ODISHA POWER TRANSMISSION CORPORATION LTD

OFFICE OF THE SENIOR GENERAL MANAGER,

CENTRAL PROCUREMENT CELL,

JANPATH, BHUBANESWAR - 751022

Specification for **33 KV & 11 KV Covered conductor & its accessories.**

Sr.G.M.CPC-II-e-Tender. Covered conductor-18/2020-21.

Supply and erection of 33 KV 120Sq.mm Covered conductor with its accessories in the Reserve forest areas for feeding power supply to 33/11 KV Sub-Station and 11 KV 99 Sq.mm Covered conductor with its accessories in the Reserve forest areas of 11 KV Outgoing feeders constructed under ODSSP Scheme against pkg-4 of phase -III, ODSSP. (Odisha Distribution System Strengthening Project) .Government of Odisha funded Scheme.

(E tendering mode only)

1	Request for online tender documents	From < 11:00 AM > dated <**04.11.2020**> to < 12:45 PM > dated <**03.12.2020**>.
2	Last date of submission of online tender	(Part-I & Part-II) : < 1:00 PM > dated <**03.12.2020**>
3	Date of opening of Tender	Dated <**03.12.2020**> at < 3:00PM > onwards.

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ODISHA POWER TRANSMISSION CORPORATION LTD.

REGD. OFFICE: JANPATH, BHUBANESWAR – 751 022,

ODISHA

Sr.G.M.CPC-II-e-Tender. Covered conductor-18/2020-21

For and on behalf of ODISHA POWER TRANSMISSION CORPORATION LTD, Sr.G.M. [C.P.C.] invites Tenders from "Only manufacturers & their authorized representatives of covered conductor & its Accessories" in two part bidding system for Supply and erection of 33 KV 120Sq.mm Covered conductor with its accessories in the Reserve forest areas for feeding power supply to 33/11 KV Sub-Station and 11 KV 99 Sq.mm Covered conductor with its accessories in the Reserve forest areas of 11 KV Outgoing feeders constructed under ODSSP Scheme against pkg-4 of phase -III, ODSSP. (Odisha Distribution System Strengthening Project) .Government of Odisha funded Scheme. Complete set of bidding documents are available at **www.tenderwizard.com/OPTCL** from Dated 04.11.2020 (11.00 Hrs) To Dated.03.12.2020(12.45 Hrs). Interested manufacturers may visit OPTCL's official web site **http://www.optcl.co.in** and **www.tenderwizard.com/OPTCL** for detail specification.

SENIOR GENERAL MANAGER [C.P.C.]

NOTICE INVITING TENDER

ODISHA POWER TRANSMISSION CORPORATION LTD.,

REGD. OFFICE: JANPATH, Bhubaneswar.

Sr.G.M.CPC-II-e-Tender. Covered conductor-18/2020-21

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

Sl. No	Tender Specification No.	Description of work and supply of equipment/materials	Completion period.	Earnest Money Deposit (In Rs.)	Cost of Tender Spec. document (in Rs.)	Last date of receipt & opening of tender
1.	**Sr.G.M.CPC-II-e-Tender. Covered conductor-18/2020-21**	Supply and erection of 33 KV 120Sq.mm Covered conductor with its accessories in the Reserve forest areas for feeding power supply to 33/11 KV Sub-Station and 11 KV 99 Sq.mm Covered conductor with its accessories in the Reserve forest areas of 11 KV Outgoing feeders constructed under ODSSP Scheme against pkg-4 of phase -III, ODSSP. (Odisha Distribution System Strengthening Project) .Government of Odisha funded Scheme.	04 (Four) months from the issue of P.O	Rs.8,88,610/-	12,000+ GST 12%-1200/- =13,440/-	< 1:00 PM > dated <03.12.2020 >**&** Dated 03.12.2020 (03.00 PM)

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

The bidders who want to submit bids shall have to pay non-refundable amount of Rs. 13,440/- (Rupees thirteen thousand four hundred and forty) only including GST @ 12%) 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. They have to submit notarized

hard copy of GST registration certificate on or before the date & time of opening of techno-commercial bid.

The bidders shall have to submit non-refundable amount of Rs.5,900/- (Rupees Five thousand & nine hundred) only including GST @ 18%) 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 date & time for opening 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 scheduled date & time of opening of tender.

The bidders shall scan the Demand Draft/Pay order/ Bank guarantee, towards EMD/ 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

ODISHA POWER TRANSMISSION CORPORATION LTD.

OFFICE OF THE SR. GENERAL MANAGER

CENTRAL PROCUREMENT CELL

JANAPATH, BHUBANESWAR – 751022

Sr.G.M.CPC-II-e-Tender. Covered conductor-18/2020-21

CONTAINING

SECTION – I : INSTRUCTION TO TENDERERS

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

SECTION – III :LIST OF ANNEXURES (COMMERCIAL)

SECTION – IV :TECHNICAL SPECIFICATION

SECTION – V PRICE BID.

PART – I.

SECTION – I.

INSTRUCTIONS TO TENDERERS

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2.	Division of Specification.	02
3.	Tenders shall be single part.	
4.	Opening of Bids.	03
5.	Purchaser's right regarding alteration in Quantities, Tendered.	04
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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 GST Laws.

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. 2360/- through e-payment/DD in favour of K S E D C Ltd Payable at Bangalore.

c. Send the acknowledgment copy for verification.

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

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 GST Laws.

2. <u>Division of Specification.</u>

The specification is mainly single part

<u>Part Consists of</u>

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

Schedule of prices as per Annexure-V

3. <u>Tenders shall be in single part.</u>

The Tenderers are required to submit the tenders in single part.

4. <u>Opening of Bids.</u>

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

required, shall be sought for from the bidders. The Tenderers shall be allowed 15 days time for such activity.

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

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

[c] When the revised price proposals are received, the original price proposals will be returned to the bidders unopened along with their original technical proposals. Only the revised technical and price proposals will be considered for bid evaluation.

