreed to engage own security at own cost		Yes/No
22.	Whether agreed to get the Project License at own cost		Yes/No
23.	Whether agreed to deposit the statutory fees		Yes/No
24.	Whether OPTCL have offloaded any work due to non-performance during last five years		Yes/No
25	Delivery (Period in month from the date of P.O.		

SIGNATURE OF BIDDER

NAME: & DESIGNATION:

ANNEXURE – IV

PERSONNEL CAPABILITIES

Name of Applicant:

Details of persons available with necessary qualifications and experience in erection of transmission lines, both managerial supervisory & workmen with necessary license/workman permit issued by the Electrical Licensing Board, Orissa shall be furnished in the following formats.

(A)**PERSONNEL IN MANAGERIAL POSITION**:

Sl. No.	Name of person with designation	Educational/ Tech. Qualification	Year of experience	Details of License from ELB (O)

(B)PERSONNEL IN SUPERVISORY POSITION:

Sl. No.	Name of person with designation	Educational/ Tech. Qualification	Year of experience	Details of Licence from ELB(O)

(C)PERSONNEL IN WORKMEN CATEGORY:

Sl. No.	Name of person with designation	Educational/ Tech. Qualification	Year of experience	Details of Licence from ELB(O)

ANNEXURE – V

EQUIPMENT CAPABILITIES

- **Name of the Applicant:**

The bidder shall provide as the capability to meet the requirements for each and all items of equipment in their possession, for manufacturing, erection and testing in the following format:

(A)**Erection**

Sl. No.	Description of equipment	Model/ Power rating	Capacity	Year of manufacture

(B)Testing:

Sl. No.	Description of equipment	Model/ Power rating	Capacity	Year of manufacture

ANNEXURE – VI

FINANCIAL CAPABILITY

(A)ANNUAL TURNOVER:

Name of the bidder:

2.4 (The bidder is requested to complete the information in this Annexure. The information supplied should be the annual turnover duly audited by the Chartered Accountant for preceding best three financial years out of the last five financial years reckoned on the date of bid opening as per the audited accounts of the bidder.(excluding current financial year).
(for work in progress or completed).

ANNUAL TURNOVER DATA:

YEAR	TURNOVER	INDIAN RUPEES

(B) The bidder shall also furnish the following information:

1 Name of Banker:

2 Address of Banker:

3 Telephone:

5. Contact Name and Title:

6. FAX

Financial information In Rupees	Actual previous three years	Projected :Next two Years:
	1. 2. 3.	4. 5.

1. Total assets:
2. Current assets:
3. Total liabilities:
4. Current liabilities
5. Profit before taxes:

(C) Proposed sources of financing:

Sources of financing Amount (Rs.)

1.

2.

3.

Attach audited financial statements for the last three years.

ANNEXURE - VII

EXPERIENCE RECORD

The bidder shall furnish details of work orders for similar nature of erection work received during the last three years and already completed and under execution.

Sl. No.	Work order/ No. & Date	Name & address of the owner	Value of contract	Scheduled date of delivery/completion of work	Slippage with	Remarks

ANNEXURE – VIII

DEVIATION SCHEDULE

Tenderer shall enter below particulars of his alternative proposals for deviation from the specification, if any.

(A) Technical

Sl. No.	Clause No. of Specification	Particulars of deviation	Price

Date:

Place: SIGNATURE OF TENDERER

NAME:

DESIGNATION:

(SEAL)

(B)**Commercial**

Sl. No.	Clause No. of Specification	Particulars of deviation	Price

Date:

Place:

SIGNATURE OF TENDERER

NAME:

DESIGNATION:

(SEAL)

ANNEXURE – IX

LITIGATION HISTORY

Name of the Bidder:

Bidder should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution.

Year.	Award for or against bidder	Name of client, cause of litigation and matter in dispute	Disputed amount (current value in Rs.)

ANNEXURE-XII

FORM OF COMPLETION CERTIFICATE

…… (Name of the Contractor)

To

Date……

Loan No……

Contract No……

(Name and address of the Owner)

Sir,

Pursuant to Conditions of the Contract entered into between yourselves and the Owner dated ……relating to the …… (brief description of the Facilities), we hereby notify you that the following part (s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Owner hereby takes over the said part (s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below

1. Description of the Facilities or part or part thereof …… ……

2.Date of Completion…

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to compete the execution of the Facilities in accordance with the Contract nor your obligations during the Defects Liability Period.

Very truly yours,

Title

(Project Manager)

ANNEXURE-XIII

FORM OF OPERATIONAL ACCEPTANCE CERTIFICATE

(Name of the Contract)_____

To

Date……

Loan No……

Contract No……

(Name and address of the Owner)

Sir,

Pursuant to Conditions of the Contract entered into between yourselves and the Owner dated ……relating to the ……(brief description of the Facilities), we hereby notify you that the following part (s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Owner hereby takes over the said part (s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below

1. Description of the Facilities……

2. Date of Operational Acceptance…

This letter does not relieve you of your obligation to compete the execution of the Facilities in accordance with the Contract nor your obligations during the Defects Liability Period.

Very truly yours,

Title

(Project Manager)

ANNEXURE – XIV

PRO-FORMA FOR BANK GUARANTEE FORM FOR EARNEST MONEY DEPOSIT

Ref Date Bank Guarantee No:

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 Branch]

[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.

7. We the _____ Bank further agree that this guarantee shall also be invokable at our place of business at ----------Branch (specify Branch name & Code)at Bhubaneswar in the state of Orissa.

Not withstanding anything contained here in.

1) Our liability under this bank guarantee shall not exceed Rs.----------(Rupees----------).

2) The bank guarantee shall be valid up to dt.----------

3) We are liable to pay the guaranteed amount or any part there of under this bank guarantee only & only if you serve upon us at ----------branch at Bhubaneswar a written claim or demand on or before dt.----------.

Dated _____ Day of _____

Witness ((Signature, names & address)

1.

2.

For_____

[Indicate the name of Bank]

ANNEXURE – XV

PRO-FORMA 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----------Branch(specify Branch name & Code at Bhubaneswar in the state of Orissa.

Not withstanding anything contained here in.

1) Our liability under this bank guarantee shall not exceed Rs.----------(Rupees----------).

2) The bank guarantee shall be valid up to dt.----------

3) We are liable to pay the guaranteed amount or any part there of under this bank guarantee only & only if you serve upon us at ----------branch at Bhubaneswar a written claim or demand on or before dt.----------.

Date at _____the, _____day of _____

For _____

[Indicate the name of the bank]

Witness (Name, Signature & Address)

1.

2.

ANNEXURE – XVI

BID PROPOSAL SHEET.

ANNEXURE – XVII

PRO-FORMA OF INDEMNITY BOND TO BE EXECUTED BY

THE CONTRACTOR FOR THE MATERIALS HANDED OVER

FOR PERFORMANCE OF ITS CONTRACT.

(Entire Materials consignment in one lot)

(On non-Judicial stamp paper of appropriate value)

INDEMNITY BOND

THIS INDEMNITY BOND is made this..... day of ..... 20 .....by..... a Company registered under the Companies Act, 1956/

Partnership Firm/ Proprietary Concern having its Registered Office at .....(hereinafter called as 'Contractor' or "Obligor" which expression shall include its successors and permitted assigns) in favour of ..... , a Company incorporated under the Companies Act, 1956 having its Registered Office at ..... And its project at..... (Hereinafter called "....." which expression shall include its successors and assigns):

WHEREAS ..... has awarded to the Contractor a Contract for ..... vide its Letter of Award/Contract No..... Dated..... and its Amendment No..... And Amendment No. ..... (Applicable when amendments have been issued) (Hereinafter called the "Contract") in terms of which ..... is required to hand over various equipment to the Contractor for execution of the Contract.

And WHEREAS by virtue of Clause No..... of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of ..... for the Materials handed over to it by..... for the purpose of performance of the Contract/ Erection portion of the Contract (hereinafter called the "Materials").

NOW THEREFORE, This Indemnity Bond witnessed as follows:

1. That in consideration of various materials as mentioned in the Contract, valued at

2. Rs... (Rupees.....) handed over to the Contractor for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep ..... indemnified, for the full value of the Materials. The Contractor hereby acknowledges receipt of the Materials as per dispatch title documents handed over to the Contractor duly

endorsed in their favour and detailed in the Schedule appended hereto. It is expressly understood by the Contractor that handing over of the dispatch title documents in respect of the said Materials duly endorsed by .....in favour of the Contractor shall be construed as handing over of the Materials purported to be covered by such title documents and the Contractor shall hold such Materials in trust as a Trustee for and on behalf of.....

2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/ protection and custody of the Materials at ..... project Site against all risks, whatsoever till the materials are duly used/ erected in accordance with the terms of the Contract and the Plant/ Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by ..... . The Contractor undertakes to keep ..... harmless against any loss or damage that may be caused to the Materials.

3. The Contractor undertakes that the Materials shall be used exclusively for the performance/ execution of the Contract strictly in accordance with its terms and conditions and no part of the Materials shall be utilized for any other work of purpose whatsoever, it is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/ penal consequences.

4. That ..... is and shall remain the exclusive Materials free from all encumbrances, charges or liens of any kind, whatsoever. The Materials

shall at all times be open to inspection and checking by Engineer-in-Charge / Engineer or other Employees/ agents authorised by him in this regard. Further, ... shall always be free at all times to take possession of the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of ..... to return the Equipment without any demur or reservation.

5. That this Indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Materials or the same or any part thereof is mis-utilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Engineer-in-Charge / Engineer of ..... as to assessment of loss or damage to the Materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Materials at his own cost and/ or shall pay the amount of loss of ..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to ..... against the Contractor under the Contract and under this Indemnity Bond.

6.NOW THE CONDITION of this Bond is that the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of ..... , THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHERE OF, the Contractor has hereunto set its hand through its authorized representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE

Particulars of the Materials handed over	Quantity	Particulars of Despatch title Documents		Value of the Materials	Signature of the Attorney (authorize Representativ
		RR/GR No. date of lading	Carrier		

For and on behalf of

M/s.....

WITNESS

1. 1. Signature . . . . . .

Signature. . . . .

. .

2. Name . . . . . .

Name . . . .

. . .

3. Address . . . . . .

Designation ....

. . . . . .

Authorised representative

2. 1. Signature . . . . . .

2. Name . . ..

(Common Seal)

3. Address ...

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of Contracting Company under common seal of the Company or (ii) having the Power of Attorney issued under common seal of the company with authority to execute Indemnity Bond, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

ANNEXURE – XVIII

CONTRACT AGREEMENT

THIS SERVICE CONTRACT AGREEMENT No._____/10-11 (also referred to as 'Service Contract / the Second Contract') is made this the _____ day of _____ between the **Sr. General Manager, Central Procurement Cell, (Empowered Officer), Orissa Power Transmission Corporation Limited, Janapath, Bhubanaeswar-751 022** (hereinafter called "the Owner" and also referred to as "OPTCL") of one part and _____ M/S_____(name of the contractor) _____a company incorporated under the laws of companies act 1956 and having its principal place of business at _____(Address of the contractor)_____ and registered office at _____(Registered address of the contractor) hereinafter called "the Contractor"

Whereas the Owner desires that certain contracts should be executed by the contractor, viz. **"Replacement of ACSR Panther conductor by HTLS conductor in 132KV Chandaka- Nimapara. Single circuit (S/C) 56.28 KMs, Ranasingpur-Kesura. . Single circuit (S/C) 24.04 KMs, Kesura- Nimapara . Single circuit (S/C) 42.55 KMson Turn key basis**", as per Bid Specification. **BID SPECIFICATION NO Sr.G.M-CPC-TENDER-UPGRADATION OF CONDUCTOR-40/2016-17.**as detailed in the Tender Document & Contractor has agreed and accepted for the execution of this contract at a sum of Rs._____**(Rupees**_____ **only)**inclusive of all Taxes & Duties except Service taxes and Entry taxes which shall be reimbursed to the Contractor (hereinafter called " the contract price"), as per actual on production of documentary evidence.

NOW THE AGREEMENT WITNESSTH AS FOLLOWS:

In this agreement works and expressions shall have the same meaning as are respectively assigned to them in the tender specifications referred to above.

1. The following documents shall be deemed to form and be read and construed as integral part of this agreement, viz.

i) This contract agreement.

ii) The Tender Specification. (Both technical & commercial)

i) The Condition of contract.

ii) The contract Data

iii) The Bid documents submitted along with the Offer No._____ dated _____and

iv) All correspondences made there after

viii) The Owners LOA, SR-GM-CPC- _____

ix) LOA No. SR.GM-CPC _____dated _____.

2. The LOA issued by OPTCL for the referred order, which shall also form the part of this agreement.

3. In Consideration of the payments to be made by the Owner to the contractor as hereinafter mentioned, the contractor hereby covenants with the Owner to execute the contract and to remedy the defects therein, in conformity & in all respects as per the provision of the tender specification & instructions given from time to time by the Owner.

4 The Owner hereby covenants to pay an amount of Rs_____**(_Rupees**_____**only)** to the contractor, in consideration of the performance/execution of the contract, and the remedying of defects therein, the contract price or such other as may become payable under the provisions of the contract in accordance with the terms & conditions of the contract.

5 The terms & procedures of Payment according to which the Owner will re-reimburse the contractor as per tender specification No. 46/2012-13.

6 The time of completion shall be one hundred eighty (180) days from the date of issue of the LOA.

7 The contract agreement no-._____ has also been made on the ._____ day of _____2013 between the Owner and the contractor for the Ex-

Works /FOB Supply contract (hereinafter referred to as the “First contract”) for the subject package which includes Ex-works/FOB supply of all equipment’s& materials interalia including the Supply, Erection, Testing & Commissioning for the complete execution of the work on Turnkey basis

8 The contractor shall be overall responsible to ensure the execution of the contract to achieve successful completion and taking over of the facilities by the Owner as per the requirements stipulated in the contract. It is expressly understood and agreed by the contractor that any default or breach under the Contract and any such breach or occurrence or default giving the Owner a right to terminate the Contract either in full or in part, and/or recover damages there under as well.. It is also expressly understood and agreed by the contractor that the equipment/materials supplied by the contractor when installed and commissioned by the contractor shall give satisfactory performance in accordance with the provisions of the contract.

IN WITNESSES whereof, the parties hereto, caused this agreement to be duly executed in accordance with their prevailing laws on the day and year first above written.

Signed by for and on behalf of	Signed by for and on behalf of
_____ (the Contractor) with	OPTCL (the Owner)
Firm's Seal	
	(Sri)
	Sr. General Manager (CPC)
	OPTCL -Janapath
	Bhubaneswar-751022.
In the Presence of	
1. Witness-1	(1). Witness-1
(Name & Address)	(Name & Address)

2. Witness-2 (2) Witness- 2

(Name & Address) (Name &Address)

ANNEXURE – XIX

PRO-FORMA OF APPLICATION FOR PAYMENT

Project :

Material package : Date :

Name of Contractor : Contract No. :

Contract Value : Contract Name :

Unit Reference : Application

Serial Number :

To

…….

……,

Dear Sir,

APPLICATION FOR PAYMET

1. Pursuant to the above referred Contract dated ……. the undersigned hereby applies for payment of the sum of ……. (Specify amount and currency in which claim is made).
2. The above amount is on account of : [TICK whichever is applicable]
   Initial advance

   Interim payment as advance

   Progressive payment against dispatch of equipment

   Progressive payment against receipt of equipment at site

Progressive payment against Erection

Ocean freight & marine insurance

Inland transportation

Inland insurance

Price adjustment

Extra work not specified in Contract

(Ref. Contract change Order No. ……..)

Other (specify)

Final payment

As detailed in the attached Schedule (s) which form an integral part of this application.

3. The payment claimed is as per item (s) No (s) …… of the payment schedule annexed to the above mentioned Contract.

4. The application consists of this page, a summary of claim statement and the following signed schedule.

1. ……
2. ……
3. ……

The following documents are also enclosed

1. ……
2. ……
3. ……

Signature of Contractor /

Authorised Signatory

Application for payment will be made to 'Engineer' to be designated for this purpose at the time of award of the Contract,

Pro-forma for the Schedule will be mutually discussed and agreed to during the finalization of the Contract Agreement

ANNEXURE– XX

PRO-FORMA BANK GUARANTEE FOR ADVANCE PAYMENT

(To be stamped in accordance with Stamp Act)

Ref No: - ……

Bank Guarantee No. ……

Date:- ……

(Name and address of the Owner)

……

……

Dear Sir,

We refer to the Contract ("the Contract") signed on …….. between you and ……("the Contractor") concerning design, execution and completion of (Brief description of the Facilities).

Whereas in accordance with the terms of the said Contract, the Owner has agreed to paid to the Contractor an Advance payment in the amount of _____ (amount of foreign currency in works) _____ (_____) (Amount in Figures) and (Amount of local currency in words)

_____ (_____) (Amount in figures) and (Amount of local currency in words) _____ (_____) (Amount in figures)

By this letter we, the undersigned……(Name of the Bank), a bank organized under the laws of ……and having its

registered / principal office at ……do hereby jointly and severally with the Contractor irrevocably argument in the event that the contractor fails to commence or fulfill its obligations under the terms of the said advance payment to the Owner.

Provided always that the Bank's obligation shall be limited to an amount equal to the outstanding balance of the advance payment, taking into account such amounts that have been repaid by the contractor from time to time in accordance with the terms of payment of the said contract as evidenced by appropriate payment certificates.

This guarantee shall remain in full force from the date of upon which the said advance payment is received by the contractor until the date upon which the contractor has fully repaid the amount so advanced to the Owner in accordance with the terms of the contract. At the time at which the outstanding amount is NIL, this Guarantee shall become null and void, whether the original is returned to us or not. Any claims to be made under this Guarantee must be received by the Bank during its period of validity i.e. on or before _____*(year, month, date).

Yours truly,

Name of the Bank

Authorized signature

Signature of witness_____

Name_____

Address_____

- The date shall be three (3) months after the date of operational acceptance by the Owner.

Note:

1. The non-judicial stamp papers of appropriate value shall be purchased in the name of the Bank who issues the "Bank Guarantee".

2. Performance security is to be provided by the successful bidder in the form of a bank guarantee, which should be issued either:

   (a) by a reputed bank located in the country of the Owner and acceptable to the Owner or
   (b) By a foreign bank confirmed by either its correspondent bank located in the country of the Owner which should be reputed and acceptable to the Owner, or a Public Sector Bank in the country of the Owner.

ANNEXURE – XXI

FORM OF UNDER TAKING

(To be submitted along with the Price Bid & a copy of the same in the

Techno-Commercial Bid)

To

The Sr. G.M (CPC)

OPTCL, Bhubaneswar

Ref: (i) Tender Notice No. ……

(ii) Tender Specification No. ……

Having read the Clause No.36 (a to f) procedure for evaluation of the price bid of instruction to Bidders, I/we understand & hereby declared and undertake that

(i) Any item/ items, which is/are completely missed / omitted / replaced with an irrelevant content or left blank (price not quoted) in our price bid, the same shall be evaluated by incorporating the highest quoted price of said item from amongst all other qualified bidders. The bid price so evaluated shall fix the relative position of the bidders for evaluation purpose only. AND

(ii) The said item/ items which is/are completely missed / omitted / replaced with an irrelevant content or left blank (price not quoted) in our price bid, shall be supplied /erected & installed by us, free of cost, in the event, the contract is awarded in our favour, irrespective of any financial involvement on us and without any financial liability to OPTCL.