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

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

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

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

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

6. Procedure and opening time of tenders.

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

7. Bidder's Liberty to deviate from Specification.

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

8. Eligibility for submission of bids.

Only those manufacturers who have deposited the cost of tender specification are eligible to participate in the tender. They should submit the money receipt as a proof of such payment.

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

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

10. Mode of submission of Tenders.

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

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

11. Earnest money deposit:

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

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

(a) **Cash:-**Payable to drawing & disbursing Officer, OPTCL (Hd.qrs. Office), Bhubaneswar - 751022

(b) **Bank Draft**: -To be drawn in favour of Drawing & Disbursing Officer, OPTCL [H.Qrs.Office], Bhubaneswar-751 022.

(c) Bank Guarantee from any Nationalized/Scheduled Bank strictly as per enclosed proforma vide **Annexure-VI** to be executed on non-judicial stamp paper worth Rs.29.00 or as

applicable, as per prevailing laws in force and also to be accompanied by the confirmation letter of the issuing Bank Branch.

NOTE:

(i). The validity of the EMD in the form of Bank Guarantee shall be at least for 240 days from the date of opening of tender failing which the tender will be liable for rejection.

(ii) No interest shall be paid on the Earnest Money Deposit.

(iii) E.M.D. in shape of cash may be submitted up to Rs. 25,000/- (Rupees Twenty-five) Thousand) only. Above Rs. 25,000/- (Rupees Twenty-five thousand) the Earnest Money Deposit shall be furnished in any one of the forms indicated above (i.e. Through Bank Draft, Bank Guarantee/ National Savings Certificate).

(iv) No adjustment towards EMD shall be permitted against any outstanding amount with the **ODISHA POWER TRANSMISSION CORPORATION LTD**.

(v) The chart showing particulars of EMD to be furnished by Tenderers of different categories is placed at **Annexure-VIII.**

(vi) In the case of un- successful tenderer, the EMD will be refunded after the tender is decided. In the case of successful Tenderer, this will be refunded only after furnishing of security money referred to at clause-19of Section-II.

(vii) Suits, if any, arising out of this clause shall be filed in a Court of law to which the jurisdiction of High Court of ODISHA extends.

(vii) EMD will be forfeited if the tenderer fails to accept the letter of intent and/or purchase order issued in his favour or to execute the order, placed on them.

(viii) Tenders not accompanied by Earnest Money shall be disqualified.

12. Validity of the Bids: -

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

13. PRICE: -

i) Tenderers are requested to quote-'FIRM' Price. No deviation from **FIRM PRICE** will be entertained irrespective of deviation clause No.7 of this part of the specification.

14. Revision of tender price by Bidders: -

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

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

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

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

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

16. Documents to Accompany Bids.

Tenderers are required to submit tenders in the following manner:

The Tender shall Contain the following documents.

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

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

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

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

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

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

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

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

[ix] Sales tax clearance certificate for the previous year and GST Compliance Rating. The GST Identification Number (GSTIN) under GST Laws and permanent account number [PAN] of the firm under Income tax Act are required.

[x] Audited Balance sheet & profit loss accounts of the bidder, for past (3) three years.

[xi] Schedule of quantity and delivery in the prescribed Proforma vide Annexure, as appended.

[xii] List of Orders in hand to be executed.

[xiii] Deviation schedule.

[xiv] The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify/declare the same in unequivocal terms by way of an affidavit duly sworn before a magistrate/notary.

17. Documents/Papers to accompany Bid.

(a) Price bid of the tender shall consist of the following

(i) Schedule of prices in the prescribed proforma

18. Conditional Offer:

Conditional offer shall not be accepted.

19. General: -

(i) In the event of discrepancy or arithmetical error in the schedule of price, the decision of the purchaser shall be final and binding on the Tenderer.

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

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

(iv) The price bids of the technically and otherwise acceptable bids shall only be evaluated. The EMD of others, if any, shall be returned to the bidders.

(v) Tenderer can offer any lot or all the lots of the tender, if there are more than one lots. But the tender (bid) must be furnished separately for each lot.

(vi) It should be distinctly understood that the price bid shall contain only details/documents relating to price, as outlined in clause-17 mentioned herein above. Inclusion of any of the documents/information etc. shall render the bid liable for rejection.

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

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

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

Important:

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

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

a) Hotel Accommodation:

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

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

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

b) Journey of the inspecting officer:

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

c) Local Conveyance:

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

d) Following points are also to be considered:

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

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

(iii) In case of inspection and testing of some critical equipment/materials like Power transformers, OPTCL may depute more than one inspecting officer.
(iv)Contractor/supplier/manufacturer shall judiciously plan the inspection/testing schedule and place of inspection/testing, so that optimum number of inspection/testing and minimum time shall be required to cover all the equipment/materials of the relevant contract package.

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

21.0 (a). Detailed information on any litigation or arbitration arising out of contract completed or under execution by it over the last five years. A consistent history of litigation by or against the bidder may result in rejection of bid.

21.0 (b). The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify / declare the same in the unequivocal terms by way of an affidavit duly sworn before a magistrate/notary. Bid furnished by the bidder shall not be eligible for consideration if it is not accompanied by the affidavit. Further the bid / LOA/ LOI shall be liable for outright rejection/ cancellation at any stage if any information contrary to the affidavit / declaration is detected.

N.B: If any statutory fee is required the same shall be deposited by the contractor and it will be reimbursed by OPTCL.

There may ROW issue while executing the work which is in the scope of the contractor.

SECTION – II.

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

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PART-I

SECTION-II

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

1. **Scope of the contract:**

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

2.0 **Definition of terms:**

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

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

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

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

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

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

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

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

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

2.9 "Month" shall mean "Calendar month".

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

2.11 Basic Price (Taxable value for Goods) at the point of destination" shall mean the price quoted by the bidder for equipment and material at the consignee's store/site. The cost is inclusive of packing, forwarding, freight, insurance and all expenses and taxes & duties at the end of the supplier excluding Goods & Service Tax. The Goods & Service Tax shall be shown in a separate column item wise alongside the Basic Price quoted at the applicable rate in the Tax Invoice. The applicable rate of GST shall refer to the HSN code of the

material supplied. The Basic Price and GST thereon shall be the "FOR Destination Price" as quoted by the bidder.

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

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

3. **Manner of execution**:

All equipment supplied under the contract shall be manufactured in the manner, set out in the specification or where not set out, to the reasonable satisfaction of

the Purchaser's representative.

4. **Inspection and Testing**:

[i] The purchaser's representative shall be entitled at all reasonable times during manufacture to inspect, examine and test at the supplier's premises, the materials and workmanship of all equipment/materials to be supplied under this contract and if part of the said equipment/material is being manufactured in other premises, the supplier shall obtain for the purchaser's representative permission to inspect, examine and test as if the equipment/material were being manufactured in the contractor's premises. Such inspection, examination and testing shall not relieve the supplier from his obligations under the contract.

[ii] The Supplier shall give to the purchaser adequate time/notice (at least clear 15 days for inside the state suppliers and 20 days for outside the state suppliers) in writing for inspection of materials indicating the place at which the equipment/material is ready for testing and inspection and shall also furnish the shop Routine Test Certificate, Calibration certificates of Testing instruments, calibrated in Govt. approved laboratory with authenticity letter of that laboratory along with the offer for inspection. A packing list along with the offer, indicating the quantity which can be delivered in full truck load/Mini truck load to facilitate issue of dispatch instruction shall also be furnished.

[iii] Where the contract provides for test at the Premises of the supplier or any of his sub-vendors, the supplier shall provide such assistance, labour, materials, electricity, fuel and instruments, as may be required or as may be reasonably demanded by the Purchaser's representative to carryout such tests efficiently. The supplier is required to produce shop routine test Certificate, calibration certificates of Testing Instruments before offering their materials/equipment for inspection & testing. The test house/laboratory where tests are to be carried out must be approved by the Govt. A letter pertaining to Govt. approved laboratory must be furnished to the purchaser along with the offer for inspection.

[iv] After completion of the tests, the Purchaser's representative shall forward the test results to the Purchaser. If the test results conform to the specific standard and specification, the Purchaser shall approve the test results and communicate the same to the supplier in writing. The supplier shall provide at least five copies of the test certificates to the Purchaser.

[v] The Purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.

[vi] If the firm fails to present the offered items for inspection/testing as per their inspection call due to any reason(s) during the visit of inspecting officer at the testing site ,the firm shall have to bear all expenses towards repetition of inspection and testing of the total offered quantity or part thereof.

5. **Training facilities.**

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

6. **Rejection of Materials.**

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

[a] At its option replace or rectify such defective equipment /materials and recover the extra costs so involved from the supplier plus fifteen percent and/or.

[b] Terminate the contract for balance work/supplies, with enforcement of price reduction Clause as per contract for the un-delivered goods and with forfeiture of Performance Guarantee/ CompositeBankguarantee.

[c] Acquire the defective equipment/materials at reduced price, considered equitable under the circumstances.

7. Experience of Bidders:

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

[i] Name of the manufacturer:

[ii] Standing of the firm and experience in manufacture of equipment/material quoted:

[iii] Description of equipment/material similar to that quoted, supplied and installed during the last two years with the name(s) of the Organisations to whom supplies were made wherein, at least one (1) certificate shall be from a state/central P.S.U.

[iv] Details as to where installed etc.

[v] Testing facilities at manufacturer's works.

[vi] If the manufacturer is having collaboration with another firm [s], details regarding the same.

[vii] A list of purchase orders of identical material/equipment offered as per technical specification executed during the last two years along with users certificate. User's certificate shall be legible and must indicate, user's name, address, designation, place of use, and satisfactory performance of the equipment/materials for at least two years from the date of commissioning. Wherein at least one (1) certificate shall be from a

State/Central or P.S.U.Bids will not be considered if the past manufacturing experience is found to be un-satisfactory or is of less than 2 (two) years on the date of opening of the bid and bids not accompanying user's certificate will be rejected..

8. **Language and measures**:

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

9. **Deviation from specification**:

It is in the interest of the tenderers to study the specification, specified in the tender schedule

thoroughly before tendering so that, if any deviations are made by the Tenderers,(both commercial and Technical), the same are prominently brought out on a separate sheet under heading "Deviations Commercial" and " Deviations Technical".

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

shall be presumed that the tenderer has accepted all the conditions, stipulated in the tender specification, not- withstanding any exemptions mentioned therein.

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

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

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

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

12. **Patent rights Etc.**

The supplier shall indemnify the Purchaser against all claims, actions, suits and proceedings for the infringement of any patent design or copy right protected either in the country of origin or in India by the use of any equipment supplied by the manufacturer.

Such indemnity shall also cover any use of the equipment, other than for the purpose indicated by or reasonably to be inferred from the specification.

13. **Delivery:-**

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

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

14. **Despatch instructions**.

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

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

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

The Purchaser shall have no responsibility on this account.

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

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

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

[b] If in the judgement of the Purchaser, the supplier fails to comply with any of the provisions of this contract.

[ii] In the event, Purchaser terminates the contract in whole or in part as provided in Clause-15 {I) of this section, the Purchaser reserves the right to purchase upon such terms and in such a manner as he may deem appropriate in relation to the equipment/material similar to that terminated and the supplier will be liable to the Purchaser for any additional costs for such similar equipment/material and/or for price reduction for delay as defined in clause-22 of this section until such reasonable time as may be required for the final supply of equipment.

[iii] In the event the Purchaser does not terminate the contract as provided in clause 15(I) of this Section, supplier shall be liable to the Purchaser for price reduction for delay as set out in Clause-22 of this section until the equipment is accepted. This shall be based only on written request of the supplier and written willingness of the Purchaser.