I/we further undertake that we shall abide by this declaration/ undertaking & shall not raise any dispute whatsoever, in future, as regards our price and the basis of evaluation of our price bid.

I/we hereby declare that this under taking is given at my / our free will and volition without being influenced, coerced or persuaded any manner.

Date: (Signature).....

Place: (Printed Name) .....

(Designation) .....

(Common Seal)

PART – II

PRICE BID

1. PRICE:

(i) Bidders are required to quote their price(s) for goods offered indicating they are 'FIRM'

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

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

Offers with exemption from excise Duty/ Sales tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean 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. Properly and in full. The tender may be rejected if the schedule of price is submitted in incomplete form.

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.

SECTION-V

TECHNICAL SPECIFICATION

FOR

UPGRADATION OF EXISTING ACSR PANTHER CONDUCTORS BY EQUIVALENT SIZE HTLS (HIGH TEMPERATURE LOW SAG) CATEGORY CONDUCTOR IN EHT LINES OF OPTCL.

Sl.No	Name of the Package	Name of the Line.	Circuit KM of the Line.
1	HTLS Package	132KV Chandaka- Nimapara. Single circuit (S/C)	56.28
2		132 KV Ranasingpur- Kesura. Single circuit (S/C)	24.04
3		132 KV Kesura- Nimapara. Single circuit (S/C)	42.55

INDEX

7. GUARANTEED TECHNICAL PARTICULARS

8. SAG TENSION CHARTS AND SAG TEMPLATES

9. ACCESSORIES

10. EXECUTION OF WORK

11. STRINGING

12. FIELD QUALITY PLAN

13. WASTAGE

14. LOSSES

15. COMMISSIONING

16. DRAWINGS AND SPECIFICATIONS

1. GENERAL INFORMATION AND SCOPE

1.1 General Information.

1.1.1 The **ORISSAPOWER TRANSMISSION CORPORATION LIMITED**, hereinafter called 'OPTCL'/'OWNER' will receive bids for replacement of the existing ACSR Panther conductor by HTLS Conductor except GAP conductor as set forth in the technical specification at section-V. All bids shall be prepared and submitted in accordance with these instructions. The tender is invited in **two-part** basis i.e. (1) Techno-commercial bid consisting all the documents except price bid & (2) Price Bid. Both the bids duly sealed separately shall be kept inside the third sealed cover with super scribed "Tender specification No. & Date of Opening".

Sl.No	Name of the Package	Name of the Line.	Circuit KM of the Line.
1	HTLS Package	132KV Chandaka- Nimapara. Single circuit (S/C)	56.28
2		132 KV Ranasingpur- Kesura. Single circuit (S/C)	24.04
3		132 KV Kesura -Nimapara. Single circuit (S/C)	42.55

1.2 **Scope**

1.2.1 The scope of work inter-alia includes:

(i) Design, manufacturing, testing & supply of High Temperature Low Sag (HTLS) conductor except GAP conductor as well as required associated hardware fittings and accessories viz. suspension clamps, dead end clamps, mid-span compression joints, repair sleeves, T-Connectors, vibration dampers, etc.

(ii) Survey & profiling of existing line route using Total stations, verification of availability of statutory electrical clearances using PLS-CADD software; de-stringing of existing Conductor including dismantling of associated fittings & accessories from the above lines and stringing of each circuit with HTLS conductor along with associated fittings and accessories with the other circuit under live condition; testing & commissioning.

1.2.2 The material to be supplied on final destination at site basis as covered in the bidding documents shall be designed, manufactured, tested, supplied and installed as per the requirements specified in this volume. The requirements, conditions, appendices etc. as specified in other Sections of bidding documents shall also apply to.

1.2.3 The standard type disc insulators (90 & 120 KN) along with hardware fittings (except suspension clamps at suspension tower and dead end clamps at tension tower) of the existing line shall be used for re-conductoring of line with HTLS conductor. The existing insulators and hardware fittings shall be inspected by the contractor for any defects and those found defective shall be replaced after approval of engineer-in-charge with fresh items to be supplied by Owner.

1.2.4 The ACSR PANTHER conductor removed from the existing line is envisaged for re-use/ utilization by the Owner in other projects. Proper handling and safety of the conductor during de-stringing, storage at site, measurement of conductor lengths, rewinding on drums at site and safe transportation to Owners

designated stores along the transmission line shall be included in the scope of work.

1.2.5 The Owner shall arrange shut down of one circuit at a time and the other circuit shall be kept under charged condition. The contractor shall destring the existing conductor and restring the circuit with the HTLS conductor section by section and restore the line in original conditions as per program finalized in co-ordination with site.Appropriate safety measures along with necessary safety tools and equipments to carry out destringing and stringing operations under the above conditions including mechanical/ structural safety of the towers, shall be the responsibility of the contractor. Necessary calculations shall be carried out by the contractor to ensure that by replacing the existing ACSR PANTHER conductor with the HTLS conductor offered, the loadings on the towers due to conductor tensions as well as loads on account of the reconductoring activities shall be within specified limits. These calculations shall be submitted by the bidder along with bid.

1.2.6 The materials covered in this package shall be supplied complete in all respects, including all components, fittings and accessories which are necessary or are usual for their efficient performance and satisfactory maintenance under the various operating and atmospheric conditions. Such parts shall be deemed to be within the scope of the Contract, whether specifically included or not in the Specification or in the Contract Schedules. The Supplier shall not be eligible for any extra charges for such fittings, etc.

1.2.7 The entire stringing work of conductor shall be carried out by tension stringing technique except where geography/ topographical or other site constraints do not permit use of tension stringing equipment. In such cases manual stringing along with other appropriate tools and equipment's may be employed with the approval of Owner's site in charge. Contractor is to indicate the sets of TSE in his proposal and indicate

no. of stringing equipment's which the bidder plans to deploy so as to meet his schedule in their offer.

1.2.8 Submission of complete technical details of the proposed HTLS conductor with relevant calculation along with the bid to adjudge the sufficiency of existing towers for carrying out the up-rating works. This shall be carried out in compliances / adherence to all safety and standard requirements as per Indian Electricity Rules 1956. Design parameters and submission of detailed drawings of conductor hardware and accessories and preparation of sag tension chart, stringing chart, of the conductor used showing, sag & tension at various temperatures are included in the scope of the Bidder.

1.2.9 The existing insulators shall be inspected by the contractor in advance for any defects and those found defective shall be replaced with good ones by OPTCL. During stringing if any existing insulator found defective, it will be supplied by OPTCL.

1.2.10 The entire stringing work of HTLS conductor shall be carried out by tension stringing technique except where geographical / topographical or other site constraints do not permit use of tension stringing equipment. In such cases manual stringing along with other appropriate tools and equipment may be employed with the approval of engineer in charge. The contractor shall indicate in their offer, the sets of tension stringing equipment he is having in his possession and the sets of stringing equipment he would deploy exclusively for this package. The contractor shall also engage sufficient manpower so that stringing of the conductor in one stretch is complete within the allowed shut down period of one day. No mid span joint will be allowed & hence the length of the conductor shall be decided by referring the tower schedule.

1.2.11. Only important road & river crossings and lines passing over civil structures will have double insulator strings. Vibration dampers are to be provided in all suspension & tension locations.

1.2.12The rollers, which will be used during stringing, should be so designed that the line can be charged with the roller.

1.2.13 Contractor should deploy stringing/ installation experts during erection of the offered type of conductor.

2. DESIGN PARAMETERS

2.1 Technical Particulars of HTLS Conductor

The design and other parameters on which the up rating is to be planned are:

The HTLS conductor shall meet the following minimum requirements:

Overall diameter of complete conduct	Overall diameter of the conductor should be than or equal to 21 mm.
Approx. mass of complete conductor (kg/Km)	Less than or equal to 974kg/km
Direction of lay of outer layer	Right Hand

The bidder shall indicate the technical particulars and details of the construction of the conductor in the relevant schedule of GTP. The bidder shall also guarantee the DC resistance of conductor at 20 deg C and AC resistance at the calculated temperature corresponding to 50Hz alternating current flow of 800 amperes per conductor at specified ambient conditions (maximum continuous operating temperature).

The bidder shall submit the supporting calculations for the AC resistance indicating details & justifications of values of temperature coefficient of resistance & DC to AC resistance conversion factor(s) with due reference to construction / geometry of the conductor.

2.2Climatic & Technical details: The climatic and system parameters are detailed below.

2.2.1 Climate details.

Location:- In the state of Orissa

Maximum ambient temperature= 50 °C

Minimum ambient temperature=05 °C

Every day temperature=32°C

Maximum relative humidity=100%

Average rainfall per year=1150mm. Approx.

Isokeraunic level = 100 / year

Number of rainy days per year = 100 days

Altitude = Less than 350 Meters.

2.2.2 Current Carrying Capacity / Ampacity Requirements

Each HTLS conductor shall be suitable to carry minimum 50 Hz alternating current of 800 Amperes conductor under the ambient conditions & maximum conductor sag specified below while satisfying other specified technical requirements/ parameters.

Ambienttemperature: 50 deg C

Solar Absorption coefficient =0.8

Solar Radiation = 1045 watt/sq.m

Emisitivity Constant= 0.45

Wind velocity = 0.6 m/sec

Maximum Conductor sag for 320m span at steady state conductor temperature and no wind corresponding to 50 Hz alternating current of 800 Amperes per conductor under ambient conditions specified at 2.2.3 will be such that the statutory ground clearance will be maintained throughout the route keeping (erection) tension at 25% of UTS of conductor.

The calculations for Ampacity shall be based on IEEE Standard 738. The bidder in his bid shall furnish calculations for the ampacity based on the above Standard for the proposed HTLS conductor.

The design of conductor shall be suitable for operation at a steady state conductor temperature experienced for AC current flow of 800 Amperes under the above ambient conditions based on ampacity calculations mentioned above. The bidder shall also indicate the maximum permissible conductor temperature for continuous operation without any deterioration of its electrical, mechanical & metallurgical properties. The bidder shall also furnish the maximum permissible conductor temperature for short-term operations including permissible duration of such short-term operation.

2.2.3 Sag-Tension Requirements

The HTLS conductor shall meet the following sag tension requirements for ruling span of 320 metres.

Particulars	Limiting value
Tension at every day condition (32°C, no wind)	≤2285 kgs& Not exceeding 25% of UTS of proposed conductor
Tension at 32°C, full wind (52 kg/m2)	≤2918 kgs& not exceeding 50% of UTS of proposed conductor
Tension at 5°C, 2/3 wind pressure (52/3 kg/m2)	≤3077 kgs& not exceeding 50% of UTS of proposed conductor
Sag at continuous operating temp (corresponding to 800 amperes and no wind), including all of the above conditions.	≤6.0 meters

Sag-Tension calculations at various conditions mentioned above using parabolic equations shall be submitted along with the bid. These calculations shall also include calculations for determination of transition / knee point temperature.

The bidder shall also furnish sag & tensions under no wind for various temperatures starting from 0 deg C to maximum continuous operating temperature in steps of 5 degC.

After award of the contract, the Supplier shall submit Sag-Tension calculations corresponding to various conditions given above for all the existing spans and spans ranging from 50 m to 350 m in intervals of 50 m.

Besides above, the Supplier shall also furnish details of creep characteristics in respect of HTLS conductor based on laboratory investigations/ experimentation (creep test as per IEE1138) conducted on similar type of conductor and shall indicate creep strain values corresponding to 1 month, 6 month, 1 year & 10 year creep at everyday tension & at maximum continuous operating temperature.

2.3.1 EVALUATION OF OHMIC LOSSES & DIFFERENTIAL PRICE LOADING.

Based on the conductor parameters guaranteed by the bidders, average ohmic losses for different type of conductors offered by the bidders shall be calculated as per the following.

Average ohmic losses= Loss load factor X Line length X (Desire operating current i.e.800A)^2 X AC resistance corresponding to 800A.(Considering loss load factor=0.53)

Where Rac is the AC resistance per KM guaranteed by the bidder at temperature corresponding to the continuous operating current of 800 A under normal condition.

Differential price evaluation for the conductors offered by the bidder shall be carried out considering the average Ohmic losses calculated as above and considering **Rs.1,65,110. per KW.**

The best parameter of loss (Lowest Ohmic loss for conductor) corresponding to lowest AC resistance quoted among bidders by the technically responsive & qualified bidders shall be taken as basis & that quoted by the particular bidder shall be used to arrive at differential price to be applied for each bid.

2.3.2: Liquidated damage for excessive losses:-

On testing, if it is found that actual losses are more than the values ,quoted in the bid, undisputed liquidated damages shall be recovered from the supplier at the following rates.

For each KW of excess loss **Rs.3, 30,220.00/ KW.**

For fractional Kilowatt , penalties shall be applied on prorata basis . No bonus shall be payble for loss, which are less than those, stated in the bid.

2.4 **Design of Hardware & accessories** should be compatible with the supplied HTLS conductor and existing insulators & structures.

TECHNICAL SPECIFICATIONS FOR HARDWARE FITTINGS & ACCESSORIES FOR HTLS CONDUCTOR.

2.4.1 Technical Description of Hardware Fittings

2.4.2 General

This section details technical particulars of fittings viz. suspension clamps and compression type dead end clamps for the HTLS Conductor to be supplied by the bidder. Each fitting shall be supplied complete in all respects.

2.4.3 The fittings shall be suitable for attachment to suspension and tension insulator strings along with hardware fittings and shall include 2.5 %

extra fasteners and Aluminium filler plugs. Indicative drawings of complete insulator strings along with hardware fittings as well as indicative drawings for suspension clamps and dead end clamps are enclosed with this specification. The supplier shall be responsible for satisfactory performance of complete conductor system along with fittings offered by them for continuous operation at the maximum temperature specified by them for the conductor.

2.4.4 **Corona and RI Performance**

Sharp edges and scratches on all the hardware fittings shall be avoided. All surfaces must be clean, smooth, without cuts and abrasions or projections. The Supplier shall be responsible for satisfactory corona and radio interference performance of the materials offered by him.

2.4.5 **Maintenance**

The hardware fittings offered shall be suitable for employment of hot line maintenance technique so that usual hot line operations can be carried out with ease, speed and safety. The technique adopted for hot line maintenance shall be generally bare hand method & hot stick method.

2.4.6 **Split Pins** Split pins shall be used with bolts & nuts.

2.4.7 **Suspension Assembly**

2.4.7.1 The suspension assembly shall be suitable for the HTLS Conductor, the bidder intend to supply. The technical details of the conductor shall be as proposed by the bidder.

2.4.7.2 The suspension assembly shall include either free centre type suspension clamp along with standard preformed armour rods or armour grip suspension clamp

2.4.7.3 The suspension clamp along with standard preformed armour rods set shall be designed to have maximum mobility in any direction and minimum moment of inertia so as to have minimum stress on the conductor in the case of oscillation of the same.

2.4.7.4 The suspension clamp suitable for various type of Conductor along with standard preformed armour rods/armour grip suspension clamp set shall have a slip strength between 20 to 29 KN.

2.4.7.5 The suspension clamp shall be designed for continuous operation at the temperature specified by the bidder for conductor.

2.4.7.6 The suspension assembly shall be designed, manufactured and finished to give it a suitable shape, so as to avoid any possibility of hammering between suspension assembly and conductor due to vibration. The suspension assembly shall be smooth without any cuts, grooves, abrasions, projections, ridges or excrescence which might damage the conductor.

2.4.7.7 The suspension assembly/clamp shall be designed so that it shall minimise the static & dynamic stress developed in the conductor under various loading conditions as well as during wind induced conductor vibrations. It shall also withstand power arcs & have required level of Corona/RIV performance.

2.4.7.8 The magnetic power loss shall not be more than 4 watts per suspension clamp, at designed rated sub-conductor current of 800 amperes.

2.4.8 **Free Centre Type Suspension Clamp**

For the Free Centre Suspension Clamp seat shall be smoothly rounded and curved into a bell mouth at the ends. The lip edges shall have rounded bead. There shall be at least two U-bolts for tightening of clamp body and keeper pieces together.

2.4.9 **Standard Preformed Armour Rod Set**

2.4.9.1 The Preformed Armour Rods Set shall be used to minimize the stress developed in the sub-conductor due to different static and dynamic loads because of vibration due to wind, slipping of conductor from the suspension clamp as a result of unbalanced conductor tension in adjacent spans and broken wire condition. It shall also withstand power arcs. chafing and abrasion from suspension clamp and localized heating effect due to magnetic power losses from suspension clamps as well as resistance losses of the conductor.

2.4.9.2 The preformed armour rods set shall have right hand lay and the inside diameter of the helics shall be less than the outside diameter of the conductor to have gentle but permanent grip on the conductor. The surface of the armour rod when fitted on the conductor shall be smooth and free from projections, cuts and abrasions etc.

2.4.9.3 The pitch length of the rods shall be determined by the Bidder but shall be less than that of the outer layer of conductor and the same shall be accurately controlled to maintain uniformity and consistently reproducible characteristic wholly independent of the skill of linemen.

2.4.9.4 The length of each rod shall not be less than 1930 ± 25 mm and diameter shall not be less than 6.35 $\pm$ 0.10 mm. The tolerance in length

of the rods in complete set should be within 13 mm between the longest and shortest rod. The ends of armour rod shall be parrot billed.

2.4.9.5 The number of armour rods in each set shall be eleven. Each rod shall be marked in the middle with paint for easy application on the line.

2.4.9.6 The armour rod shall not loose their resilience even after five applications.

The conductivity of each rod of the set shall not be less than 40% of the conductivity of the International Annealed Copper Standard (IACS).

2.4.10 **Armour Grip Suspension Clamp**

2.4.10.1 The armour grip suspension clamp shall comprise of retaining strap, support housing, elastomer inserts with aluminium reinforcements and AGS preformed rod set.

2.4.10.2 Elastomer insert shall be resistant to the effects of temperature up to maximum conductor temperature guaranteed by the bidder corresponding to peak current, Ozone, ultraviolet radiations and other atmospheric contaminants likely to be encountered in service. The physical properties of the elastomer shall be of approved standard. It shall be electrically shielded by a cage of AGS performed rod set. The elastomer insert shall be so designed that the curvature of the AGS rod shall follow the contour of the neoprene insert.

2.4.10.3 The length of the AGS preformed rods shall be such that it shall ensure sufficient slipping strength and shall not introduce unfavourable stress on the conductor under all operating conditions. However the length of AGS preformed rods shall not be less than 1760 $\pm$ 16 mm for HTLS Conductor.

2.4.11 **Dead end Assembly**

2.4.11.1 The dead end assembly shall be suitable for the proposed HTLS Conductor.

2.4.11.2 The dead end assembly shall be of compression type with provision for compressing jumper terminal at one end. The angle of jumper terminal to be mounted should be 30° with respect to the vertical line. The area of bearing surface on all the connections shall be sufficient to ensure positive electrical and mechanical contact and avoid local heating due to I^2R losses. The resistance of the clamp when compressed on Conductor shall not be more than 75% of the resistance of equivalent length of Conductor.