16 **Force Majeure**:

The supplier shall not be liable for any price reduction for delay or for failure to perform the contract for reasons of force majeure such as acts of god, acts of the public enemy, acts of Govt., Fires, floods, epidemics, Quarantine restrictions, strikes, Freight Embargo and provided that the supplier shall within Ten (10)days from the beginning of delay on such

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

17. Extension of time:-

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

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

18. **Guarantee period: - (As per clause 35 of the technical specification.**

[i] The stores covered by this specification should be guaranteed for satisfactory operation and against defects in design, materials and workmanship for a period of 36 months from the date of commissioning. The above guarantee certificate shall be furnished in triplicate to the purchaser for his approval. Any defect noticed during this period should be rectified by the supplier free of cost to the purchaser provided such defects are due to faulty design, bad workmanship or bad materials used, within one month upon written notice from the purchaser failing which provision of clause 22 (ii) shall apply.

[ii] Equipment/material failed or found defective during the guarantee period shall have to be guaranteed after repair/replacement for a further period of 36 months from the date of commissioning. The Bank Guarantee is to be extended accordingly. Date of delivery as used in this clause shall mean the date on which the materials are received in OPTCL'S stores/site in full & good condition which are released for Despatch by the purchaser after due inspection.

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

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

A Composite Bank Guarantee as per the Proforma enclosed at Annexure-VII of the specification for 10% [ten percent] of the Total Landing cost (Taxable Value plus GST thereon) of the purchase order shall be furnished from any nationalized/scheduled bank having a place of business at Bhubaneswar, to the office of Sr.General Manager [Central Procurement Cell] OPTCL within 15 days from the date of issue of the purchase order,. The BG shall be executed on non-judicial stamp paper worth of Rs.29.00 [Rupees twenty nine] only or as per the prevalent rules, valid for a period of 38 months from the last date of completion period, for scrutiny and acceptance, failing which the supply order will be liable for cancellation without any further written notices. The BG should be accompanied by a confirmation letter from the concerned bank and should have provision for encashment at Bhubaneswar, before the Bank Guarantee is accepted and all concerned intimated. The B.G should be revalidated as and when intimated to you to cover the entire guarantee period.

[ii] No interest is payable on any kind of Bank Guarantee.

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

20. Import License

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

21. (A) Terms of Payment.

i) 60% taxable value of each consignment with 100% Goods and Services Tax in full as applicable will be paid on receipt of materials in good condition at stores/desired site and verification thereof, subject to furnishing and approval of a. Contract cum Performance Bank Guarantee at the rate of 10% (Ten per cent) of Taxable Value plus GST there on b. Guarantee certificate, c. Test certificate by the Purchaser & 40% of taxable value after erection & commissioning.

ii) TDS under GST Laws for intra/inter-state transactions shall be deducted, if applicable.

iii) TDS: The statutory deduction of taxes at source as applicable, related to these works, shall be made by OPTCL from the contractor's bill for which the contractor cannot claim any reimbursement. TDS so deducted shall be deposited with the relevant tax authorities and TDS certificates shall be issued by OPTCL, wherever so required under the respective law.

iv) Any imposition of new tax or revision of tax shall be paid/reimbursed at the time of dispatch, scheduled or actual whichever is lower (i.e. If delivery is within schedule period, tax variation as applicable shall be paid, and if delivery is made beyond schedule date, any additional financial implication due to statutory variation in tax shall be to bidder's account)

[B] The supplier shall furnish contract cum performance Bank Guarantee of appropriate amount to OPTCL as indicated in (i) above, within 30 days from the date of issue of the purchase order.

22 Price Reduction Schedule for Delay in Completion of Supply under Purchase Order/Contract

(i) If the Supplier fails to deliver the materials/equipment/commission within the delivery schedule, specified in the Purchase Order/Contract including delivery time extension, if any, granted with waiver of Price Reduction Schedule, the Purchaser shall recover from the Supplier, Price Reduction Schedule for a sum of half per cent (0.5 per cent) of the Taxable Value of the un-delivered equipment /materials/un-completed portion for each calendar week of delay or part thereof. For this purpose, the date of receipted challan/joint measurement certificate shall be reckoned as the date of delivery. The total amount of Price Reduction Schedule shall not exceed five per cent (5%) of the Taxable Value of the un-delivered equipment/materials/ un-completed portion. Equipment will be deemed to have been delivered only when all its components, accessories and spares as per technical Specification are also delivered. If certain components, accessories and spares are not delivered in time, the equipment/materials will be considered delayed until such time as the missing components, accessories and spares are delivered.
(ii) During the guarantee period, if the Supplier fails to rectify/replace the equipment/material within 30 daysfrom the date of intimation of defect by the purchaser, then the Price Reduction Schedule at the rate of half percent (0.5%) of the Total Taxable Value for each calendar week of delay or part thereof shall be recovered by the purchaser.

For this purpose, Price Reduction Schedule shall be reckoned from the 30th day from the date of issue of letter on defectiveness of equipment/material. The total amount of Price Reduction Schedule in this case shall not exceed 10% (TEN PERCENT) of the Purchase Order/Contract amount except GST (i.e.Total Taxable Value). If the defects, so intimated are not rectified or equipment/materials not replaced by the supplier within the guarantee period, then whole of the C.P.B.G. will be forfeited by the purchaser, without any intimation to the supplier.

23. **Insurance**

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

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

25. Rating under Goods and Services Tax and Balance sheet and profit & Loss Account:

The following documents are to be submitted at the time of Tender Submission:

i. Rating under Goods and Services Tax shall be enclosed with the tender.

ii. Audited Balance Sheet and Profit & Loss Account of the bidder for the previous three years shall be enclosed to assess the financial soundness of the bidder(s).

26. Certificate of Exemption from Goods and Services Tax.

Offers with exemption from Goods and Services Tax shall be accompanied with authenticated proof of such exemption. Authenticated proof for this clause shall mean attested Photostat copy of exemption certificate. Any claim towards Goods and Services Tax shall be paid on actual basis subject to production of authenticated documentary evidence.

27. Supplier's Responsibility.

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

28. Validity.

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

29. EVALUATION.

(i) Evaluation of price bids will be on the basis of the FOR DESTINATION PRICE including Goods and Services Tax & other levies as may be applicable. The FORD PRICE shall consist of the following components:

a) Taxable value of equipment/materials including mandatory spares, if any for maintenance of equipment. (At the discretion of the purchaser)

b) Goods and Services Tax

c) Other levies, if any.

d) Test charges, if any.

e) Erection, testing and commissioning charges, if any.

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

g) Loading will be made for items not quoted by the bidder at the highest rate quoted by other bidders unless particular item is included in other items.

h) Any imposition of new tax or revision of tax shall be considered between due date of submission of bids and the date of price bid opening.

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

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

30. Minimum Qualification Criteria of Bidders.

1. Bidders should be a manufacturer who must have designed, manufactured, tested, supplied, erected and commissioned; shall provide proof of supply, erection and commissioning in any Power Utilities of **at least 100% of the tendered quantity of Covered Conductors in India of 11 kV or higher voltage** during the last 5 years period and its financial turnover during any one year of the last five years should have been equal or more than 100% value of the material now quoted.
2. Only manufacturers & their authorized representatives of covered conductor & its Accessories are allowed to participate in the tender. **Covered conductor & Accessories should be of the same make so as to ensure system compatibility & reliability**. Purchase orders and other documents should be submitted along with the bid in proof of qualification requirement.
3. Bidder shall have it's own Service support team, spread across India to serve immediate service requirements.
4. Covered conductors with higher thickness of insulations shall not be accepted as this will tend to cause higher sag in the system when installed and this is not desirable.
5. The Bidder and his sub-contractor should have carried out the supply & supervision of erection of stringing & commissioning of covered Conductors and should have all the necessary tools and tackles and manpower to carry out the erection.

31. Jurisdiction of the High Court of Odisha.

`Suits, if any, arising out of this contract shall be filed by either Party in a court of Law to which the jurisdiction of High court of Odisha extends.

32. Correspondences.

i) Any notice to the supplier under the terms of the contract shall be served by Registered Post or by hand at the Supplier's Principal Place of Business.

ii) Any notice to the Purchaser shall be served at the Purchaser's Principal Office in the same manner.

33. **Official Address of the Parties to the Contract**

The address of the parties to the contract shall be specified:-

[i] **Purchaser**: Senior General Manager (Procurement)(CPC) OPTCL
Bhubaneswar-751022 (Odisha)
Telephone No. 0674 - 2541801
FAX No. 0674 - 2542964

[ii] **Supplier:** Address
Telephone No.
Fax No.

34. **Outright Rejection of Tenders**

Tenders shall be outrightly rejected if the followings are not complied with.

[i] The tenderer shall submit the bid in electronic mode only and shall submit the tender cost on or before the scheduled date and time of opening of technical bid.

[ii] The tenderer shall submit the bid in electronic mode only

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

[iv] The prescribed EMD shall be submitted on or before the scheduled date and time of opening of technical bid.

[v] The Tender shall be kept valid for a minimum period of 180 days from the date of opening of tender.

[vi] The Tender shall be submitted in single part as specified.

[vii] The tenderer shall upload the scanned copy of latest type test certificates (for the tests, carried out on the tendered equipment, being offered). Such type tests should have been conducted within last five years from the date of opening of this tender in a Government approved laboratory/CPRI in presence of any Government Organization's representative(s).

[viii] The schedule of prices should be filled up fully to indicate the break-up of the prices including taxes and duties. Incomplete submission of this schedule will make the tender liable for rejection. Vide Clause-4(ii) of Part-II..

[ix] The Tenderer should quote 'FIRM' price only and the price should be kept valid for a minimum period of 180 days from the date of opening of the tender.

(x) Guaranteed Technical particulars & Abstract of terms and Conditions should be filled in completely.

(xi) (a) Detailed information on any litigation or arbitration arising out of contract completed or under execution by it over the last five years. A consistent history of litigation by or against the bidder may result in rejection of bid.

(xii) (b) The bidder should not have any pending litigation or arbitration with OPTCL with regard to any project or related activity. The bidder should certify / declare the same in the

unequivocal terms by way of an affidavit duly sworn before a magistrate/notary. Bid furnished by the bidder shall not be eligible for consideration if it is not accompanied by the affidavit. Further the bid / LOA/ LOI shall be liable for outright rejection/ cancellation at any stage if any information contrary to the affidavit / declaration is detected.

35. **Documents to be treated as confidential**.

The supplier shall treat the details of the specification and other tender documents as private and confidential and these shall not be reproduced without written authorization from the Purchaser.

36. **Scheme/Projects**

The materials/equipment covered in this specification shall come under "R & M "

SECTION – III.

LIST OF ANNEXURES

[I TO XI]

[PAGE 32 TO 53]

SECTION – III

[LIST OF ANNEXURES]

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

1	Declaration form	ANNEXURE-I
2	Abstract of terms and conditions to accompany Section-II of	ANNEXURE-II
3	Schedule of Quantity and Delivery	ANNEXURE-III
4	Abstract of price component	ANNEXURE-IV
5	Schedule of prices	ANNEXURE-V
6	Bank Guarantee form for earnest money deposit	ANNEXURE-VI
7	Composite Bank Guarantee form for security deposit, payment and performance	ANNEXURE-VII
8.	Chart showing particulars of E.M.D.	ANNEXURE – VIII
9.	Data on Experience.	ANNEXURE – IX
10.	Schedule of spare parts.	ANNEXURE-X
11.	Schedule of Installations.	ANNEXURE-XI
12	Schedule of deviations (Technical)	ANNEXURE-XII (A)
13.	Schedule of deviations (Commercial)	ANNEXURE-XII (B)

14	Litigation /Arbitration	ANNEXURE-XIII

ANNEXURE - I

DECLARATION FORM

To

The Sr. General Manager (CPC)

OPTCL Head Qrs.BBSR,751022

Sub:- Tender Specification No-_____

Sir,

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

Signed this day of 2020

Yours faithfully

Signature of the Tenderer with seal of the company

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

* (Strikeout whichever is not applicable).