2.4.11.3 Die compression areas shall be clearly marked on each dead-end assembly designed for continuous die compressions and shall bear the words 'COM PRESS FIRST' suitably inscribed near the point on each

assembly where the compression begins. If the dead end assembly is designed for intermittent die compressions it shall bear identification marks 'COMPRESSION ZONE' AND 'NON-COMPRESSION ZONE' distinctly with arrow marks showing the direction of compressions and knurling marks showing the end of the zones. Tapered aluminium filler plugs shall also be provided at the line of demarcation between compression & non-compression zone. The letters, number and other markings on the finished clamp shall be distinct and legible. The dimensions of dead end assembly before & after compression along with tolerances shall be shall be guaranteed in the relevant schedules of the bid and shall be decided by the manufacturer so as to suit the conductor size & conform to electrical & mechanical requirement stipulated in the specification.

2.4.11.4 The assembly shall not permit slipping of, damage to, or failure of the complete conductor or any part there of at a load less than 95% of the ultimate tensile strength of the conductor.

2.4.12 **Fasteners : Bolts, Nuts and Washers**

2.4.12.1 All bolts and nuts shall conform to IS 6639. All bolts and nuts shall be galvanised as per IS 1367 (Part-13)/IS 2629. All bolts and nuts shall have hexagonal heads, the heads being forged out of solid truly concentric, and square with the shank, which must be perfectly straight.

2.4.12.2 Bolts upto M16 and having length upto 10 times the diameter of the bolt should be manufactured by cold forging and thread rolling process to obtain good and reliable mechanical properties and effective dimensional control. The shear strength of bolt for 5.6 grade should be 310 MPa minimum as per IS 12427. Bolts should be provided with washer face in accordance with IS 1363 (Part-1) to ensure proper bearing.

2.4.12.3 Nuts should be double chamfered as per the requirement of IS 1363 Part-III 1984. It should be ensured by the manufacturer that nuts should not be over tapped beyond 0.4 mm oversize on effective diameter for size up to M16.

2.4.12.4 Fully threaded bolts shall not be used. The length of the bolt shall be such that the threaded portion shall not extend into the place of contact of the component parts.

2.4.12.5 All bolts shall be threaded to take the full depth of the nuts and threaded enough to permit the firm gripping of the component parts but no further. It shall be ensured that the threaded portion of the bolt

protrudes not less than 3 mm and not more than 8 mm when fully tightened. All nuts shall fit and tight to the point where shank of the bolt connects to the head.

2.4.12.6 Flat washers and spring washers shall be provided wherever necessary and shall be of positive lock type. Spring washers shall be electro-galvanized. The thickness of washers shall conform to IS:2016.

2.4.12.7 The Contractor shall furnish bolt schedules giving thickness of components connected. the nut and the washer and the length of shank and the threaded portion of bolts and size of holes and any other special details of this nature.

2.4.12.8 To obviate bending stress in bolt, it shall not connect aggregate thickness more than three time its diameter.

2.4.12.9 Bolts at the joints shall be so staggered that nuts may be tightened with spanners without fouling.

2.4.12.10 To ensure effective in-process Quality control it is essential that the manufacturer should have all the testing facilities for tests like weight of zinc coating, shear strength, other testing facilities etc, in-house. The manufacturer should also have proper Quality Assurance system which should be in line with the requirement of this specification and IS-.14000 services Quality System standard.

2.4.12.11 Fasteners of grade higher than 8.8 are not to be used and minimum grade for boltshall be 5.6.

2.4.13 **Materials**

The materials of the various components shall be as specified hereunder. The Bidder shall indicate the material proposed to be used for each and every component of hardware fittings stating clearly the class, grade or alloy designation

of the material, manufacturing process & heat treatment details and the reference standards.

2.4.13.1 The details of materials for different component are listed as in Table No-1.

2.4.14 **Workmanship**

2.4.14.1 All the equipment shall be of the latest design and conform to the best modern practices adopted in the Extra High Voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 132 kV transmission lines and will give continued good performance.

2.4.14.2 High current, heat rise test shall be conducted by the supplier to determine the maximum temperature achieved in different components of fittings under simulated service condition corresponding to continuous operation of conductor at rated maximum temperature. The material of the components should be suitable for continued good performance corresponding to these maximum temperatures. The supplier shall submit relevant type/performance test certificates as per applicable standards/product specifications tp confirm suitability of the offered material.

2.4.14.3 The design, manufacturing process and quality control of all the materials shall be such as to give the specified mechanical rating, highest mobility, elimination of sharp edges and corners to limit corona and radio-interference, best resistance to corrosion and a good finish.

2.4.14.4 All ferrous parts including fasteners shall be hot dip galvanized, after all machining has been completed. Nuts may, however, be tapped (threaded) after galvanizing and the threads oiled. Spring washers shall be electro galvanized. The bolt threads shall be undercut to take care of the increase in diameter due to galvanizing. Galvanizing shall he done in accordance with IS 2629 / IS 1367 (Part-13) and shall satisfy the tests mentioned in IS 2633. Fasteners shall withstand four dips while spring washers shall withstand three dips of one minute duration in the standard Preece test. Other galvanized materials shall have a minimum average coating of zinc equivalent to 600 gm/sq.m., shall be guaranteed to withstand at least six successive dips each lasting one (1) minute under the standard preece test for galvanizing.

2.4.14.5 The zinc coating shall be perfectly adherent. of uniform thickness, smooth, reasonably bright. continuous and free from imperfections such as flux,. ash rust, stains, bulky white deposits and blisters. The zinc used for galvanizing shall be grade Zn 99.95 as per IS:209.

2.4.14.6 In case of casting, the same shall be free from all internal defects like shrinkage, inclusion, blow holes, cracks etc. Pressure die casting shall not be used for casting of components with thickness more than 5 mm.

2.4.14.7 All current carrying parts shall be so designed and manufactured that contact resistance is reduced to minimum.

2.4.14.8 No equipment shall have sharp ends or edges, abrasions or projections and cause any damage to the conductor in any way during erection or during continuous operation which would produce high electrical and mechanical stresses in normal working. The design of adjacent metal parts and mating surfaces shall be such as to prevent corrosion of the

contact surface and to maintain good electrical contact under service conditions.

2.4.14.9 All the holes shall be cylindrical, clean cut and perpendicular to the plane of the material. The periphery of the holes shall be free from burrs.

2.4.14.10 All fasteners shall have suitable corona free locking arrangement to guard against vibration loosening.

2.4.14.11 Welding of aluminium shall be by inert gas shielded tungesten arc or inert gas shielded metal arc process. Welds shall be clean, sound, smooth, uniform without overlaps, properly fused and completely sealed. There shall be no cracks, voids incomplete penetration, incomplete fusion, under-cutting or inclusions. Porosity shall be minimised so that mechanical properties of the aluminium alloys are not affected. All welds shall be properly finished as per good engineering practices.

2.4.15 **Bid Drawings**

2.4.15.1 The Bidder shall furnish full description and illustrations of materials offered.

2.4.15.2 Fully dimensioned drawings of the hardwares and their component parts shall be furnished in five (3) copies alongwith the bid. Weight, material and fabrication details of all the components should be included in the drawings.

All drawings shall be identified by a drawing number and contract number. All drawings shall be neatly arranged. All drafting & lettering shall be legible. The minimum size of lettering shall be 3 mm. All dimensions & dimensional tolerances shall be mentioned in mm.

The drawings shall include :

(i) Dimensions and dimensional tolerance.

(ii) Material, fabrication details including any weld details & any specified finishes & coatings. Regarding material designation & reference of standards are to be indicated.

(iii) Catalogue No.

(iv) Marking

(v) Weight of assembly

(vi) Installation instructions

(vii) Design installation torque for the bolt or cap screw.

(viii) Withstand torque that may be applied to the bolt or cap screw without failure of component parts.

(ix) The compression die number with recommended compression pressure.

(x) All other relevant terminal details.

2.4.15.3 After placement of award, the Contractor shall submit fully dimensioned drawing including all the components in three (3) copies to the Owner for approval. After getting approval from the Owner and successful completion of all the type tests, the Contractor shall submit ten (10) more copies of the same drawings to the Owner for further distribution and field use at Owner's end.

TABLE-1 (Details of Materials)

Sl. No.	**Name of item**	**Material treatment**	**Process of Standard**	**Reference**	**Remarks**
1.	Security Clips	Stainless Steel/ Phospher Bronze	-	AISI 302 or 304-L/ IS-1385	
2.	Arcing Horn	Mild Steel Rod/ Tube Type	Hot dip galvanised	As per IS-226 or IS-2062	
3.	Ball Fittings, Socket, all shackles links cleves	Class-IV Steel	Drop forged & normalized Hot dip galvanised	As per IS: 2004	
4.	Yoke Plate	Mild Steel	Hot dip galvanized	As per IS-226 or IS-2062	
5.	Sag Adjustment plate	Mild Steel	Hot dip galvanized	As per IS-226 or IS-2062	

6(a).	Corona Control ring/ Grading ring	High Strength Al. Alloy tube (6061/ 6063/1100 type or 65032/ 63400 Type)	Heat treated Hot dip galvanized	ASTM-B429 or as per IS	Mechanical strength of welded joint shall not be less than 20 KN
6(b).	Supporting Brackets & Mounting Bolts	High Strentgth Al Alloy 7061/ 6063/ 65032/63400 Type) or Mild Steel	Heat treated Hot dip galvanized	ASTM-B429 or as per IS:226 or IS:2062	
7(a).	Dead End Assembly: Outer Sleeve	EC grade Al of purity not less than 99.50%			
7(b).	Steel Sleeve	Mild Steel	Hot Dip Galvanised	IS:226/ IS-2062	

Note : Alternate materials conforming to other national standards of other countries also may be offered provided the properties and compositions of these are close to the properties and compositions of material specified. Bidder should furnish the details of comparision of material offered viz a viz specified in the bid or else the bids are liable to be rejected.

2.5 **Accessories For the HTLS Conductor**

2.5.1 **General**

This portion details the technical particulars of the accessories for Conductor.

2.5.2 2.5% extra fasteners, filler plugs and retaining rods shall be provided.

2.5.3 The supplier shall be responsible for satisfactory performance of complete conductor system along with accessories offered by him for continuous operation at temperature specified for the HTLS Conductor.

2.5.4 **Mid Span Compression Joint**

2.5.4.1 Mid Span Compression Joint shall be used for joining two lengths of conductor. The joint shall have a resistively less than 75% of the resistivity of equivalent length of conductor. The joint shall not permit

slipping off, damage to or failure of the complete conductor or any part thereof at a load less than 95% of the ultimate tensile strength of the conductor. It must be able to withstand the continuous design temperature of conductor.

2.5.4.2 The dimensions of mid span compression joint before & after compression alongwith tolerances shall be shall be guaranteed in the relevant schedules of the bid and shall be decided by the manufacturer so as to suit the conductor size & conform to electrical & mechanical requirement stipulated in the specification.

2.5.5 **Connector**

Connector of compression type shall be used for jumper connection at tension tower . It shall be manufactured out of 99.5% pure aluminium / aluminium alloy and shall be strong enough to withstand normal working loads as well as able to withstand the continuous maximum operating temperature of conductor. The connector shall have a resistivity across jumper less than 75% resistivity of equivalent length of conductor. The connector shall not permit slipping off, damage to or failure of complete conductor . The welded portions shall be designed for 30 kN axial tensile load. Leg sleeve of connector should be kept at an angle of 15 deg. from vertical and horizontal plane of the conductor in order to minimize jumper pull at the welded portion . The dimensions of connector along with tolerances shall be shall be guaranteed in the relevant schedules of the bid and shall be decided by the manufacturer so as to suit the conductor size & conform to electrical & mechanical requirement stipulated in the specification.

2.5.6 **Repair Sleeve**

Repair Sleeve of compression type shall be used to repair conductor with not more than two strands broken in the outer layer. The sleeve shall be manufactured from 99.5% pure aluminium / aluminium alloy and shall have a smooth surface.It shall be able to withstand the continuous maximum operating temperature of conductor The repair sleeve shall comprise of two pieces with a provision of seat for sliding of the keeper piece. The edges of the seat as well as the keeper piece shall be so rounded that the conductor strands are not damaged during installation. The dimensions of Repair sleeve alongwith tolerances shall be guaranteed in the relevant schedules of the bid and shall be decided by the manufacturer so as to suit the conductor size & conform to electrical & mechanical requirement stipulated in the specification.

2.5.7 **Vibration Damper**

2.5.7.1 Vibration dampers of 4R-stockbridge type with four (4) different resonances spread within the specified aeolian frequency band width corresponding to wind speed of 1 m/s to 7 m/s are installed in the existing line at suspension and tension points on each conductor in each span alongwith bundle spacers to damp out aeolian vibration as well as sub- span oscillations,. One damper minimum on each side per sub-conductor for suspension points and two dampers minimum on each side per sub-conductor for tension points has been used for a ruling design span of 320 meters.

2.5.7.2 The bidder shall offer damping system including Stockbridge type dampers and bundle spacers for HTLS conductor for its protection from wind induced vibrations which could cause conductor fatigue /strand breakage near a hardware attachment, such as suspension clamps. Alternate damping systems with proven design offering equivalent or better performance also shall be accepted provided the manufacturer meets the qualifying requirements stipulated in the Specifications. Relevant technical documents including type test reports to establish the technical suitability of alternate systems shall be furnished by the Bidder alongwiththe bid.

The damper shall be designed to have minimum 4 nos of resonance frequencies to facilitate dissipation of vibration energy through interstrand friction of the messanger cable and shall be effective in reducing vibration over a wide frequency range (depending upon conductor dia) or wind velocity range specified above. The vibration damper shall meet the requirement of frequency or wind velocity range and also have machanicalimpedence closely matched with the offered HTLS conductor. The vibration dampers shall be installed at suitable positions to ensure damping effectiveness across the frequency range. The power dissipation of the vibration dampers shall exeed the wind power so that the vibration level on the conductor is reduced below its endurence limit ie 150 micro strain. The bidder shall clearly indicate the method for evaluating performance of dampers including analytrical and laboratory test methods. The bidder shall indicate the the type tests to evaluate the performance of offered damping system .

2.5.7.3 The clamp of the vibration damper shall be made of high strength aluminium alloy of type LM-6. It shall be capable of supporting the damper and prevent damage or chafing of the conductor during erection or continued operation. The clamp shall have smooth and permanent grip to keep the damper in position on the conductor without damaging the strands or causing premature fatigue failure of the conductor under

the clamp. The clamp groove shall be in uniform contact with the conductor over the entire clamping surface except for the rounded edges. The groove of the clamp body and clamp cap shall be smooth, free from projections, grit or other materials which could cause damage to the conductor when the clamp is installed. Clamping bolts shall be provided with self locking nuts and designed to prevent corrosion of threads or loosening in service.

2.5.7.4 The messenger cable shall be made of high strength galvanised steel/stain less steel with a minimum strength of 135 kg/sqmm. It shall be of preformed and post formed quality in order to prevent subsequent drop of weight and to maintain consistent flexural stiffness of the cable in service.The messenger cable other than stainless steel shall be hot dip galvanised in accordance with the recommendations of IS:4826 for heavily coated wires.

2.5.7.5 The damper mass shall be made of hot dip galvanised mild steel/cast iron or a permanent mould cast zinc alloy. All castings shall be free from defects such as cracks, shrinkage, inclusions and blowholes etc. The surface of the damper masses shall be smooth.

2.5.7.6 The damper clamp shall be casted over the messenger cable and offer sufficient and permanent grip on it. The messenger cable shall not slip out of the grip at a load less than the mass pull-off value of the damper. The damper masses made of material other-than zinc alloy shall be fixed to the messenger cable in a suitable manner in order to avoid excessive stress concentration on the messenger cables which shall cause premature fatigue failure of the same. The messenger cable ends shall be suitably and effectively sealed to prevent corrosion. The damper mass made of zinc alloy shall be casted over the messenger cable and have sufficient and permanent grip on the messenger cable under all service conditions.

2.5.7.7 The damper assembly shall be so designed that it shall not introduce radio interference beyond acceptable limits.

2.5.7.8 The vibration damper shall be capable of being installed and removed from energised line by means of hot line technique. in addition, the clamp shall be capable of being removed and reinstalled on the conductor at the designated torque without shearing or damaging of fasteners.

2.5.7.9 The contractor must indicate the clamp bolt tightening torque to ensure that the slip strength of the clamp is maintained between 2.5 kN and 5 kN. The clamp when installed on the conductor shall not cause excessive stress concentration on the conductor leading to permanent deformation of the conductor strands and premature fatigue failure in operation.

2.5.7.10 The vibration analysis of the system, with and without damper and dynamic characteristics of the damper as detailed under Annexure-A, shall have to be submitted. The technical particulars for vibration analysis and damping design of the system are as follows:

Sl. No.	**Description**	**Technical particulars**
1.	Span length in meters	
i)	Ruling design span	320 meters
ii)	Maximum span	336meters
iii)	Minimum span	50 meters
2.	Configuration	Double / Single Circuit conductor per phase in vertical configuration.
3.	Tensile load in Conductor at temperature of 0 deg. C and still air	2884 kGF
4.	Armour rods used	Standard preformed armour rods/AGS
5.	Maximum permissible dynamicstrainieendurencelimit.	+/- 150 micro strains

2.5.7.11 The damper placement chart shall be submitted for spans ranging from 50 m to 320 m. Placement charts should be duly supported with relevant technical documents and sample calculations.

2.5.7.12 The damper placement charts shall include the following

(1) Location of the dampers for various combinations of spans and line tensions clearly indicating the number of dampers to be installed per conductor per span.

(2) Placement distances clearly identifying the extremities between which the distances are to be measured.

(3) Placement recommendation depending upon type of suspension clamps (vizFreecentre type/Armour grip type etc.)

(4) The influence of mid span compression joints, repair sleeves &armour rods (standard& AGS) in the placement of dampers.

2.5.8 **Material and Workmanship**

2.5.8.1 All the equipment shall be of the latest proven design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 132 kV transmission line application with HTLS conductors and will give continued good performance at all service conditions.

2.5.8.2 The design, manufacturing process and quality control of all the materials shall be such as to achieve requisite factor of safety for maximum working load, highest mobility, elimination of sharp edges and corners, best resistance to corrosion and a good finish.

2.5.8.3 High current, heat rise test shall be conducted by the supplier to determine the maximum temperature achieved in different components of fittings under simulated service condition corresponding to continuous operation of conductor at rated maximum temperature. The material of the components should be suitable for continued good performance corresponding to these maximum temperatures. The supplier shall submit relevant type/ performance test certificates as per applicable standards/product specifications tp confirm suitability of the offered material.

2.5.8.4 All ferrous parts shall be hot dipgalvanised, after all machining has been completed. Nuts may, however, be tapped (threaded) after galvanising and the threads oiled. Spring washers shall be electro galvanised as per grade 4 of IS-1573. The bolt threads shall be undercut to take care of increase in diameter due to galvanising. Galvanising shall be'done in accordance with IS:2629/ IS-1367 (Part-13) and satisfy the tests mentioned in IS-2633. Fasteners shall withstand four dips while spring washers shall withstand three dips. Other galvanised materials shall have a minimum average coating of Zinc equivalent to 600 gm/sq.m and shall be guaranteed to withstand at least six dips each lasting one minute under the standard Preece test for galvanising unless otherwise specified.