ANNEXURE-II

ABSTRACT OF GENERAL TERMS AND CONDITIONS OF CONTRACT [COMMERCIAL]

(To be filled up by the tenderer as indicated in the excel sheet)

ANNEXURE-III

SCHEDULE OF QUANTITY AND DELIVERY

(To be filled up by the tenderer**)**

SL No	Description of materials	Tender Quantity	Completion Period	Destination	Remarks.
1	2	3	4	5	6

Signature of Tenderer

with seal of Company

ANNEXURE-IV

(To be filled up by the tenderer as indicated in the excel sheet)

ANNEXURE-V.

(To be filled up by the tenderer as indicated in the excel sheet)

NB: -

1. **The tenderer should fill up the price schedule properly in Excel file in e-tender mode.** The tender will be rejected, if the price bid is not submitted in accordance with the price schedule. No post tender correspondence will be entertained on break-up of prices. Also, the supplier should agree for delivery at the desired site.
2. The Tenderer shall give an undertaking in part-I of the bid that, entire implication of lower Tax and Input Tax Credit benefit have been fully passed on to the purchaser as per anti-profiteering and other provisions under GST Laws while quoting the tender price.
3. Conditional offers will not be acceptable.

ANNEXURE-VI

[PROFORMA FOR BANK GUARANTEE FORM FOR EARNEST MONEY DEPOSIT]

(To be Stamped in accordance with Stamp Act and the Non-Judicial Stamp Paper of appropriate value should be in the name of Issuing Bank)

Ref No: …….

Bank Guarantee No. …….

Date:……
BG Amount:…….
Validity Period:…….

This Guarantee Bond is executed this…… day of …… by us the…… Bank at …… , P.O…… , Dist……, State…… and Code No……..

Whereas the ODISHA POWER TRANSMISSION CORPORATION Limited, Janpath, Bhubaneswar, a company constituted under the Companies Act-1956 (hereinafter called OPTCL) has invited Tender vide e-NIT No……. Dated…… for the purpose of …… work under Package(s) No……../ purchase of ---------- .

1. Now, therefore, in accordance with Notice Inviting Tender (e-NIT) No…….. Dated …… of OPTCL, Ms/Shri……Address…….. Wish / wishes to participate in the said tender and as a Bank Guarantee for the sum of Rs…….. [Rupees in ***words***----------] valid for a period of ……days is required to be submitted by the bidder, as per Tender Specification, we the _____) [indicate the name, Address & Code of the bank] [hereinafter referred to as "Bank"] at the request of Ms/Shri…….. [hereinafter referred to as "Bidder"] do hereby unequivocally and unconditionally guarantee and undertake to pay during the above said period on written request by the <Tender Issuing Authority, Central Procurement Cell (CPC) ODISHA POWER TRANSMISSION CORPORATION Ltd. , Bhubaneswar an amount not exceeding Rs……. to OPTCL., without any reservation. The guarantee would remain valid up to …….. [Date] and if any further extension to this is required, the same will be extended on receiving instruction from ---------- on whose behalf this Bank Guarantee has been issued.

2. We, the _____ [indicate the name of the Bank, Address, Code] do hereby further undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from OPTCL. 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 in words……)

3. We undertake to pay to OPTCL any money so demanded not withstanding any dispute or disputes so raised by the bidder 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 thereunder and the bidder shall have no claim against us for making such payment.

4. We, the _____ Bank further agree that the guarantee herein contained shall remain in full force and effect during the aforesaid period of _____ days [in words]…….. (as per Tender Specification) and it shall continue to be so enforceable till all the dues of OPTCL under or by virtue of the said Bid have been fully paid and its claims satisfied or discharged or till OPTCL certifies that the terms and conditions of the said Bid have been fully and properly carried out by the said bidder and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us or our Branch Office at Bhubaneswar <Mention Name, Address & Code of the Branch Office at Bhubaneswar of Issuing Bank> in writing on or before _____ we shall be discharged from all liability under this guarantee thereafter.

5. We the _____ Bank further agree with OPTCL that 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 Bidder from time to time or to postpone for any time or from time to time any of the powers exercisable by OPTCL against the said Bidder 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 granted to the Bidder or for any forbearance, act or omission on the part of OPTCL or any indulgence by OPTCL to the said Bidder or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of so relieving us.

6 This guarantee will not be discharged due to the change in the name, style and constitution of the Bank and/or of the Bidder.

7 We _____ [indicate the name of Bank, Address &Code] lastly undertake not to revoke this guarantee during its currency except with the previous consent of OPTCL in writing .

8. We, the _____Bank (Name, Address & Code) further agree that this guarantee shall also be invokable at our place of business at ---------- Branch of **Bhubaneswar** (indicate Name, Address & Code of the Branch at Bhubaneswar) in the State of Odisha."

" Notwithstanding anything contained herein"

a) Our liability under the bank guarantee shall not exceed Rs.----------(Rupees in words----------) only.

b) This Bank guarantee shall be valid up to ----------.

c) We or our Branch at Bhubaneswar <Mention Name, Address & Code…….> shall be liable to pay guaranteed amount or any part thereof under this guarantee only if you serve upon us at--------- Branch of Bhubaneswar a written claim or demand on or before ……..,

The Bank Guarantee is issued in paper form and Advice transmitted through SFMS with required details to the beneficiary's advising bank (ICICI Bank Bhubaneswar, IFSC Code ICIC0000061).

Dated, the _____Day of _____

For _____ [Indicate name of Bank]

Signature ……
Full name …….
Designation ……
Power of Attorney No. …….
Date…….
Seal of the Bank…….

WITNESS: (SIGNATURE WITH NAME AND ADDRESS)
(1)
Signature ……
Full name …….
(2)
Signature ……
Full name …….

N.B.:

1. Name of the Bidder.: ……
2. BG No & Date :……
3. Amount (In Rs.):……

4. Validity up to :……

5. E-NIT No……..

6. Package/Works No……..

7. Name, Address & Code of Issuing Bank:……

8. Name, Address & Code Bhubaneswar Branch of the Issuing Bank:……

9. The Bank Guarantee shall be accepted after getting SFMS advice as per details below.

Format for SFMS details

(The Unique Identifier for field 7037 is "OPTCL541405793")

Sl. No	PARTICULARS	TYPE	DETAILS
1	Type of Bank Guarantee	Mandatory	EMD
2	Currency & Amount	Mandatory	
3	Validity Period(from—to --)	Mandatory	
4	Effective Date	Mandatory	
5	End date of lodgment of Claim	Mandatory	
6	Place of lodgment of claim	Mandatory	Bhubaneswar, Branch Name------ of Bhubaneswar Branch code------- of Bhubaneswar Branch Address ------ at Bhubaneswar
7	Issuing Branch IFSC Code	Mandatory	
8	Issuing Branch name & address	Mandatory	
9	Name of applicant and its details	Mandatory	
10	Name of Beneficiary and its details	Mandatory	
11	Beneficiary's Bank/Branch and IFSC Code	Mandatory	ICICI Bank Ltd IFSC Code-ICIC0000061
12	Beneficiary's Bank/Branch name and address	Mandatory	ICICI Bank Ltd Bhubaneswar Main Branch, Bhubaneswar
13	Sender to receiver information	Mandatory	
14	Purpose of Guarantee	Mandatory	EMD
15	Reference/Description of the underlined tender/contract	Mandatory	NIT No

ANNEXURE-VII

[PROFORMA FOR COMPOSITE BANK GUARANTEE FOR SECURITY DEPOSIT PAYMENT AND PERFORMANCE]

(To be stamped in accordance with Stamp Act and the Non-Judicial stamp paper of appropriate value should be in the name of the Issuing Bank.)

Ref No:- …….

Bank Guarantee No. …….

Date: ……

BG Amount:…….

Validity Period:……..

This Guarantee Bond is executed this…… day of …… by us the…… Bank at …… , P.O…… , Dist……, State…… and Code No……..

Whereas the ODISHA POWER TRANSMISSION CORPORATION Limited, Janpath, Bhubaneswar, a company constituted under the Companies Act-1956 (hereinafter called OPTCL) has issued Letter of Award (LOA) No…… Dated…… for the purpose of …… work under Package No……. (herein after called "the Agreement") to M/s/Shri …….. , Address…….. (herein after called the "Contractor") for supply, erection, installation & commissioning and associated civil works under the above LoA and whereas OPTCL has agreed (1) to exempt demand of security deposit under the terms and conditions of the LOA (2) to release payment of the cost of the Contract Price to the Contractor on furnishing by the Contractor to OPTCL a Contract Performance Bank Guarantee (CPBG) of the value of 10% of the Contract Price of the said Agreement.

1. Now therefore, in accordance with the terms and conditions of LOA No. _____ dated _____ for the due fulfillment by the said Contractor of the terms and conditions contained in the said agreement, on production of a Bank Guarantee for Rs._____ (Rupees_____) only, we the bank _____ [Indicate bank Name , Address & Code] (hereinafter referred to as "the Bank") at the request of M/s/Shri _____ contractor do hereby undertake to pay to OPTCL, an amount not exceeding Rs._____ (Rupees _____) only .

2. We, the _____ Bank [indicate the name of the Bank, Address & Code] do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from OPTCL. 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---------- -------- In Words).

3. We, the …… Bank also undertake to pay to OPTCL any money so demanded not withstanding any dispute or disputes raised by the Contractor in any suit or proceeding instituted / pending before any court or tribunal relating thereto, our liability under this present being absolute and irrevocable. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor shall have no claim against us for making such payment.

4. We, the _____ Bank further agree that the guarantee herein contained shall remain in full force and effect during the aforesaid period of _____ days and it shall continue to be so enforceable till all the dues of OPTCL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till OPTCL certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor and accordingly discharges this guarantee.

   Unless a demand or claim under this guarantee is made on us or our Branch Office at Bhubaneswar <Mention Name, Address & Code of the Branch Office at Bhubaneswar of issuing Bank> in writing on or before …… (Date), we shall be discharged from all liability under this guarantee thereafter.

5. We, the _____ Bank [indicate the name of the Bank, Address & Code] further agree with the Board that 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 or performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by OPTCL against the said contractor(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 contractor(s) or for any forbearance, act or omission on the part of OPTCL or any indulgence by OPTCL to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of so relieving us.

6. This guarantee will not be discharged due to the change in the name, style or constitution of the Bank and/or of the contractor(s).

7. We, the _____ Bank [indicate the name of the bank, Address & Code] lastly undertake not to revoke this guarantee during its currency except with the previous consent of OPTCL in writing.

8. We, the _____Bank (Name, Address & Code) further agree that this guarantee shall also be invokable at our place of business at **Bhubaneswar** (indicate Name, Address & Code of the Branch at Bhubaneswar) in the State of Odisha.

" Notwithstanding anything contained herein"

a) Our liability under the bank guarantee shall not exceed Rs.----------(Rupees in words----------) only.

b) This Bank guarantee shall be valid up to ----------.

c) We or our Branch at **Bhubaneswar** <Mention Name, Address & Code…….> shall be liable to pay guaranteed amount or any part thereof under this guarantee only if you serve upon us at--------- Branch of Bhubaneswar a written claim or demand on or before ……..,

The Bank Guarantee is issued in paper form and Advice transmitted through SFMS with required details to the beneficiary's advising bank (**ICICI Bank Bhubaneswar**, IFSC Code ICIC0000061).

Dated, the _____Day of _____
For _____ [Indicate name of Bank]

Signature……..

Full Name…….

Designation……..

Power Of Attorney……..

Dated……

Seal of the Bank……..

WITNESS: (SIGNATURE WITH NAME AND ADDRESS)

1.Signature…….

Full Name…….

2. Signature…….

Full Name…….