2.5.8.5 The zinc coating shall be perfectly adherent, of uniform thickness, smooth, reasonably bright, continuous and free from imperfections such as flux, ash, rust stains, bulky white deposits and blisters. The zinc used for galvanising shall be of grade Zn 99.95 as per IS:209.

2.5.8.6 In case of castings, the same shall be free from all internal defects like shrinkage, inclusion, blow holes, cracks etc.

2.5.8.7 All current carrying parts shall be so designed and manufactured that contact resistance is reduced to minimum and localised heating phenomenon is averted.

2.5.8.8 No equipment shall have sharp ends or edges, abrasions or projections and shall not cause any damage to the conductor in any way during erection or during continuous operation which would produce high electrical and mechanical stresses in normal working. The design of adjacent metal parts and mating surfaces shall be such as to prevent corrosion of the contact surface and to maintain good electrical contact under all service conditions.

2.5.8.9 Particular care shall be taken during manufacture and subsequent handling to ensure smooth surface free from abrasion or cuts.

2.5.8.10 The fasteners shall conform to the requirements of IS:6639-1972. All fasteners and clamps shall have corona free locking arrangement to guard against vibration loosening.

2.5.9 **Compression Markings**

Die compression areas shall be clearly marked on each equipment designed for continuous die compressions and shall bear the words 'COMPRESS FIRST' 'suitably inscribed on each equipment where the compression begins. If the equipment is designed for intermittent die compressions, it shall bear the identification marks 'COMPRESSION ZONE' and 'NON-COMPRESSION ZONE' distinctly with arrow marks show the direction of compression and knurling marks showing the end of the zones. The letters, number and other markings on finished equipment shall be distinct and legible.

2.5.10 **Bid Drawings**

2.5.10.1 The Bidder shall furnish detailed dimensioned drawings of the equipment's and all component parts. Each drawing shall be identified by a drawing number and Contract number. All drawings shall be neatly arranged. All drafting and lettering shall be legible. The minimum size of lettering shall be 3 mm. All dimensions and dimensional tolerances shall be mentioned in mm.

2.5.10.2 The drawings shall include

(i) Dimensions and dimensional tolerances

(ii) Material. Fabrication details including any weld details and any specified finishes and coatings. Regarding material, designations and reference of standards are to be indicated.

(iii) Catalogue No.

(iv) Marking

(v) Weight of assembly

(vi) Installation instructions

(vii) Design installation torque for the bolt or cap screw

(viii) Withstand torque that may be applied to the bolt or cap screw without failure of component parts

(ix) The compression die number with recommended compression pressure.

(x) All other relevant technical details

2.5.10.3 Placement charts for spacer/spacer damper and damper

2.5.10.4 The above drawings shall be submitted with all the details as stated abcvealongwith the bid document. After the placement of award.the Contractor shall again submit the drawings in three copies to the Owner for approval. After Owner's approval and successful completion of all type tests, 20 (twenty) more sets of drawings shall be submitted to Owner for further distribution and field use at Owner's end.

2.5.11 **Tests and Standards**

Type Tests (Type tests should have been completed during last five years)

All the specified type tests on Hardware Fittings and Accessories for HTLS Conductors offered by the bidder shall not be required to be carried out if valid test certificate is available i.e., tests conducted within last five years from the date of bid opening in an accredited laboratory or witnessed by the representative (s) of a Utility.

In the event of any discrepancy in the test report (i.e., any test report not applicable due to any design / material/manufacturing process change including substitution of components or due to non compliance with the requirement stipulated in the Technical Specification) the tests shall be conducted by the Contractor at no extra cost to the OPTCL.

NB. In case the bidder do not have valid type test report at the time of bidding & intent to carry out the type test after becoming the successful bidder, they can do so provided they give an undertaking while bidding that to save time they will supply the material, pending the type test result. However, the payment against supply will be released only after receipt of successful type test result or against 100% bank guarantee till the type test result is receipt. In case the material fails in type test they have to lift it back after which above bank guarantee will be released & performance bank guarantee will be encashed.

2.5.11.1 **On Suspension Clamp**

a)	Magnetic power loss test	: As per Annexure-B
b)	Clamp slip strength Vs torque test	: As per Annexure-B
c)	Ozone Test on elastomer	: As per Annexure-B

2.5.11.2 **On Dead end Tension Assembly**

a)	Electrical resistance test for dead end Assembly	: As per IS:2486-(Part-I)
b)	Heating cycle test for dead end Assembly	: As per IS:2486-(Part-I)
c)	Slip strength test for dead end assembly	: As per IS:2486-(Part-I)
d)	Ageing test on filler (if applicable)	: As per Annexure-B

2.5.11.3 **Mid Span Compression Joint for Conductor**

a)	Chemical analysis of materials	: As per Annexure-B
b)	Electrical resistance test	:As per IS:2121 (Part-II)
c)	Heating cycle test	:As per IS:2121 (Part-II)
d)	Slip strength test	: As per Annexure-B
e)	Corona extinction voltage test (dry)	: As per Annexure-B
f)	Radio interference voltage test (dry)	: As per Annexure-B

2.5.11.4 **Repair Sleeve for Conductor**

a)	Chemical analysis of materials	: As per Annexure-B
b)	Corona extinction voltage test (dry)	: As per Annexure-B
c)	Radio interference voltage test (dry)	: As per Annexure-B

2.5.11. **Connector for Conductor**

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a)	Chemical analysis of materials	: As per Annexure-B
b)	Electrical resistance test	:As per IS:2121 (Part-II) Clause 6.5 & 6.6
c)	Heating cycle test	:As per IS:2121 (Part-II)
d)	Axial tensile load test on welded portion	: As per Annexure-B
e)	Corona extinction voltage test (dry)	: As per Annexure-B
f)	Radio interference voltage test (dry)	: As per Annexure-B

2.5.11.6 **Vibration Damper for Conductor**

a)	Chemical analysis of materials	: As per Annexure-B
b)	Dynamic characteristics test*	: As per Annexure-B
c)	Vibration analysis	: As per Annexure-B
d)	Clamp slip test	: As per Annexure-B
e)	Fatigue tests	: As per Annexure-B
f)	Magnetic power loss test	: As per Annexure-B
g)	Corona extinction voltage test (dry)	: As per Annexure-B
h)	Radio interference voltage test (dry)	: As per Annexure-B
i)	Damper efficiency test	: As per IS:9708

* Applicable for 4 R stock bridge dampers. For alternate type of vibration dampers (permitted as per clause 2.5.2), as an alternative to dynamic characteristic test, damper efficiency test as per IEEE-664 Power Manual may be proposed/ carried out by the supplier.

2.5.12 **Acceptance Tests**

2.5.12.1 **On Both Suspension Clamp and Tension Assembly**

a)	Visual Examination	: As per IS:2486-

		(Part-I)
b)	Verification of dimensions	: As per IS:2486-(Part-I)
c)	Galvanising/Electroplating test	: As per IS:2486-(Part-I)
d)	Mechanical strength test of each component	: As per Annexure-B
e)	Mechanical Strength test of welded joint	: As per Annexure-B
f)	Chemical analysis, hardness tests, grain size, inclusion rating & magnetic particle inspection for forgings/castings	: As per Annexure-B

2.5.12.2 **On Suspension Clamp only**

a)	Clamp Slip strength Vs Torque test for suspension clamp	: As per Annexure-B
b)	Shore hardness test of elastomer cushion for AG suspension clamp	: As per Annexure-B
c)	Bend test for armour rod set	: As per IS:2121(Part-I), Clause 7.5,7,10 &7.11
d)	Resilience test for armour rod set	: As per IS:2121(Part-I), Clause 7.5,7,10 & 7.11
e)	Conductivity test for armour rods set	: As per IS:2121(Part-I), Clause 7.5,7,10 & 7.11

2.5.12. **On Tension Hardware Fittings only**

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	a)	Slip strength test for dead end assembly	: As per IS:2486 (Part-I) Clause 5.4
	d)	Ageing test on filler (if applicable)	: As per Annexure-C

2.5.12.4 **On Mid Span Compression Joint for Conductor**

	a)	Visual examination and dimensional verification	: As per IS:2121 (Part-II), Clause 6.2, 6.3 7 6.7
	b)	Galvanising test	: As per Annexure-C
	c)	Hardness test	: As per Annexure-C
	d)	Ageing test on filler (if applicable)	: As per Annexure-C

2.5.12.5 **Connector for Conductor**

	a)	Visual examination and dimensional verification	: As per IS:2121 (Part-II)
	b)	Axial tensile load test for welded portion	: As per Annexure-B

2.5.12.6 **Repair Sleeve for Conductor**

	a)	Visual examination and dimensional verification	: As per IS:2121(Part-II) Clause 6.2, 6.3

2.5.12.7 **Vibration Damper for Conductor**

	a)	Visual examination and dimensional verification	: As per IS:2121(Part-II) Clause 6.2, 6.3 7 6.7

b)	Galvanising test	: As per Annexure-C
	(i) On damper masses	: As per Annexure-C
	ii) On messenger cable	: As per Annexure-C
c)	Verification of resonance frequencies	: As per Annexure-C
d)	Clamp slip test	: As per Annexure-C
e)	Clamp bolt torque test	: As per Annexure-C
f)	Strength of the messenger cable	: As per Annexure-C
g)	Mass pull off test	: As per Annexure-C
h)	Dynamic characteristics test*	: As per Annexure-C

* Applicable for 4 R stockbridge dampers. For alternate type of vibration dampers (permitted as per clause 2.5.2), as an alternative to dynamic characteristic test, damper efficiency test as per IEEE-664 Power Manual may be proposed/ carried out by the supplier.

2.5.13 **Routine Tests**

2.5.13.1 **For Hardware Fittings**

a)	Visual examination	IS:2486-(Part-I)
b)	Proof Load Test	: As per Annexure-B

2.5.13.2 **For conductor accessories**

a)	Visual examination and dimensional verification	: As per IS:2121(Part-II) Clause 6.2, 6.3 7 6.7

2.5.13.3 **Tests During Manufacture on all components as applicable**

a)	Chemical analysis of Zinc used for galvanising	IS:2486-(Part-I)
b)	Chemical analysis mechanical metallographic test and magnetic particle	: As per Annexure-B

inspection for malleable castings

c) Chemical analysis, hardness tests and magnetic particle inspection for forging : As per Annexure-B

If any of the above type tests have not been made, the supplier should furnish an undertaking with the bid that the test reports to be furnished before offering call for acceptance test. Otherwise the EMD will be forfeited, the bidder will not be eligible to participate in future tenders of OPTCL.

2.5.14 **Co-ordination for testing**

The Contractors shall have to co-ordinate testing of their hardware fittings with insulators to be supplied by other Supplier to the *Owner* and shall have to also guarantee overall satisfactory performance of the hardware fittings with the insulators.

2.5.15 **Inspection**

2.5.15.1 The Owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where the material and/or its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the Contractor's, sub-Contractor's works raw materials. manufacturer's of all the material and for conducting necessary tests as detailed herein.

2.5.15.2 The material for final inspection shall be offered by the Contractor only under packed condition as detailed in clause 4.11 of this part of the Specification. The engineer shall select samples at random from the packed lot for carrying out acceptance tests.

2.5.15.3 The Contractor shall keep the Owner informed in advance of the time of starting and of the progress of manufacture of material in its various stages so that arrangements could be made for inspection.

2.5.15.4 Material shall not be despatched from its point of manufacture before it has been satisfactorily inspected and tested unless the inspection is waived off by the Owner in writing. In the latter case also the material shall be despatched only after all tests specified herein have been satisfactorily completed.

2.5.15.5 The acceptance of any quantity of material shall in no way relieve the Contractor of his responsibility for meeting all the requirements of the Specification, and shall not prevent subsequent rejection, if such materials are later found to be defective.

2.5.16 **Packing and Marking**

2.5.16.1 All material shall be packed in strong and weather resistant wooden cases/crates. The gross weight of the packing shall not normally exceed 200 Kg to avoid handling problems.

2.5.16.2 The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

2.5.16.3 Suitable cushioning, protective padding, dunnage or spacers shall be provided to prevent damage or deformation during transit and handling.

2.5.16.4 Bolts, nuts, washers, cotter pins, security clips and split pins etc. shall be packed duly installed and assembled with the respective parts and suitable measures shall be used to prevent their loss.

2.5.16.5 Each component part shall be legibly and indelibly marked with trade mark of the manufacturer and year of manufacture.

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

2.5.17 **Standards**

2.5.17.1 The Hardware fittings; conductor and earthwire accessories shall conform to the following Indian/International Standards which shall mean latest revisions, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification.

2.5.17.2 In the event of the supply of hardware fittings; conductor and earthwire accessories conforming to standards other than specified, the Bidder shall confirm in his bid that these standards are equivalent to those specified. In case of award, salient features of comparison between the Standards proposed by the Contractor and those specified in this document will be provided by the Contractor to establish their equivalence.

Sl. No.	**Indian Standard**	**Title**	**International Standard**

1.	IS: 209-1992	Specification for zinc	BS:3436-1986
2.	IS:398-1992 Part-V	Aluminum Conductor Galvanised Steel- Reinforced For Extra High Voltage (400 KV) and above	IEC:1089- 1 9 9 1 BS:215-1970
3.	IS 1573	Electroplated Coating of Zinc on iron and Steel	
4.	IS : 2121 (Part-II)	Specification for Conductor and Earthwire Accessories for Overhead Power lines: Mid-span Joints and Repair Sleeves for Conductors	
5.	IS:2486 (Part-I)	Specification for Insulator Fittings for Overhead power Lines with Nominal Voltage greater than 1000 V: General Requirements and Tests	
6.	IS:2629	Recommended Practice for Hot Dip Galvanising of Iron and Steel	
7.	IS:2633	Method of Testing Uniformity of Coating on Zinc Coated Articles	
8.		Ozone test on Elastomer	ASTM- D1 1 7 1

9.		Tests on insulators of Ceramic material or glass for overhead lines with a nominal voltage greater than 1000V	IEC:383-1993
10.	IS:4826	Galvanised Coating on Round Steel Wires	ASTM A 4 7 2 7 2 9 BS:443-1969
11.	IS:6745	Methods of Determination of Weight of Zinc Coating of Zinc Coated Iron and Steel Articles	BS:433 ISO : 1460 (E)
12.	IS:8263	Method of Radio Interference Tests on High Voltage Insulators	IEC:437 NEMA:107 CISPR
13.	IS:6639	Hexagonal Bolts for Steel Structures	ISO/R-272
14.	IS:9708	Specification for Stock	
15.	IS:10162	Specification for Spacers Dampers for Twin Horizontal Bundle Conductors	

The standards mentioned above are available from:

Reference Abbreviation	**Name and Address**
BS	British Standards, British Standards Institution

	101, Pentonvile Road, N - 19-ND UK
IEC/CISPR	International Electro technical Commission, Bureau Central de la Commission, electro Technique international, 1 Rue de verembe, Geneva SWITZERLAND
BIS/IS	Beureau Of Indian Standards. ManakBhavan, 9, Bahadur Shah ZafarMarg, New Delhi - 110001. INDIA
ISO	International Organisation for Standardization. Danish Board of Standardization Danish Standardizing Sraat, Aurehoegvej-12 DK-2900, Heeleprup, DENMARK.
NEMA	National Electric Manufacture Association, 155, East 44th Street. New York, NY 10017 U.S.A.

2.6 Workmanship

i) All the conductor strands shall be smooth, uniform and free from all imperfections, such as spills and splits, cracks, die marks, scratches, abrasions, rust etc.

ii) The finished conductor shall be smooth, compact, uniform and free from all imperfections including kinks (protrusion of wires), wire cross over, over riding, looseness (wire being dislocated by finger/hand pressure and / or unusual bangle noise on tapping), material inclusions, white rust, powder formation or black spot (on account of reaction with trapped rain water etc),dirt, grit etc.

2.7 Joints in wires

a)Aluminum OR Aluminum Alloy Wires

During stranding no Aluminum/ aluminium Alloy welds shall be made for the purpose of achieving the required conductor length.

c) Core Wires

There shall be no joint of any kind in the finished wire entering into the manufacture of the strand. There shall also be no joints or splices in any length of the completed stranded core.

2.8Tolerances

Manufacturing tolerances on the dimensions to the extent of one percent shall be permitted for individual strands and the complete conductor.

2.9Materials

The materials used for construction of the conductor shall be such that the conductor meets the specified technical and the performance requirements.

2.10Outer Layer

(i) The material of outer layer of HTLS conductor shall be of high temperature resistant aluminum/ aluminum alloy added with zirconium or any other suitable elements to electrolytic aluminum having purity not less than 99.5% and a copper content not exceeding 0.04%. Bidder shall guarantee the chemical composition in the schedule GTP and also furnish description of the manufacturing process in the bid.

(ii) Annealed conductor can be accepted for Package-I.

2.11Core

The stranded core shall be used. Solid core is also acceptable. The core wire strands may be of any composite materials or special steel and shall have properties conforming to the technical performance requirements of the finished conductor. Bidder shall furnish properties and composition of the core wire strands in the GTP schedule. The composite material for core shall be of such proven quality that its properties are not deteriorated by the normal operating conditions of 132KV transmission line in tropical environment conditions as experienced by the existing lines. The Bidder shall provide adequate details including specifications / test reports / operating experience details / performance certificates etc. in support of the suitability of the offered materials. Care to be taken for internal friction due to different material having different thermal co efficient of expansion.

2.12Conductor Length

The Bidder after his survey of the existing line shall determine the most appropriate individual conductor lengths to be manufactured & supplied keeping in view of the tower schedules, section lengths, special crossings etc. The drum drawing as per IS 1778 or any international standard shall be submitted to purchaser for review and approval. The Bidder shall also indicate the maximum single length of conductor that they can manufacture, in the GTP. The tower schedule and individual span lengths of the existing lines are given in Appendix-I ,II, III & IV.

3. STANDARDS

The conductors & accessories shall comply in all respects to the clauses of this specification as indicated above & with the standards noted in Appendix-V, Appendix-VI.

4. STRANDING

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

5. Packing

5.1 The conductor shall be supplied in non-returnable, strong, wooden/painted steel/hybrid (painted steel cum wood) drums provided with lagging of adequate strength, constructed to protect the conductor against all damage and displacement during transit, storage and subsequent handling and stringing operations in the field. The Supplier shall select suitable drums for supply of conductor and shall be responsible for any loss or damage to conductor and/or drum during transportation handling and storage due to improper selection of drum or packing.

5.2 The drums shall be suitable for wheel mounting and for letting off the conductor under a minimum controlled tension of the order of 5000 Kgf.

5.3 The Bidder should submit their proposed drum drawings along with the bid.

5.4 One conductor length only shall be wound on each drum.

5.5 The conductor ends shall be properly sealed and secured on the side of one of the flanges to avoid loosening of the conductor layers during transit and handling.

5.6 **Marking**

Each drum shall have the following information stenciled on it in indelible ink along with other essential data :

(a) Contract/Award letter number.

(b) Name and address of consignee.

(c) Manufacturer's name and address.

(d) Drum number

(e) Size of conductor

(f) Length of conductor in meters

(g) Arrow marking for unwinding

(h) Position of the conductor ends

(i) Distance between outer-most Layer of conductor and the inner surface of lagging.

(k) Barrel diameter at three locations & an arrow marking at the location of the measurement.

(l) Number of turns in the outer most layer.

(m) Gross weight of drum after putting lagging.

(n) Tear weight of the drum without lagging.

(o) Net weight of the conductor in the drum.

(p) Dispatch instruction.

The above should be indicated in the packing list also.

5.7 Verification of Conductor Length

The Owner reserves the right to verify the length of conductor after unreeling at least ten (10) percent of the drums in a lot offered for inspection.

6. Tests and Standards

6.1 Type Tests

Type Tests on Stranded Conductor/ Stranded wire

The following tests should have been conducted in last five year for which offer is made.

All the specified type tests on HTLS Conductors offered by the bidder shall not be required to be carried out if valid test certificate is available i.e., tests conducted within last five years from the date of bid opening in an accredited laboratory or witnessed by the representative (s) of a Utility.

In the event of any discrepancy in the test report (i.e., any test report not applicable due to any design/ material/manufacturing process change including substitution of components or due to noncompliance with the requirement stipulated in the Technical

Specification) the tests shall be conducted by the Contractor at no extra cost to the OPTCL.

NB. In case the bidder do not have valid type test report at the time of bidding & intent to carry out the type test after becoming the successful bidder, they can do so provided they give an undertaking while bidding that to save time they will supply the material, pending the type test result. However, the payment against supply will be released only after receipt of successful type test result or against 100% bank guarantee till the type test result is receipt. In case the material fails in type test they have to lift it back after which above bank guarantee will be released & performance bank guarantee will be encashed.

(i) **On complete Conductor**

a)	DC resistance test on stranded conductor	: As per Annexure-A
b)	UTS test on stranded conductor	: As per Annexure-A
c)	Stress- Strain test on stranded conductor and core at room temperature	: IEC 1089
d)	Stress-strain test on stranded conductor and core at elevated temperature	As per Annexure-A
e)	High temperature endurance & creep test on stranded conductor	: As per Annexure-A
f)	Sheaves Test	: As per Annexure-A
g)	Axial Impact Test	: As per Annexure-A
h)	Crush Strength Test	: As per Annexure-A
i)	Torsional Ductility Test	: As per Annexure-A

(ii) **On Conductor Strand/core**

a)	Heat resistance test on Aluminium Alloy strands	: As per Annexure-A
b)	Bending test on core	: As per Annexure-A
c)	Compression test on core	: As per Annexure-A
d)	Coefficient of linear expansion on core/ core strands	: As per Annexure-A

6.2 Acceptance Tests

a)	Visual and dimensional check on drum	: As per Annexure-A
b)	Visual check for joints scratches etc. and length measurement of conductor by rewinding	: As per Annexure-A
c)	Dimensional check on core strands/composite core and Aluminium Alloy strands	: As per Annexure-A
d)	Check for lay-ratios of various layers	: As per Annexure-A
e)	Galvanising test on core strands (if applicable)	: As per Annexure-A
f)	aluminum thickness on aluminium clad wires (if applicable)	
g)	Torsion and Elongation tests on core strands/composite core	: As per Annexure-A
h)	Breaking load test on core strands and Aluminium / Aluminium Alloy strands	: As per Annexure-A
i)	Wrap test on core strands and conductor.	: As per IEC:888 & IES:889

j)	Minimum conductivity test on conductor strands.	: As per IEC : 889
k)	Heat resistance test on Aluminium Alloy strands	: As per Annexure-A
l)	Ageing test on filler (if applicable)	: As per Annexure-A
m)	Minimum conductivity test on core strands(if applicable)	: As per Annexure-A
n)	Dimentional check on conductor	

Note: All the above tests except (j) shall be carried out on Aluminium / Aluminium Alloy and core strands after stranding only.

6.3 Routine Test

a) Check to ensure that the joints are as per Specification

b) Check that there are no cuts, fins etc., on the strands.

c) Check that drums are as per Specification

d) All acceptance tests as mentioned above to be carried out on each coil

6.4 Tests During Manufacture

a)	Chemical analysis of zinc used for galvanizing (if applicable)	: As per Annexure-A
b)	Chemical analysis of Aluminium alloy used for making Aluminium Alloystrands	: As per Annexure-A
c)	Chemical analysis of core strands/composite core	: As per Annexure-A

6.5 Test Reports

6.5.1 Record of routine test reports shall be maintained by the Supplier at his works for periodic inspection by the Owner's representative.

6.5.2 Test Certificates of tests during manufacture shall be maintained by the Supplier. These shall be produced for verification as and when desired by the Owner.

6.6 Inspection

6.6.1 The Owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where conductor shall be manufactured and representative shall have full facilities for unrestricted inspection of the Supplier's works, raw materials and process of manufacture for conducting necessary tests as detailed herein.

6.6.2 The Supplier shall keep the Owner informed in advance of the time of starting and of the progress of manufacture of conductor in its various stages so that arrangements can be made for inspection.

6.6.3 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested, unless the inspection is waived off by the Owner in writing. In the latter case also the conductor shall be dispatched only after satisfactory testing for all tests specified herein have been completed.

6.6.4 The acceptance of any quantity of material shall in no way relieve the Supplier of any of his responsibilities for meeting all requirements of the Specification, and shall not prevent subsequent rejection it such material is later found to be defective.

6.7 Test Facilities

6.7.1 The following additional test facilities shall be available at the Supplier's works:

a) Calibration of various testing and measuring equipment including tensile testing machine, resistance measurement facilities, burette, thermometer, barometer etc.

b) Standard resistance for calibration of resistance bridges.

c) Finished conductor shall be checked for length verification and surface finish on separate rewinding machine at reduced speed (variable from 8 to 16 meters per minute). The rewinding facilities shall have appropriate clutch system and free of vibrations, jerks etc. with traverse laying facilities.

6.8 Standards

6.8.1 The conductor shall conform to the following Indian/International Standards, which shall mean latest revisions, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification.

6.8.2 In the event of the supply of conductor conforming to standards other than specified, the Bidder shall confirm in his bid that these standards are equivalent to those specified. In case of award, salient features of comparison between the standards proposed by the Supplier and those specified in this document will be provided by the Supplier to establish their equivalence.

Sl. No.	Indian Standard	Title	International Standard
1.	IS: 209-1992	Specification for zinc	BS:3436-1986
2.	IS: 398-1982	Specification for Aluminium Conductors for Overhead Transmission Purposes	IEC:1089-1991 BS:215-1970
3.	IS:398-1990 Part-II	Aluminum Conductor Galvanised Steel Reinforced	BS;215-1970 IEC:1089-1991
4.	IS:398-1992 Part-V	Aluminum Conductor Galvanised Steel- Reinforced For Extra High Voltage (400 KV) and above	IEC:1089-1991 BS:215-1970
5.	IS : 1778-1980	Reels and Drums for Bare Conductors	BS:1559-1949
6.	IS : 1521-1991	Method of Tensile Testing of Steel Wire	ISO 6892-1984
7.	IS : 2629-1990	Recommended Practice for Hot Dip Galvanising of Iron and Steel	
8.	IS : 2633-1992	Method of Testing Uniformity of Coating on Zinc Coated Articles	
9.	IS : 4826-1992	Galvanised Coating on Round Steel Wires	IEC : 888-1987 BS:443-1969
10.	IS : 6745-1990	Methods of Determination of Weight of Zinc Coating of Zinc Coated Iron and Steel Articles	BS:433-1969 ISO 1460 - 1973
11.	IS : 8263-1990	Method of Radio Interference Tests on High Voltage Insulators	IEC:437-1973 NEMA:107-1964

			CISPR
12.	IS : 9997-1988	Aluminium Alloy Redraw Rods	IEC 104 - 1987
13.		Zinc Coated steel wires for stranded Conductors	IEC : 888-1987
14.		Hard drawn Aluminium wire for overhead line conductors	IEC : 889-1987
15.	IS:398 (Part-IV)	Aluminium Alloy stranded conductor	IEC : 208-1966 BS-3242-1970
16.		Aluminium clad steel wires	IEC:1232
17.		Method of measurement of resistivity of metallic materials	IEC:468
18		Ampacity	IEEE738
19.		Creep	

The standards mentioned above are available from:

Reference Abbreviation	**Name and Address**
BS	British Standards, British Standards Institution 101, Pentonvile Road, N - 19-ND UK
IEC/CISPR	International Electro technical Commission, Bureau Central de la Commission, electro Technique international,

	1 Rue de verembe, Geneva SWITZERLAND
BIS/IS	Beureau Of Indian Standards. ManakBhavan, 9, Bahadur Shah ZafarMarg, New Delhi - 110001. INDIA
ISO	International Organisation for Standardization. Danish Board of Standardization Danish Standardizing Sraat, Aurehoegvej-12 DK-2900, Heeleprup, DENMARK.
NEMA	National Electric Manufacture Association, 155, East 44th Street. New York, NY 10017 U.S.A.

ANNEXURE-A

1. Tests on Conductor

1.1 UTS Test on Stranded Conductor

Circles perpendicular to the axis of the conductor shall be marked at two places on a sample of conductor of minimum 5 m length between fixing arrangement suitably fixed by appropriate fittings on a tensile testing machine. The load shall be increased at a steady rate up to 50% of 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 steady rate to

minimum UTS and held for one minute. The Conductor sample shall not fail during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

1.2 D.C. Resistance Test on Stranded Conductor

On a conductor sample of minimum 5m length two contact-clamps shall be fixed with a predetermined bolt torque. The resistance shall be measured by a Kelvin double bridge or using micro ohm meter of suitable accuracy by placing the clamps initially zero metre and subsequently one metre 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 20^0C as per IS:398-(Part-IV)/(Part-V). The resistance corrected at 20deg C shall conform to the requirements of this Specification.

1.3 Coefficient of linear expansion for core/core strands

The temperature and elongation on a sample shall be continuously measured and recorded at interval of approximately 15 degree C from 15 degree C to maximum continuous operating temperature corresponding to rated current(800 A) by changing the temperature by suitable means. Coefficient of linear expansion shall be determined from the measured results.

1.4.1 Breaking load test on Aluminium Alloy & Core strands and D.C Resistance test on Aluminium Alloy wire

The above tests shall be carried out as per IEC: 888/889 and the results shall meet the requirements of the specification.

1.5 Wrap test on Core strand

The wrap test on steel strands shall be meet the requirements of IEC: 888. In case of aluminium clad core wire, the same shall be wraped around a mandel of diameter of five times that of the strand to form a helix of eight turns. The strand shall be unwrapped. No breakage of strand shall occurred.

1.6 Heat Resistance test on Aluminium Alloy wire

Breaking load test as per clause 1.5 above shall be carried out before and after heating the sample in uniform heat furnace at 280 degC (+5/-3 degC) temperature for one hour. The breaking strength of the wire after heating shall not be less than the 90% of the breaking strength before heating.

1.7 Chemical Analysis of Aluminium Alloy and Core

Samples taken from the Aluminium and core coils/strands shall be chemically/spectrographically analysed. The same shall be in conformity to the particulars guaranteed by the bidder so as to meet the requirements stated in this Specification.

1.8 Visual and Dimensional Check on Drums

The drums shall be visually and dimensionally checked to ensure that they conform to the approved drawings.

1.9 Visual Check for Joints, Scratches etc.

Conductor drums shall be rewound in the presence of the Owner. The Owner shall visually check for scratches, joints etc. and that the conductor generally conform to the requirements of this Specification. Ten percent (10%) drums from each lot shall be rewound in the presence of the Owner's representative.

1.10 Dimensional Check on Core Strands and Aluminium Alloy Strands

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

1.11 Check for Lay-ratios of Various Layers

The lay-ratios of various layers shall be checked to ensure that they conform to the guaranteed values furnished by the Contractor.

1.12 Procedure Qualification test on welded Aluminium Alloy strands.

Two Aluminium Alloywire shall be welded as per the approved qualityplan and shall be subjected to tensile load. The breaking strength of the welded joint of the wire shall not be less than the guaranteed breaking strength of individual strands.

1.13 Chemical Analysis of Zinc

Samples taken from the zinc ingots shall be chemically/ spectrographically analyzed. The same shall be in conformity to the requirements stated in the Specification.

1.14 Galvanizing Test

The test procedure shall be as specified in IEC : 888. The material shall conform to the requirements of this Specification. The adherence of zinc shall be checked by wrapping around a mandrel four times the diameter of steel wire.

1.15 Torsion and Elongation Tests on Core Strands

The test procedures shall be as per clause No. 10.3 of IEC 888. In torsion test, the number of complete twists before fracture shall not be less than 18 on a length equal to 100 times the standard diameter of the strand. In case test sample length is less or more than 100 times the stranded diameter of the strand, the minimum number of twists will be proportioned to the length and if number comes in the fraction then it will be rounded off to next higher whole number. In elongation test, the elongation of the strand shall not be less than 1.5% for a gauge length of 250 mm.

1.16 Bending test on conductor core strand

A sample of conductor core strand measuring 30 cm in length shall be subject to bending with help of a vise. The vised length of wire should be 5 cm and radius of bend 4.8 mm. The bending should be first 90 degrees left and 90 degree right. After this operation the strand should cut at the bending point. There should be no separation of core and aluminium at the bending point after this operation.

1.17 Compression test on aluminium clad strand

A sample of aluminium clad core strand 10 mm in length is to be compressed by a plate with a load of 3600 kgs. The aluminium and core strand should not break.

1.18 Aluminium conductivity test on aluminium clad strand

Resistivity test as per IEC-468 shall be conducted to confirm minimum conductivity as per specification requirement.

1.19.1 Minimum conductivity test on thermal resistant aluminium alloy strands

Resistivity test as per IEC-468/IEC 889 shall be conducted to confirm minimum conductivity as per specification requirement.

1.20 Stress-strain test at elevated temperature

Stress-strain test as per IEC-1089 shall be conducted keeping conductor temperature at designed maximum temperature.

1.21 High Temperature endurance & creep test

A conductor sample of at least 20 m length shall be strung at tension equal to 25 % of conductor UTS. The conductor temperature shall be increased to designed maximum temperature in steps of 20 deg. C and thermal elongation of the conductor sample shall be measured & recorded at each step. Further, the temperature of the conductor shall be maintained at maximum continuous operating temperature (±10 Deg. C) for 1000 hours. The elongation/creep strain of the conductor during this period shall be measured and recorded at end of 1 hour, 10 hour, 100 hour and subsequently every 100 hour upto 1000 hours time period. After completion of the above, the conductor sample shall be subjected to UTS test as mentioned above at clause 1.1 of Annexure-A.

The supplier shall furnish details of creep characteristic in respect of the conducted based on laboratory test and other laboratory investigations/ experimental conducted on similar type of conductor and shall indicate creep strain values corresponding to 1 month, 6 month, 1 year, 10 year & 20 year creep at everyday tension & continuous designed temperature.

1.22 Axial Impact Test

The conductor sample shall be suspended vertically and load applied by dropping a 650 Kg from an elevation of 4 meters above the sample. The impact velocity shall be not be less than 8 m/sec. with an initial pre-tension of 200 kgs. The curve for load vs time shall be recorded and recorded load of failure for core shall not be less than UTS of core.

1.23 Crush Strength Test

A section of conductor is to be crushed between two six inch steel platens. Load shall be held at 350 Kgs for 1 minute and then released. All the strands shall be subsequently disassembled and tensile tested. All the strands shall exhibit full strength retention

1.24 Torsional Ductility Test

After removing the outer layer aluminium/ aluminium alloy strands, the conductor shall be loaded to 25% of UTS and than loaded in increasing steps of +/-180 deg, the core shall withstand atleast 16 such rotation.

1.25 Sheaves Test (if required)

The conductor sample of minimum length of 35 meter shall be tensioned at 22 % of the UTS and shall be passed through pulleys having diameter of 32 times that of the conductor with angle of 20 deg. between the pulleys. The conductor shall be passed over the pulleys 36 times a speed of 2 m/sec. After this test UTS test on the conductor shall be carried out.

1.0 **Tests on Hardware Fittings**

1.1 **Magnetic Power Loss Test for Suspension Assembly**

Two hollow aluminium tubes of 32 mm diameter for the conductor shall be placed 450 mm apart respectively. An alternating current over the range of 1500 to 2000 amps shall be passed through each tube. The reading of the wattmeter with and without suspension assemblies alongwith line side yoke plate, clevis eye shall be recorded. Not less than three suspension assemblies shall be tested. The average power loss for suspension assembly.shall be

plotted for each value of current. The value of the loss corresponding to 2456 amperes per phase shall be read off from the graph and the same shall not be more than the value guaranteed by the supplier.

1.2 **Galvanising/Electroplating Test**

The test shall be carried out as per Clause no. 5.9 of IS:2486-(Part-1) except that both uniformity of zinc coating and standard preecee test shall be carried out and the results obtained shall satisfy the requirements of this specification.

1.3 **Mechanical Strength Test of Each Component**

Each component shall be subjected to a load equal to the specified minimum ultimate tensile strength (UTS) which shall be increased at a steady rate to 67% of the minimum UTS specified. The load shall be held for five minutes and then removed. The component shall then again be loaded to 50% of UTS and the load shall be further increased at a steady rate till the specified UTS and held for one minute. No fracture should occur. The applied load shall then be increased until the failing load is reached and the value recorded.

1.5 **Clamp Slip Strength Vs Torque Test for Suspension Clamp**

The suspension assembly shall be vertically suspended by means of a flexible attachment. A suitable length of conductor shall be fixed in the clamp. The clamp slip strength at various tightening torques shall be obtained by gradually applying the load at one end of the conductor. The Clamp slip strength vs torque curve shall be drawn. The above procedure is applicable only for free centre type suspension clamp. For AG suspension clamp only clamp slip strength after assembly shall be found out. The clamp slip strength at the recommended tightening torque shall be more than 20 kN but less than 29 kN.

1.6 **Heating Cycle Test**

Heating cycle test shall be performed in accordance with IS 2486 (Part-I) with following modifications:-

i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor.

ii) Number of cycle: 100

Slip strength test shall also be carried out after heating cycle test.

1.8 **Shore Hardness Test for Elastomer Cushion for AG Suspension Assembly**

The shore hardness at various points on the surface of the elastomer cushion shall be measured by a shore hardness meter and the shore hardness number shall be between 65 to 80.

1.9 **Proof Load Test**

Each component shall be subjected to a load equal to 50% of the specified minimum ultimate tensile strength which shall be increased at a steady rate to 67% of the UTS specified. The load shall be held for one minute and then removed. After removal of the load the component shall not show any visual deformation.

1.10 **Tests for Forging Casting and Fabricated Hardware**

The chemical analysis, hardness test, grain size, inclusion rating and magnetic particle inspection for forging, castings and chemical analysis and proof load test for fabricated hardware shall be as per the iniiternationallyrecognised procedures for these tests. The sampling will be based on heat number and heat treatment batch. The details regarding test will be as in the Quality Assurance programme.

2.0 Tests on Accessories for Conductor

2.1 **Mid Span Compression Joint for Conductor and Earthwire**

(a) Slip Strength Test

The fitting compressed on conductor shall not be less than one metre in length. The test shall be carried out as per IS:2121 (Part-ii)-1981 clause 6-4 except that the load shall be steadily increased to 95% of minimum ultimate tensile strength of conductor/earthwire and retained for one minute at this load. There shall be no movement of the conductor/ earthwire relative to the fittings and no failure of the fit tings during this one minute period.

2.2 **Connector for Conductor**

Axial Tensile Load Test for Welded Portion

The sleeve portion of the T-Connector shall be compressed on conductor. The compressed portion shall be held rigidly on some fixtures and axial load shall be applied along with the jumper terminal The load shall be increased gradually till breaking of welded joint occurs. The breaking load should be above 30 kN.

Vibration damper for conductor.

Clamp Slip and Fatigue Tests

(i) Test Set Up

The clamp slip and fatigue tests shall be conducted on a laboratory set up with a minimum effective span length of 30 m. The conductor shall be tensioned at tension corresponding to 0 deg& no wind condition and ruling span 400 from sag –tension calculation and shall not be equipped with

protective armour rods at any point. Constant tension shall be maintained within the span by means of lever arm arrangement. After the conductor has been tensioned, clamps shall be installed to support the conductor at both ends and thus influence of connecting hardware fittings are eliminated from the free span. The clamps shall not be used for holding the tension on the conductor. There shall be no loose parts, such as suspension clamps, U bolts on the test span supported between clamps mentioned above. The span shall be equipped with vibration inducing equipment suitable for producing steady standing vibration. The inducing equipment shall have facilities for stepless speed control as well as stepless amplitude arrangement. Equipment shall be available for measuring the frequency, cumulative number of cycles and amplitude of vibration at any point along the span.

(ii) Clamp Slip test

The vibration damper shall be installed on the test span. The damper clamp, after lightning with the manufacturer's specified tightening torque, when subjected to a longitudinal pull of 2.5 kN parallel to the axis of conductor for a minimum duration of one minute shall not slip i.e. the permanent displacement between conductor and clamp measured after removal of the load shall not exceed 1.0 mm. The load shall be further increased till the clamp starts slipping. The load at which the clamp slips shall not be more than 5 kN.

3.0 **Tests on All components (As applicable)**

3.1 **Chemical Analysis of Zinc used for Galvanizing**

Samples taken from the zinc ingot shall be chemically analysed as per IS-209-1979. The purity of zinc shall not be less than 99.95%.

3.2 **Tests for Forgings**

The chemical analysis hardness tests and magnetic particle inspection for forgings, will be as per the internationally recognised procedures for these tests. The, sampling will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the Contractor and Owner in Quality Assurance Programme.

3.3 **Tests on Castings**

The chemical analysis, mechanical and metallographic tests and magnetic particle inspection for castings will be as per the internationally recognised procedures for these tests. The samplings will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the Contractor and Ownerin Quality Assurance Programme.

Acceptance Tests **ANNEXURE-C**

1 Mid Span Compression Joint for Conductor

(a) Hardness Test

The Brinnel hardness at various points on the steel sleeve of conductor core and tension clamp shall be measured.

2. Connector for Conductor

(a) Axial Tensile Load Test for Welded Portion

Same as clause 2.2 of Annexure - B .

3. Vibration Damper for Conductor

(a)Verification of Resonance Frequencies

The damper shall be mounted on a shaker table and vibrate at damper clamp displacement of +/-0.5 mm to determine the resonance frequencies. The resonance shall be visually identified as the frequency at which damper mass vibrates with maximum displacement on itself. The resonance frequency thus identified shall be compared with the guaranteed value. A tolerance of ± 1 Hz at a frequency lower than 15 Hz and ± 2 Hz at a frequency higher than 15 Hz only shall be allowed.

(b) Clamp Slip Test

(c) Same as Clause 2.4 (c) (ii) of Annexure - B.

(c) Clamp Bolt Torque Test

The clamp shall be attached to a section of the conductor/earthwire. A torque of 150 percent of the manufacturer's specified torque shall be applied to the bolt. There shall be no failure of component parts. The test set up is as described in Clause 2.4 (c) (i), Annexure-B.

(d) Strength of the Messenger Cable

The messenger cable shall be fixed in a suitable tensile testing machine and the tensile load shall be gradually applied until yield point is reached. Alternatively, each strand of messenger cable may be fixed in a suitable tensile testing machine and the tensile load shall be gradually applied until yield point is reached. In such a case, the 95% of yield strength of each wire shall be added to get the total strength of the cable. The load shall be not less than the value guaranteed by the Contractor

(e) Mass Pull off Test

Each mass shall be pulled off in turn by fixing the mass in one jaw and the clamp in the other of a suitable tensile testing machine. The longitudinal pull shall be applied gradually until the mass begins to pull out of the messenger cable. The pull off loads shall not be less than the value guaranteed by the Contractor.

7. GUARANTEED TECHNICAL PARTICULARS

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

GUARANTEED TECHNICAL PARTICULARS OF HTLS CONDUCTOR

Sl.	**Description**	**Unit**	**Value guaranteed by the Bidder**
1.	Name of Manufacturer		
2.	Address of Manufacturer		
3.	Name of the conductor		
4.	Construction of conductor/ Designation of conductor as per IEC:61089		
5.	Particulars of Raw Material		
5.1	Outer Layers		
	a) Type of conductor strand.		
	b) Chemical composition of Conductor strand .		
	i) ----------	%	
	ii) ----------	%	
	iii) ----------	%	
	iv) ----------	%	

v) --------- %

5.2 Inner Core

a) Material of core

b) Chemical composition of core

i) ---------- %

ii) ---------- %

iii) ---------- %

iv) --------- %

v) --------- %

vi) -------- %

6. Outer Aluminium / Aluminium Alloy Strand after Stranding

6.1 Number of outer layers Nos.

6.2 Diameter mm

a) Nominal mm

b) Maximum mm

c) Minimum mm

6.3 Minimum Breaking load of strand

a) Before stranding KN

b) After stranding KN

6.4 Resistance of 1m length of strand at 20 deg. C. Ohm

6.5 Modulus of elasticity (kg/mm^2)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

6.6 Co-efficient of linear expansion (/ °C)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

7. Inner core strands/inner core after stranding

7.1 Number of layers in inner core No

7.2 Diameter mm

a) Nominal mm

b) Maximum mm

c) Minimum mm

7.3 Minimum Breaking load of strand/Core

a) Before stranding KN

b) After stranding KN

7.4 Min. no. of twists which a single strand shall withstand during torsion test for a length equal to 100times dia of wire after stranding. Nos

7.4 Modulus of elasticity (kg/mm^2)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

7.5 Co-efficient of linear expansion (/ °C)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

8. Complete conductor

8.1 Diameter (mm)

a) Nominal

b) Maximum

c) Minimum

8.2 Area of conductor (mm^2)

a) Total cross sectional area

b) Effective Aluminium area

c) Effective core area

8.3 Modulus of elasticity (kg/mm^2)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

8.4 Co-efficient of linear expansion (/ °C)

a) At 32°C

b) Below Knee point

c) Above Knee point

d) At maximum operating tempt.

8.5 UTS of Conductor KN

8.6 Lay ratio of conductor Maximum Minimum

a) 1st layer (outer most layer)

b) 2nd Layer

c) 3rd Layer

d) 4th Layer

8.7 Maximum permissible conductor temperature for continuous operationDeg C

8.8 Maximum permissible conductor temperature for short term operationDeg C

8.9 Permissible duration of above short term operation Minutes

8.10 Steady state conductor temperature at conductor current

	of min.800 A at 50°C ambient conditions & zero wind as detailed in Technical Specification at 2.1	Deg C
8.11	DC resistance of conductor at 20°C	Ohm/km
8.12	AC resistance at maximum continuous operating temperature corresponding to specified maximum operating current (Minimum 800 A under maximum ambient conditions and zero wind as per Technical Specification at 2.1)	Ohm/km
8.13	Details of Creep characteristic for conductor enclosed (as per Technical Specification)	Yes/No
8.14	Sag Tension Calculation	
8.14.1	Sag Tension Calculation enclosed	Yes/No
8.14.2	Sag& tension at 32 deg. C & no wind	Meters & KN
8.14.3	Sag& tension at 32 deg. C & full wind	Meters & KN

8.14.4 Sag& tension at 05 deg. C & 2/3rd wind Meters & KN

8.14.5 Sag& tension at 65 deg. C & no wind Meters & KN

8.14.6 Sag & tension at continous current

Carrying 800A. C & no wind (The corresponding

Temperature to be mentioned) Meters & KN

8.14.7 Sag& tension at maximum operating temperature & no wind Meters & KN

8.14.8 Sag& tension at emergency temperature & no wind Meters & KN

8.15 Tolerance on standard length of conductor %

8.16 Direction of lay for outside layer

8.17 Linear mass of the Conductor

a) Standard Kg/Km

b) Minimum Kg/Km

c) Maximum Kg/Km

8.18 Standard length of conductor KM

8.19 Maximum length of conductor

that can be offered as single length KM

9.0 Drum is as per specification Yes/No

10.0 Accessories as per specification/standards Yes/No

Date: (Signature)……

Place: (Printed Name)……

(Designation)……

(Common Seal)……

8. SAG TENSION CHARTS AND SAG TEMPLATES

The contractor shall supply six copies of sag tension charts and sag templates each in respect of the conductor. The contractor shall also supply sag template in celluloid, which shall be subject to the approval by the owner and without involving any extra charges.The sag template will be used for changing the tower positions in future.

9. ACCESSORIES

The Bidder after his survey of the existing line shall determine the quantity and type of the accessories required for the turnkey job, which are to be supplied by them. These accessories should be suitable for the supplied conductor for its entire operating range without degradation of mechanical, metallurgical and electrical properties. The steady state temperature of hardware and accessories must not exceed 90°C during no wind and 50°C ambient temperature at minimum 800Amp load. The contractor shall be responsible for satisfactory performance of complete conductor, hardware and accessories, offered by him, for continuous operation at temperatures corresponding to various conditions stipulated at 2.2 of this technical specification.

10. EXECUTION OF WORK

10.1 The erection works consist of

a. Dismantling of existing ACSR Panther Conductor , hardware, accessories and crediting at

b. Transportation, delivery of conductor, hardware, accessories etc. at erection site and keeping in safe custody.

PTCL store.

c. Insurance of materials during storage-cum-erection.

d. Distribution of materials at erection site,

e. Stringing of conductor up to both ends of the lines, with the help of tensioner and puller machine and if required, manually with the approval of the owner.

f. Guarantee of all the activities carried out from (a) to (e) and submission of FQP for carrying out of all above activities.

g. Other items not specifically mentioned in this Specification and are required for the successful erection and commissioning of the transmission lines, unless specifically excluded in the Specification.

10.2 All works shall be carried out in accordance with the revised and latest provisions under Indian Electricity Act and Rules made there under.

10.3 All the erection tools required during erection of lines shall be arranged by the Contractor at his own cost. The Contractor shall also be responsible for any damage to and / or loss of his erection tools.

10.4 In case of any deviation in quantities from the tendered quantity, payment will be made with the approval from the corporate office of the owner.

10.5 It will be the Contractor's sole responsibility to take the materials up to the location. Any pathway, temporary road, temporary bridge required for the work, same will be provided by the contractor at his cost. If, for any reasons the above is not feasible, the contractor at his own cost shall have to arrange transportation by head loads.

11. STRINGING

The stringing work shall be carried with the help of tensioner and puller machines. Wherever it is not possible to install the tensioner, it can be done manually with the approval of site engineer of the owner. Stringing shall mean,

the activities of paying, jointing, tensioning, clamping with armor-rod, providing dampers and fixing the conductor at tension hardware and jumpering etc.

11.1 Stringing of conductor shall be done up to gantry at both ends of the individual lines.

11.2 The stringing work should be planned in such a manner in consultation with the Engineer in charge of the Owner that minimum shut down of power line crossings are required. Revenue loss due to any undue shut down due to contractor's irresponsibility shall be recoverable from the contractor.

11.3 Before commencing of stringing work, Contractor shall obtain approval of sag tension charts showing final sag and tension for various temperature and spans.

The Contractor shall be responsible and will take care of proper handling of conductor drums. Sufficient numbers of aluminum snatch blocks shall be used for paying out the Conductors. Necessary precautions shall be taken to avoid conductor rubbing on the ground by providing adequate ground roller, rollers on supports. Additional rollers shall also be provided to cross thorny hedges, tower footing and other obstructions to avoid scratching of conductor. The conductor shall be made to sag correctly as per stringing charts, before they are finally transferred to the hardware and clamps . No mid span joint shall be made at less than 30 meters from the tower end and no mid span joint shall be permitted in road and other important crossings spans. There shall not be more than one joint in the same span of individual conductor. The sag shall be adjusted to suit the sag indicated against actual temperature. The thermometer shall be provided at the conductor point during the stringing work. Dynamo meters shall be used in tensioning the conductors. All conductors shall be stressed to their load at the time of stringing, as per approved stringing charts.

11.5 The minimum clearance between the lowest point of conductor and ground shall not be less than as specified in the chart. All compression joints should be carefully made and a record of initial and final lengths of the joints, jointly signed by contractor and OPTCL representatives shall be maintained. Check for

sag should also be made at intervals when conductors are drawn up. Over stressing, causing damage to towers must be avoided. Care should be exercised not to over tension the conductor.

To avoid contact with the ground or any object above ground level the conductors shall be pulled by the controlled tension methods using neoprene lined double pulled wheel type tension stringing equipments. The equipment shall be capable of maintaining continuous tension of not less than of 3000 kg. per conductor.

11.6 When the conductor is on the stringing rollers before sagging-in, it shall be ensured that the conductor is not damaged due to wind, vibration, vehicles or other causes. Scaffolding should be used to cross the important road crossings for minimum interruption to traffic.

11.7 The conductor shall be pulled up to desired sag and left in serial stringing sheaves for at least one hour after which the sag shall be rechecked and adjusted, if necessary, before clipping in and transferring the conductors from the serial stringing sheaves to the suspension clamps.

11.8 The stringing rollers, when suspended on the transmission structure for supporting conductors, shall be so adjusted that the conductor will be on the rollers at the same height as the suspension clamp to which it is to be secured.

11.9 Armour rods and vibration dampers shall be fitted at each suspension and tension tower before final clamping of conductor with Insulator strings. Vibration dampers are to be fixed with clamping bolt and in correct vertical position in relation to conductor.

11.10 Compression type joints are to be used for jointing of conductors. Each part connected with joints shall be perfectly cleaned & precautionary measures taken before final compression. All the joints of conductors shall be made with the best workmanship and shall be perfectly straight and having maximum possible strength.

11.11 Proper guys shall be provided to counter balance the paying out tension of conductor at the tension locations, to avoid damage to towers and/or accident.

12. FIELD QUALITY PLAN (FQP)

Bidder shall invariably submit the FQP along with Technical Bid for erection of line including all the activities such as dismantling, stringing etc. with detailed checklist to be referred.

13. WASTAGE

13.1 The maximum permitted ceiling for wastages for conductor permitted is 0.5% (maximum) which takes into account the additional length for sag & jumpers.

13.2 No wastage is allowed for any material except the percentage limit mentioned for Conductor here in above in Clause No. 13.1

14. LOSSES In the event of any material used for transmission line found broken or damaged or received short during transit or failed during the erection / testing at site before commissioning of line, the contractor shall replace the same free of cost.

15. COMMISSIONING

15.1 The contractor shall ensure that at the end of each sub-activity the surplus material is immediately removed from the work-site to avoid loss and injury to the public.

15.2 The contractor has to make reconciliation of material account and to settle final bill including signature in all relevant papers required for passing of final bill within three months from the date of charging / commissioning of line.

16. DRAWINGS AND SPECIFICATIONS

16.1. Appendix-I: - Tower schedule showing individual span length,ruling span lengths & existing ground clearance of 132KV Chandaka- Nimapara. Single circuit (S/C)= 56.28 Ckt. KMs.16.2.

Appendix-II: - Tower schedule showing individual span length, ruling span lengths, and existing ground clearance of 132 KV Ranasingpur-Kesura. Single circuit (S/C))= 24.04 Ckt. KMs.

Appendix-III: - Tower schedule showing individual span length, ruling span lengths, and existing ground clearance of 132 KV Kesura-Nimapara. Single circuit (S/C))= 42.55 Ckt. KMs.

16.2 Appendix-IV: - List of rate contract holder firms of OPTCL

APPENDIX-VI

OPTCL WORKS RATE CONTRACTOR LIST

(1) M/s ABHISEK CONTECH (INDIA) PRIVATE LIMITED,PLOT NO-MIG-B/18, BRIT COLONY, NAYAPALLI, BHUBANESWAR-751012, email- abhisekcontechipl @gmail. com, abhisekcontech @rediffmail.com

(2) M/S A.K.DAS ASSOCIATES PVT LTD, PLOT NO. H-1, SATYANAGAR, BHUBANESWAR, email- amiyakanta @akdasassociates.com

(3) M/s AAY BEE ELECTRICAL & CONSTRUCTION, A-65,GROUND FLOOR,SAHEED NAGAR, BHUBANESWAR, email- aaybeeelectrical@yahoo.com

(4) M/s APURBA CONSTRUCTION, INFRONT OF F41/7 BURLA , SAMBALPUR, email- pksvss@gmail.com

(5) M/S BHARAT KUMAR SAHOO, AT/PO/VIA-RENGALI DAM SITE, ANUGUL, EMAIL- bharatkumarsahoo99 @gmail.com.

(6) M/S MAA DURGA ENGINEERING ASSOCIATES, AT -SUABARAI, PO-KALAYANPUR SASANVIA- BHUBANESWAR-2, DIST-PURI, E-MAIL: dhirendrakumarswain19@yahoo,com.

(7) M/S. INLAND ENGINEERS, PLOT. NO. A/127, SAHID NAGAR, BHUBANESWAR-751 007, e-mail- inlandengineers127@ gmail.com

(8) M/S J.D.CONSTRUCTION, AT- BHASKARGANJ-B, NEAR-MUNISAMAJ, SAHADEVKHUNTA, BALASORE, E-MAIL: jdconstructionbalasore@yahoo.com

(9) M/S JAGABANDHU ENTERPRISERS (P) LTD, PLOT NO:- 35/B , SEC-A, MANCHESWAR INDUSTRIAL AREA, RASULGARH , BHUBANESWAR-10, E-MAIL-JEPL_BBSR@REDIFFMAIL.COM, sunilmuduli@ jagabandhuenterprisers.com

(10) M/S. JAGAMOHAN PRADHAN, AT/PO-KULUMA, VIA-RENGALI DAM SITE, DIST-ANGUL, E-MAIL- pradhanjagamohan @yahoo.co.in

(11) M/S KBS EL-CONS., PLOT NO.18, MADHUSUDAN NAGAR, UNIT-IV, BHUBANESWAR-751001, E-MAIL: kbs.elc@gmail.com

(12) M/S KRISHNA POWER CONSTRUCTION PVT. LTDAT: ANANDANAGAR, PO: HAKIMPADA, DIST: ANGUL - 759143 (ODISHA), E-MAIL: krishna_ashokray@yahoo.co.in / krishnapowerconstruction@gmail.com

(13) M/S LAKHESWAR ELECTRICAL AND CONSTRUCTION (PROP. SURYAKANTA JYETHI), PLOT NO-96/1549, AT/PO- BHOI NAGAR, UNIT-IX, BHUBANESWAR, E-MAIL:lec.surya@yahoo.com

(14) M/S OOMKAR TECHNICAL SERVICES (P) LTD, JANARDANPUR, BARIPADA, MAYURBHANJ. EMAIL- otsplodisha@gmail.com

(15) M/S S.B. ELECTROSTRUCTURAL,A/180, SAHEED NAGAR, BHUBANESWAR, E-MAIL: s.structural @rediffmail.com, TEL PHONE NO- 0674-2543896, MOBILE NO-9437010202

(16) M/S SR ASSOCIATES INFRASTRUCTURE PVT LTD, S-2/40, MANCHESWAR INDUSTRIAL ESTATE, BHUBANESWAR - 751010, E-MAIL:info@srai.in, PHONE NO-0674-2585774, MOBILE NO- 9437230865

(17) M/S SUBASH CHANDRA DHAL, AT: SULDIA, PO: EKTALI, JHARSUGUDA, E-MAIL:subashdhal@ yahoo.com, MOBILE NO- 9439664592

(18) M/S TRIBENI ERECTION & RESTORTS(PVT.) LTD, PLOT NO. 69/LP, MAHANADI VIHAR, NAYABAZAR, E-MAIL:tribenierection@ yahoo.com, CUTTACK-753004, MOBILE NO- 9437070707

(19) M/S VELCRO ELECTRICAL MANUFACTURERS PVT LTD,301-302 MADHAV VIHAR APARTMENT, BOMIKHAL, CUTTACK ROAD, BHUBANESWAR-751010., E-MAIL: velcroelectrical @gmail.com,TELEPHONE NO- 0674-2571246, MOBILE NO-9437090013

(20) M/S E. ENGINEERS, SL-150, GOURI GARDEN, GOURI NAGAR, OLD TOWN, BHUBANESWAR-751002, EMAIL- eengineersenergy@gmail.com

(21) M/S AKHANDALAMANI ELECTRICALS & CONSTRUCTION, PLOT NO - 1581, MAHANADI VIHAR, NAYABAZAR, CUTTACK-4, EMAIL: pravat@aecinfrastructure.com

(22) M/S BHARATI CONSTRUCTIONS, PLOT NO- 921/1295, 922/1296, NIGAMANANDA NAGAR, LANE - 3, BOMIKHAL, bharati_constructions@yahoo.co.in

(23) M/S GAYATRI AGENCY, 1089, BISWAL COMPLEX, 1ST FLOOR, MAHANADI VIHAR, CUTTACK, E-MAIL ADDRESS: smruti@gayatriagency.com

(24) M/S KARAN ENGINEERING & CONSTRUCTION, AT-ANDARPUR,PO-KALYANNAGAR,NEAR NAGESWAR TEMPLE, CUTTACK, E-MAIL ADDRESS: samratkaran@gmail.com

(25) M/S MANARANJAN ENTERPRISES, AT/PO-NUAHATA,VIA-BANARPAL,DIST-ANGUL,ODISHA-759128, E-MAIL ADDRESS: mebplagl@rediffmail.com

(26) M/S MOTHER POWER HOUSE PVT. LTD, PLOT NO -52, PRACHI ENCLAVE, 2ND FLOOR, B.D.A, CHANDRASEKHARPUR, DIST-KHORDA, ODISHA, E-MAIL: mother.power@rediffmail.com

(27) M/S DHABALESWAR ENTERPRISERS, DL/A 25,VSS NAGAR, BHUBANESWAR, E-MAIL ADDRESS: dhabaleswar.ent@gmail.com

The contractor may engage experience installer with special skill for the correct installation of the HTLS conductor for supervision in addition to engagement of OPTCLs rate contract holder.

APPENDIX-III

TOWER SCHEDULE OF 132KV KESURA-NIMAPARA LINE

Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
0	Gantry of Kesura		0	0		132kV Kesura line out (LO)
1	1	PC+6	60	60	60	132kV Kesura line out (LO)
2	2	PC+3	115	118	118	132kV Kesura line out (LO)
3	3	DB+6	265	265	265	132kV Kesura line out (LO)
4	4	DD	285	287	287	132kV Kesura line out (LO)
5	5	DB+3	40	40	40	132kV Kesura line out (LO)
6	5A	DB+3	20	20	20	132kV Kesura line out (LO)
7	6	DD+3	190	194	194	132kV Kesura line out (LO)
8	7	DC+6	150	138	138	132kV Kesura line out (LO)
9	8	DB+3	330	325	325	132kV Kesura line out (LO)
10	9	DC+0	280	257	257	132kV Kesura line out (LO)
11	10	DB	210	120	120	132kV Kesura line out (LO)
12	11	DA+6	290	321		132kV Kesura line out (LO)
13	12	DB	280	310	631	132kV Kesura line out (LO)
14	13	DA+3	250	262		132kV Kesura line out (LO)
15	14	DB	260	251	513	132kV Kesura line out (LO)
16	15	DB	300	300	300	132kV Kesura line out (LO)
17	16	DA	170	175		132kV Kesura line out (LO)
18	17	DC+3	170	170	345	132kV Kesura line out (LO)
19	18	DA+6	310	294		132kV Kesura line out (LO)
20	19	DC	236	106	400	132kV Kesura line out (LO)
21	20	DA+9	236	255		132kV Kesura line out (LO)
22	21	DB	232	201	456	132kV Kesura line out (LO)
23	22	DB	246	242	242	132kV Kesura line out (LO)
24	23	DB+6	150	135	135	132kV Kesura line out (LO)
25	24	UR+6	22	25	25	132kV Kesura line out (LO)
26	25	UR+6	470	472	472	132kV Kesura line out (LO)
27	26	DB+3	250	218	218	132kV Kesura line out (LO)
28	27	DA+3	264	261		132kV Kesura line out (LO)
29	28	DA	260	262		132kV Kesura line out (LO)
30	29	DA	250	250		132kV Kesura line out (LO)
31	30	DA	240	244		132kV Kesura line out (LO)
32	31	DC	240	213	1230	132kV Kesura line out (LO)
33	32	DA+6	200	262		132kV Kesura line out (LO)
34	33	DA+6	208	358		132kV Kesura line out (LO)
35	34	DB	208	206	826	132kV Kesura line out (LO)
36	35	DA+6	300	296		132kV Kesura line out (LO)
37	36	DB+3	300	297	593	132kV Kesura line out (LO)
38	37	DA+3	140	140		132kV Kesura line out (LO)
39	38	DA	280	274		132kV Kesura line out (LO)
40	39	DD	150	156	570	132kV Kesura line out (LO)
41	40	DB+3	163	150	150	132kV Kesura line out (LO)
42	41	DB+3	210	125	125	132kV Kesura line out (LO)
43	42	DA+6	290	102		132kV Kesura line out (LO)
44	43	DC+6	390	226	328	132kV Kesura line out (LO)
45	44	DD+6	100	377	377	132kV Kesura line out (LO)
46	45	DD+6	170	73	73	132kV Kesura line out (LO)
47	46	DB	100	170	170	132kV Kesura line out (LO)
48	47	DA	140	93		132kV Kesura line out (LO)
49	48	DB+3	220	138	231	132kV Kesura line out (LO)
50	49	DB+9	285	208	208	132kV Kesura line out (LO)

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Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
51	50	DC	210	227	227	132kV Kesura line out (LO)
52	51	DA	230	295		132kV Kesura line out (LO)
53	52	DB+3	210	218	513	132kV Kesura line out (LO)
54	53	DB+6	170	211	211	132kV Kesura line out (LO)
55	54	DD+12	215	142	142	132kV Kesura line out (LO)
56	55	DD+3	360	391	391	132kV Kesura line out (LO)
57	56	DC+6	230	222	222	132kV Kesura line out (LO)
58	57	DD	310	354	354	132kV Kesura line out (LO)
59	58	DA+3	300	222		132kV Kesura line out (LO)
60	59	DA	310	242		132kV Kesura line out (LO)
61	60	DD	225	282	746	132kV Kesura line out (LO)
62	61	DA+6	305	303		132kV Kesura line out (LO)
63	62	DA+3	290	217		132kV Kesura line out (LO)
64	63	DA	290	266		132kV Kesura line out (LO)
65	64	DD+3	310	278	1064	132kV Kesura line out (LO)
66	65	DD+6	310	255	255	132kV Kesura line out (LO)
67	66	DD	250	309	309	132kV Kesura line out (LO)
68	67	DD	290	259	259	132kV Kesura line out (LO)
69	67A	DD	174	174	174	132kV Kesura line out (LO)
70	113	PA	157	157		132kV Chandaka-Nimapara ckt-I
71	114	PA+6	340	336		132kV Chandaka-Nimapara ckt-I
72	115	PA+3	340	308		132kV Chandaka-Nimapara ckt-I
73	116	PC	240	225	1026	132kV Chandaka-Nimapara ckt-I
74	117	PA	305	324		132kV Chandaka-Nimapara ckt-I
75	118	PA	270	280		132kV Chandaka-Nimapara ckt-I
76	119	PA	270	279		132kV Chandaka-Nimapara ckt-I
77	120	PA	300	298		132kV Chandaka-Nimapara ckt-I
78	121	PA	300	316		132kV Chandaka-Nimapara ckt-I
79	122	PA	300	304		132kV Chandaka-Nimapara ckt-I
80	123	PA	310	317		132kV Chandaka-Nimapara ckt-I
81	124	PA	290	307		132kV Chandaka-Nimapara ckt-I
82	125	PB	300	329	2754	132kV Chandaka-Nimapara ckt-I
83	126	PA	320	320		132kV Chandaka-Nimapara ckt-I
84	127	PA+3	300	295		132kV Chandaka-Nimapara ckt-I
85	128	PA	320	290		132kV Chandaka-Nimapara ckt-I
86	129	PA+3	300	297		132kV Chandaka-Nimapara ckt-I
87	130	PA	280	258		132kV Chandaka-Nimapara ckt-I
88	131	PA+3	320	307		132kV Chandaka-Nimapara ckt-I
89	132	PA	300	335		132kV Chandaka-Nimapara ckt-I
90	133	PA	290	271		132kV Chandaka-Nimapara ckt-I
91	134	PB	290	262	2635	132kV Chandaka-Nimapara ckt-I
92	135	PA+6	345	348		132kV Chandaka-Nimapara ckt-I
93	136	PA	350	351		132kV Chandaka-Nimapara ckt-I
94	137	PA	340	334		132kV Chandaka-Nimapara ckt-I
95	138	PA	270	303		132kV Chandaka-Nimapara ckt-I
96	139	PA	280	290		132kV Chandaka-Nimapara ckt-I
97	140	PA	260	240		132kV Chandaka-Nimapara ckt-I
98	141	OA+6	350	361		132kV Chandaka-Nimapara ckt-I
99	142	OA+6	460	440		132kV Chandaka-Nimapara ckt-I
100	143	PB	250	281	2948	132kV Chandaka-Nimapara ckt-I
101	144	PA+3	345	338		132kV Chandaka-Nimapara ckt-I
102	145	PA+3	300	291		132kV Chandaka-Nimapara ckt-I

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Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
103	146	PA	340	340		132kV Chandaka-Nimapara ckt-I
104	147	PA	300	297		132kV Chandaka-Nimapara ckt-I
105	148	PB	300	296	1562	132kV Chandaka-Nimapara ckt-I
106	149	PA	305	258		132kV Chandaka-Nimapara ckt-I
107	150	PA	220	268		132kV Chandaka-Nimapara ckt-I
108	151	PA+3	310	322		132kV Chandaka-Nimapara ckt-I
109	152	PA	320	324		132kV Chandaka-Nimapara ckt-I
110	153	PC	310	310	1482	132kV Chandaka-Nimapara ckt-I
111	154	PA	287	272		132kV Chandaka-Nimapara ckt-I
112	155	PA	310	303		132kV Chandaka-Nimapara ckt-I
113	156	PA	270	283		132kV Chandaka-Nimapara ckt-I
114	157	PC	300	306	1164	132kV Chandaka-Nimapara ckt-I
115	158	PA+3	330	338		132kV Chandaka-Nimapara ckt-I
116	159	PA+6	370	380		132kV Chandaka-Nimapara ckt-I
117	160	PB+3	350	357	1075	132kV Chandaka-Nimapara ckt-I
118	161	PA+3	325	317		132kV Chandaka-Nimapara ckt-I
119	162	PA	340	368		132kV Chandaka-Nimapara ckt-I
120	163	PA	300	300		132kV Chandaka-Nimapara ckt-I
121	164	PA+3	330	320		132kV Chandaka-Nimapara ckt-I
122	165	PA	320	338		132kV Chandaka-Nimapara ckt-I
123	166	PB	260	261	1904	132kV Chandaka-Nimapara ckt-I
124	167	PA	280	315		132kV Chandaka-Nimapara ckt-I
125	168	PA	240	287		132kV Chandaka-Nimapara ckt-I
126	169	PA	300	308		132kV Chandaka-Nimapara ckt-I
127	170	PA	280	307		132kV Chandaka-Nimapara ckt-I
128	171	PA	300	305		132kV Chandaka-Nimapara ckt-I
129	172	PA	300	308		132kV Chandaka-Nimapara ckt-I
130	173	PA	290	293		132kV Chandaka-Nimapara ckt-I
131	174	PA	290	291		132kV Chandaka-Nimapara ckt-I
132	175	PA+6	340	340		132kV Chandaka-Nimapara ckt-I
133	176	PB	360	363	3117	132kV Chandaka-Nimapara ckt-I
134	177	PA	292	283		132kV Chandaka-Nimapara ckt-I
135	178	PA	290	309		132kV Chandaka-Nimapara ckt-I
136	179	PA	300	275		132kV Chandaka-Nimapara ckt-I
137	180	PA	300	283		132kV Chandaka-Nimapara ckt-I
138	181	PA	300	269		132kV Chandaka-Nimapara ckt-I
139	182	PA+3	320	335		132kV Chandaka-Nimapara ckt-I
140	183	PA	300	300		132kV Chandaka-Nimapara ckt-I
141	184	PA	290	297		132kV Chandaka-Nimapara ckt-I
142	185	PB	290	301	2652	132kV Chandaka-Nimapara ckt-I
143	186	PA	295	305		132kV Chandaka-Nimapara ckt-I
144	187	PA+6	370	379		132kV Chandaka-Nimapara ckt-I
145	188	PA	350	340		132kV Chandaka-Nimapara ckt-I
146	189	PA+3	300	315		132kV Chandaka-Nimapara ckt-I
147	190	PB	290	319	1658	132kV Chandaka-Nimapara ckt-I
148	191	PA	300	292		132kV Chandaka-Nimapara ckt-I
149	192	PA+6	350	340		132kV Chandaka-Nimapara ckt-I
150	193	PA	330	330		132kV Chandaka-Nimapara ckt-I
151	194	PB	280	280	1242	132kV Chandaka-Nimapara ckt-I
152	195	PA	270	230		132kV Chandaka-Nimapara ckt-I
153	196	PA	280	246		132kV Chandaka-Nimapara ckt-I
154	197	PA	280	250		132kV Chandaka-Nimapara ckt-I

Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
155	198	PB+6	300	301	1027	132kV Chandaka-Nimapara ckt-I
156	199	PA+3	375	264		132kV Chandaka-Nimapara ckt-I
157	200	PA	260	267		132kV Chandaka-Nimapara ckt-I
158	201	PB	280	275	806	132kV Chandaka-Nimapara ckt-I
159	202	PC	140	154	154	132kV Chandaka-Nimapara ckt-I
160	Gantry of Nimapara		43	43	43	132kV Chandaka-Nimapara ckt-I
		GRAND TOTAL	**43158**	**42558**	**42558**	

Appendix-I.

TOWER SCHEDULE OF 132KV CHANDAKA-NIMAPARA D.C LINE

Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
0	0	EHV Cable end Gantry at Chandaka	0	0		
1	4A	PC	10	10	10	132kV Chandaka-Nimapara line
2	5	PB	264	264	264	132kV Chandaka-Nimapara line
3	6	PC	131	131	131	132kV Chandaka-Nimapara line
4	7	PA	266	266		132kV Chandaka-Nimapara line
5	8	PA	240	240		132kV Chandaka-Nimapara line
6	9	PA	272	272		132kV Chandaka-Nimapara line
7	10	PA	225	225		132kV Chandaka-Nimapara line
8	11	PB	260	260	1263	132kV Chandaka-Nimapara line
9	12	PA	227	227		132kV Chandaka-Nimapara line
10	13	PC	197	197	424	132kV Chandaka-Nimapara line
11	14	PB	128	128	128	132kV Chandaka-Nimapara line
12	15	PC	198	198	198	132kV Chandaka-Nimapara line
13	16	PC	222	222	222	132kV Chandaka-Nimapara line
14	17	PC	156	156	156	132kV Chandaka-Nimapara line
15	18	PA	239	239		132kV Chandaka-Nimapara line
16	19	PB	242	242	481	132kV Chandaka-Nimapara line
17	20	PA	188	188		132kV Chandaka-Nimapara line
18	21	PB	182	182	370	132kV Chandaka-Nimapara line
19	22	PA	341	341		132kV Chandaka-Nimapara line
20	23	PC	251	251	592	132kV Chandaka-Nimapara line
21	24	PC	153	153	153	132kV Chandaka-Nimapara line
22	25	PC	243	243	243	132kV Chandaka-Nimapara line
23	26	PC	247	247	247	132kV Chandaka-Nimapara line
24	27	PC	151	151	151	132kV Chandaka-Nimapara line
25	28	PA	235	235		132kV Chandaka-Nimapara line
26	29	PC	266	266	501	132kV Chandaka-Nimapara line
27	30	PB	193	193	193	132kV Chandaka-Nimapara line
28	31	PA	335	335		132kV Chandaka-Nimapara line
29	32	PA	309	309		132kV Chandaka-Nimapara line
30	33	PA	293	293		132kV Chandaka-Nimapara line
31	34	PA	312	312		132kV Chandaka-Nimapara line
32	35	PB	281	281	1530	132kV Chandaka-Nimapara line
33	36	PA	278	278		132kV Chandaka-Nimapara line
34	37	PC	279	279	557	132kV Chandaka-Nimapara line
35	38	PC	116	116	116	132kV Chandaka-Nimapara line
36	39	PC	156	156	156	132kV Chandaka-Nimapara line
37	40	PA	243	243		132kV Chandaka-Nimapara line
38	41	PB	168	168	411	132kV Chandaka-Nimapara line
39	42	PC	138	138	138	132kV Chandaka-Nimapara line
40	43	PB	42	42	42	132kV Chandaka-Nimapara line
41	44	PB	259	259	259	132kV Chandaka-Nimapara line
42	45	PA	296	296		132kV Chandaka-Nimapara line
43	46	PA+3	325	325		132kV Chandaka-Nimapara line
44	47	PB	325	325	946	132kV Chandaka-Nimapara line
45	48	PA	284	284		132kV Chandaka-Nimapara line
46	49	PA	301	301		132kV Chandaka-Nimapara line
47	50	PB	305	305	890	132kV Chandaka-Nimapara line
48	51	PA+3	326	326		132kV Chandaka-Nimapara line
49	52	PC	315	315	641	132kV Chandaka-Nimapara line
50	53	PB	184	184	184	132kV Chandaka-Nimapara line
51	54	PA	271	271		132kV Chandaka-Nimapara line

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Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
52	55	PA	276	276		132kV Chandaka-Nimapara line
53	56	PA	274	274		132kV Chandaka-Nimapara line
54	57	PC	229	229	1050	132kV Chandaka-Nimapara line
55	58	PC	30	30	30	132kV Chandaka-Nimapara line
56	59	PB+3	232	232	232	132kV Chandaka-Nimapara line
57	60	PB	238	238	238	132kV Chandaka-Nimapara line
58	61	PC+3	250	250	250	132kV Chandaka-Nimapara line
59	61A	PC+3	180	180	180	132kV Chandaka-Nimapara line
60	61B	PB	212	212	212	132kV Chandaka-Nimapara line
61	61C	PB+3	246	246	246	132kV Chandaka-Nimapara line
62	61D	PB+3	210	210	210	132kV Chandaka-Nimapara line
63	61E	PB	220	220	220	132kV Chandaka-Nimapara line
64	61F	PC	54	54	54	132kV Chandaka-Nimapara line
65	62	PA	62	62		132kV Chandaka-Nimapara line
66	63	PA	279	279		132kV Chandaka-Nimapara line
67	64	PB	300	300	641	132kV Chandaka-Nimapara line
68	65	PA	304	304		132kV Chandaka-Nimapara line
69	66	PA	299	299		132kV Chandaka-Nimapara line
70	67	PA+3	325	325		132kV Chandaka-Nimapara line
71	68	PA	345	345		132kV Chandaka-Nimapara line
72	69	PA	291	291		132kV Chandaka-Nimapara line
73	70	PB	309	309	1873	132kV Chandaka-Nimapara line
74	71	PA	259	259		132kV Chandaka-Nimapara line
75	72	PA	280	280		132kV Chandaka-Nimapara line
76	73	PC	284	284	823	132kV Chandaka-Nimapara line
77	74	PA	214	214		132kV Chandaka-Nimapara line
78	75	PC	244	244	458	132kV Chandaka-Nimapara line
79	76	PC	148	148	148	132kV Chandaka-Nimapara line
80	77	PA	195	195		132kV Chandaka-Nimapara line
81	78	PA	317	317		132kV Chandaka-Nimapara line
82	79	PA	298	298		132kV Chandaka-Nimapara line
83	80	PC	277	277	1087	132kV Chandaka-Nimapara line
84	81	PA	301	301		132kV Chandaka-Nimapara line
85	82	PA	314	314		132kV Chandaka-Nimapara line
86	83	PC	303	303	918	132kV Chandaka-Nimapara line
87	84	PA	276	276		132kV Chandaka-Nimapara line
88	85	PA	261	261		132kV Chandaka-Nimapara line
89	86	PA	268	268		132kV Chandaka-Nimapara line
90	87	PA	288	288		132kV Chandaka-Nimapara line
91	88	PB	280	280	1373	LILO to Ranasingpur
92	89	PA	256	252		132kV Chandaka-Nimapara line
93	90	PA	306	297		132kV Chandaka-Nimapara line
94	91	PA	292	288		132kV Chandaka-Nimapara line
95	92	OC+6	336	306	1143	132kV Chandaka-Nimapara line
96	93	OC+6	190	209	209	132kV Chandaka-Nimapara line
97	94	PA	268	258		132kV Chandaka-Nimapara line
98	95	PA	306	300		132kV Chandaka-Nimapara line
99	96	PA	306	300		132kV Chandaka-Nimapara line
100	97	PA	306	300		132kV Chandaka-Nimapara line
101	98	PA	304	301		132kV Chandaka-Nimapara line
102	99	PB	328	318	1777	132kV Chandaka-Nimapara line
103	100	PA+3	342	332		132kV Chandaka-Nimapara line
104	101	PA+6	248	245		132kV Chandaka-Nimapara line
105	102	PA	326	320		132kV Chandaka-Nimapara line
106	103	PA	314	308		132kV Chandaka-Nimapara line

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Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
107	104	PA	302	295		132kV Chandaka-Nimapara line
108	105	PA	314	309		132kV Chandaka-Nimapara line
109	106	PA	318	324		132kV Chandaka-Nimapara line
110	107	PB	308	291	2424	132kV Chandaka-Nimapara line
111	108	PA	306	300		132kV Chandaka-Nimapara line
112	109	PA	324	317		132kV Chandaka-Nimapara line
113	110	PA+3	300	293		132kV Chandaka-Nimapara line
114	111	PA	290	286		132kV Chandaka-Nimapara line
115	112	PA	300	291		132kV Chandaka-Nimapara line
116	113	PA	320	314		LILO to Kesura in between 112 & 113 of ckt-I by interposing tower.
117	114	PA+6	340	336		132kV Chandaka-Nimapara line
118	115	PA+3	340	308		132kV Chandaka-Nimapara line
119	116	PC	240	225	2670	132kV Chandaka-Nimapara line
120	117	PA	305	324		132kV Chandaka-Nimapara line
121	118	PA	270	280		132kV Chandaka-Nimapara line
122	119	PA	270	279		132kV Chandaka-Nimapara line
123	120	PA	300	298		132kV Chandaka-Nimapara line
124	121	PA	300	316		132kV Chandaka-Nimapara line
125	122	PA	300	304		132kV Chandaka-Nimapara line
126	123	PA	310	317		132kV Chandaka-Nimapara line
127	124	PA	290	307		132kV Chandaka-Nimapara line
128	125	PB	300	329	2754	132kV Chandaka-Nimapara line
129	126	PA	320	320		132kV Chandaka-Nimapara line
130	127	PA+3	300	295		132kV Chandaka-Nimapara line
131	128	PA	320	290		132kV Chandaka-Nimapara line
132	129	PA+3	300	297		132kV Chandaka-Nimapara line
133	130	PA	280	258		132kV Chandaka-Nimapara line
134	131	PA+3	320	307		132kV Chandaka-Nimapara line
135	132	PA	300	335		132kV Chandaka-Nimapara line
136	133	PA	290	271		132kV Chandaka-Nimapara line
137	134	PB	290	262	2635	132kV Chandaka-Nimapara line
138	135	PA+6	345	348		132kV Chandaka-Nimapara line
139	136	PA	350	351		132kV Chandaka-Nimapara line
140	137	PA	340	334		132kV Chandaka-Nimapara line
141	138	PA	270	303		132kV Chandaka-Nimapara line
142	139	PA	280	290		132kV Chandaka-Nimapara line
143	140	PA	260	240		132kV Chandaka-Nimapara line
144	141	OA+6	350	361		132kV Chandaka-Nimapara line
145	142	OA+6	460	440		132kV Chandaka-Nimapara line
146	143	PB	250	281	2948	132kV Chandaka-Nimapara line
147	144	PA+3	345	338		132kV Chandaka-Nimapara line
148	145	PA+3	300	291		132kV Chandaka-Nimapara line
149	146	PA	340	340		132kV Chandaka-Nimapara line
150	147	PA	300	297		132kV Chandaka-Nimapara line
151	148	PB	300	296	1562	132kV Chandaka-Nimapara line
152	149	PA	305	258		132kV Chandaka-Nimapara line
153	150	PA	220	268		132kV Chandaka-Nimapara line
154	151	PA+3	310	322		132kV Chandaka-Nimapara line
155	152	PA	320	324		132kV Chandaka-Nimapara line
156	153	PC	310	310	1482	132kV Chandaka-Nimapara line
157	154	PA	287	272		132kV Chandaka-Nimapara line
158	155	PA	310	303		132kV Chandaka-Nimapara line
159	156	PA	270	283		132kV Chandaka-Nimapara line
160	157	PC	300	306	1164	132kV Chandaka-Nimapara line

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Sl. No.	Loc. No.	Type of Tower	Span Length as per record (Meters)	Span Length from GIS (Meters)	Stretch length (Meters)	Remarks
161	158	PA+3	330	338		132kV Chandaka-Nimapara line
162	159	PA+6	370	380		132kV Chandaka-Nimapara line
163	160	PB+3	350	357	1075	132kV Chandaka-Nimapara line
164	161	PA+3	325	317		132kV Chandaka-Nimapara line
165	162	PA	340	368		132kV Chandaka-Nimapara line
166	163	PA	300	300		132kV Chandaka-Nimapara line
167	164	PA+3	330	320		132kV Chandaka-Nimapara line
168	165	PA	320	338		132kV Chandaka-Nimapara line
169	166	PB	260	261	1904	132kV Chandaka-Nimapara line
170	167	PA	280	315		132kV Chandaka-Nimapara line
171	168	PA	240	287		132kV Chandaka-Nimapara line
172	169	PA	300	308		132kV Chandaka-Nimapara line
173	170	PA	280	307		132kV Chandaka-Nimapara line
174	171	PA	300	305		132kV Chandaka-Nimapara line
175	172	PA	300	308		132kV Chandaka-Nimapara line
176	173	PA	290	293		132kV Chandaka-Nimapara line
177	174	PA	290	291		132kV Chandaka-Nimapara line
178	175	PA+6	340	340		132kV Chandaka-Nimapara line
179	176	PB	360	363	3117	132kV Chandaka-Nimapara line
180	177	PA	292	283		132kV Chandaka-Nimapara line
181	178	PA	290	309		132kV Chandaka-Nimapara line
182	179	PA	300	275		132kV Chandaka-Nimapara line
183	180	PA	300	283		132kV Chandaka-Nimapara line
184	181	PA	300	269		132kV Chandaka-Nimapara line
185	182	PA+3	320	335		132kV Chandaka-Nimapara line
186	183	PA	300	300		132kV Chandaka-Nimapara line
187	184	PA	290	297		132kV Chandaka-Nimapara line
188	185	PB	290	301	2652	132kV Chandaka-Nimapara line
189	186	PA	295	305		132kV Chandaka-Nimapara line
190	187	PA+6	370	379		132kV Chandaka-Nimapara line
191	188	PA	350	340		132kV Chandaka-Nimapara line
192	189	PA+3	300	315		132kV Chandaka-Nimapara line
193	190	PB	290	319	1658	132kV Chandaka-Nimapara line
194	191	PA	300	292		132kV Chandaka-Nimapara line
195	192	PA+6	350	340		132kV Chandaka-Nimapara line
196	193	PA	330	330		132kV Chandaka-Nimapara line
197	194	PB	280	280	1242	132kV Chandaka-Nimapara line
198	195	PA	270	230		132kV Chandaka-Nimapara line
199	196	PA	280	246		132kV Chandaka-Nimapara line
200	197	PA	280	250		132kV Chandaka-Nimapara line
201	198	PB+6	300	301	1027	132kV Chandaka-Nimapara line
202	199	PA+3	375	264		132kV Chandaka-Nimapara line
203	200	PA	260	267		132kV Chandaka-Nimapara line
204	201	PB	280	275	806	132kV Chandaka-Nimapara line
205	202	PC	140	154	154	132kV Chandaka-Nimapara line
206	Gantry of Nimapara		43	43	43	
		TOTAL	**56437**	**56286**	**56286**	

APPENDIX – II.

TOWER SCHEDULE OF 132KV RANASINGPUR-KESURA LINE

Sl. No.	Loc. No.	Type of Tower	Span Length (Meters)	Span Length from (GIS) (Meters)	Stretch length (Meters)	Remarks
0	Gantry at Ranasingpur		0	0		
1	88-K	PC	56	56	56	132kV Ranasingpur line out (LO)
2	88-J	PB+3	180	180	180	132kV Ranasingpur line out (LO)
3	88-I	PC+3	214	214	214	132kV Ranasingpur line out (LO)
4	88-H	PC+3	23	23	23	132kV Ranasingpur line out (LO)
5	88-G	PB+3	212	212	212	132kV Ranasingpur line out (LO)
6	88-F	PC+6	182	182	182	132kV Ranasingpur line out (LO)
7	88-E	PC+3	22	22	22	132kV Ranasingpur line out (LO)
8	88-D	PB+3	23	23	23	132kV Ranasingpur line out (LO)
9	88-C	DD+3	287	287	287	132kV Ranasingpur line out (LO)
10	88-B	DD	99	99	99	132kV Ranasingpur line out (LO)
11	88-A	DD	238	238	238	132kV Ranasingpur line out (LO)
12	88	PB	18	18	18	132kV Chandaka-Nimapara line
13	89	PA	256	252		132kV Chandaka-Nimapara line
14	90	PA	306	297		132kV Chandaka-Nimapara line
15	91	PA	292	288		132kV Chandaka-Nimapara line
16	92	OC+6	336	306	1143	132kV Chandaka-Nimapara line
17	93	OC+6	190	209	209	132kV Chandaka-Nimapara line
18	94	PA	268	258		132kV Chandaka-Nimapara line
19	95	PA	306	300		132kV Chandaka-Nimapara line
20	96	PA	306	300		132kV Chandaka-Nimapara line
21	97	PA	306	300		132kV Chandaka-Nimapara line
22	98	PA	304	301		132kV Chandaka-Nimapara line
23	99	PB	328	318	1777	132kV Chandaka-Nimapara line
24	100	PA+3	342	332		132kV Chandaka-Nimapara line
25	101	PA+6	248	245		132kV Chandaka-Nimapara line
26	102	PA	326	320		132kV Chandaka-Nimapara line
27	103	PA	314	308		132kV Chandaka-Nimapara line
28	104	PA	302	295		132kV Chandaka-Nimapara line
29	105	PA	314	309		132kV Chandaka-Nimapara line
30	106	PA	318	324		132kV Chandaka-Nimapara line
31	107	PB	308	291	2424	132kV Chandaka-Nimapara line
32	108	PA	306	300		132kV Chandaka-Nimapara line
33	109	PA	324	317		132kV Chandaka-Nimapara line
34	110	PA+3	300	293		132kV Chandaka-Nimapara line
35	111	PA	290	286		132kV Chandaka-Nimapara line
36	112	PA	300	291		132kV Chandaka-Nimapara line
37	67A	DD	157	157	1644	Interposing tower along the line
38	67	DD	174	174	174	132kV Kesura line in (LI)
39	66	DD	290	259	259	132kV Kesura line in (LI)
40	65	DD+6	250	309	309	132kV Kesura line in (LI)
41	64	DD+3	310	255	255	132kV Kesura line in (LI)
42	63	DA	310	278		132kV Kesura line in (LI)
43	62	DA+3	290	266		132kV Kesura line in (LI)
44	61	DA+6	290	217		132kV Kesura line in (LI)
45	60	DD	305	303	1064	132kV Kesura line in (LI)
46	59	DA	225	282		132kV Kesura line in (LI)
47	58	DA+3	310	242		132kV Kesura line in (LI)
48	57	DD	300	222	746	132kV Kesura line in (LI)

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Sl. No.	Loc. No.	Type of Tower	Span Length (Meters)	Span Length from (GIS) (Meters)	Stretch length (Meters)	Remarks
49	56	DC+6	310	354	354	132kV Kesura line in (LI)
50	55	DD+3	230	222	222	132kV Kesura line in (LI)
51	54	DD+12	360	391	391	132kV Kesura line in (LI)
52	53	DB+6	215	142	142	132kV Kesura line in (LI)
53	52	DB+3	170	211	211	132kV Kesura line in (LI)
54	51	DA	210	218		132kV Kesura line in (LI)
55	50	DC	230	295	513	132kV Kesura line in (LI)
56	49	DB+9	210	227	227	132kV Kesura line in (LI)
57	48	DB+3	285	208	208	132kV Kesura line in (LI)
58	47	DA	220	138		132kV Kesura line in (LI)
59	46	DB	140	93	231	132kV Kesura line in (LI)
60	45	DD+6	100	170	170	132kV Kesura line in (LI)
61	44	DD+6	170	73	73	132kV Kesura line in (LI)
62	43	DC+6	100	377	377	132kV Kesura line in (LI)
63	42	DA+6	390	226		132kV Kesura line in (LI)
64	41	DB+3	290	102	328	132kV Kesura line in (LI)
65	40	DB+3	210	125	125	132kV Kesura line in (LI)
66	39	DD	163	150	150	132kV Kesura line in (LI)
67	38	DA	150	156		132kV Kesura line in (LI)
68	37	DA+3	280	274		132kV Kesura line in (LI)
69	36	DB+3	140	140	570	132kV Kesura line in (LI)
70	35	DA+6	300	297		132kV Kesura line in (LI)
71	34	DB	300	296	593	132kV Kesura line in (LI)
72	33	DA+6	208	206		132kV Kesura line in (LI)
73	32	DA+6	208	358		132kV Kesura line in (LI)
74	31	DC	200	262	826	132kV Kesura line in (LI)
75	30	DA	240	213		132kV Kesura line in (LI)
76	29	DA	240	244		132kV Kesura line in (LI)
77	28	DA	250	250		132kV Kesura line in (LI)
78	27	DA+3	260	262		132kV Kesura line in (LI)
79	26	DB+3	264	261	1230	132kV Kesura line in (LI)
80	25	UR+6	250	218	218	132kV Kesura line in (LI)
81	24	UR+6	470	472	472	132kV Kesura line in (LI)
82	23	DB+6	22	25	25	132kV Kesura line in (LI)
83	22	DB	150	135	135	132kV Kesura line in (LI)
84	21	DB	246	242	242	132kV Kesura line in (LI)
85	20	DA+9	232	201		132kV Kesura line in (LI)
86	19	DC	236	255	456	132kV Kesura line in (LI)
87	18	DA+6	236	106		132kV Kesura line in (LI)
88	17	DC+3	310	294	400	132kV Kesura line in (LI)
89	16	DA	170	170		132kV Kesura line in (LI)
90	15	DB	170	175	345	132kV Kesura line in (LI)
91	14	DB	300	300	300	132kV Kesura line in (LI)
92	13	DA+3	260	251		132kV Kesura line in (LI)
93	12	DB	250	262	513	132kV Kesura line in (LI)
94	11	DA+6	280	310		132kV Kesura line in (LI)
95	10	DB	290	321	631	132kV Kesura line in (LI)
96	9	DC+0	210	120	120	132kV Kesura line in (LI)
97	8	DB+3	280	257	257	132kV Kesura line in (LI)
98	7	DC+6	330	325	325	132kV Kesura line in (LI)
99	6	DD+3	150	138	138	132kV Kesura line in (LI)

Sl. No.	Loc. No.	Type of Tower	Span Length (Meters)	Span Length from (GIS) (Meters)	Stretch length (Meters)	Remarks
100	5	DB+3	190	194	194	132kV Kesura line in (LI)
101	4	DD	40	40	40	132kV Kesura line in (LI)
102	3	DB+6	285	287	287	132kV Kesura line in (LI)
103	2	PC+3	265	265	265	132kV Kesura line in (LI)
104	1	PC+6	115	118	118	132kV Kesura line in (LI)
105	Gantry of Kesura		60	60	60	
		TOTAL	**24795**	**24040**	**24040**	