N.B.:

1. Name of the Contractor.: ……
2. BG No & Date :……
3. Amount (In Rs.):……
4. Validity up to :……
5. LOA No……..
6. Package No……..
7. Name, Address & Code of Issuing Bank:……
8. Name, Address & Code of Bhubaneswar Branch of the Issuing Bank:……
10. The Bank Guarantee shall be accepted after getting SFMS advice as per details below.

Format for SFMS details

(The Unique Identifier for field 7037 is "OPTCL541405793")

Sl. No	PARTICULARS	TYPE	DETAILS
1	Type of Bank Guarantee	Mandatory	Contract Performance
2	Currency & Amount	Mandatory	

3	Validity Period(from—to --)	Mandatory	
4	Effective Date	Mandatory	
5	End date of lodgment of Claim	Mandatory	
6	Place of lodgment of claim	Mandatory	Bhubaneswar, Branch Name------ of Bhubaneswar Branch code------- of Bhubaneswar Branch Address ------ at Bhubaneswar
7	Issuing Branch IFSC Code	Mandatory	
8	Issuing Branch name & address	Mandatory	
9	Name of applicant and its details	Mandatory	
10	Name of Beneficiary and its details	Mandatory	
11	Beneficiary's Bank/Branch and IFSC Code	Mandatory	ICICI Bank Ltd IFSC Code-ICIC0000061
12	Beneficiary's Bank/Branch name and address	Mandatory	ICICI Bank Ltd Bhubaneswar Main Branch, Bhubaneswar
13	Sender to receiver information	Mandatory	
14	Purpose of Guarantee	Mandatory	Contract Performance
15	Reference/Description of the underlined tender/contract	Mandatory	LOA No----

ANNEXURE-VIII

[CHART SHOWING PARTICULARS OF EARNEST MONEY DEPOSIT FURNISHABLE BY TENDERERS]

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

NB: - REFUND OF E.M.D.

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

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

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

ANNEXURE-IX

DATA ON EXPERIENCE

[a] Name of the manufacturer.

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

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

[d] Details as to where installed etc.

[e] Testing facilities at manufacturer's works.

[f] If the manufacturer is having collaboration with another firm, details regarding the same and present status.

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

[h] A list of similar equipments of specified MVA rating, voltage class, Impulse level, short circuit rating, Designed, manufactured, tested and commissioned which are in successful operation for at least two years from the date of commissioning with legible user's certificate. User's full complete postal address/fax/phone must be indicated. (Refer clause No.7 of the Section-II of the specification).

Place:

Date:

Signature of tenderer

Name, Designation, Seal

ANNEXURE-XII

DEVIATION SCHEDULE.

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

A) Technical

(To be filled up by the tenderer as indicated in the excel sheet)

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

B) Commercial deviations.

A) Commercial.

(To be filled up by the tenderer as indicated in the excel sheet)

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

ANNEXURE – XIII

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.)

Place: -

Date

Signature of Tenderer:

Name, Designation, Seal

PART – II

PRICE BID

1. PRICE:

(i) Bidders are required to quote their price(s) for goods offered indicating they are '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 in Annexure-V of Section – III. The Bidders has to certify in the price bid that any implication of lower Tax and Input Tax Credit benefit as per anti-profiteering and other provisions under GST Laws, have been fully passed on to the Purchaser, while quoting the tender prices.

2. INSURANCE:

Insurance of materials/equipments, 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/equipments 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 equipments/materials damaged or lost which will be reported by the Consignee within 30 days of receipt of the equipments/materials at Destination without awaiting for the settlement of their claims with the carriers and underwriters.

3. CERTIFICATE FOR EXEMPTION FROM GOODS AND SERVICES TAX:

Offers with exemption from Goods and Services 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:

The Bidders should fill up the price schedule (Annexure-V of Section-III) properly and in full. The tender may be rejected if the schedule of price is submitted in incomplete form as per clause-34 (ix) of Section-II of the Specification.

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

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

TECHNICAL SPECIFICATIONS OF 11-22-33 kV
COVERED CONDUCTORS & ACCESSORIES

Section 1 : Bidding Qualification Requirements

Section 2 : Covered Conductors

Section 3 : Insulation Piercing Connectors

Section 4 : Fired Wedge Connectors

Section 5 : Suspension & Tension String Hardware

Section 6 : Mid span Jointing Kit & Termination Kit

Section 7 : Non-metallic Helical Ties

Section 8 : Insulators

Section 9 : Surge Arresters

SECTION – 1

ELIGIBILITY AND QUALIFICATION CRITERION

1. Bidders should be a manufacturer who must have designed, manufactured, tested, supplied, erected and commissioned; shall provide proof of supply, erection and commissioning in any Power Utilities of **at least 3000 km length of Covered Conductors in India of 11 kV or higher voltage** during the last 5 years period and its financial turnover during any one year of the last five years should have been equal or more than 100% value of the material now quoted.
2. Only manufacturers & their authorized representatives of covered conductor & its Accessories are allowed to participate in the tender. **Covered conductor & Accessories should be of the same make so as to ensure system compatibility & reliability**. Purchase orders and other documents should be submitted along with the bid in proof of qualification requirement.
3. Bidder shall have it's own Service support team, spread across India to serve immediate service requirements.
4. Covered conductors with higher thickness of insulations shall not be accepted as this will tend to cause higher sag in the system when installed and this is not desirable.
5. The Bidder and his sub-contractor should have carried out the supply & supervision of erection of stringing & commissioning of covered Conductors and should have all the necessary tools and tackles and manpower to carry out the erection.

SECTION – 2

TECHNICAL SPECIFICATIONS FOR 11, 22 & 33 KV COVERED CONDUCTORS

INTRODUCTION:

These Specifications lay down the Constructional, Dimensional and Performance Requirements for Covered Conductors which consist of a Conductor surrounded by a Covering made of Insulating Material (as described hereunder) as protection against Accidental temporary Contacts with Grounded Parts such as Tree Branches and with other Covered Conductors and etc.

CONSTRUCTION REQUIREMENTS:

1) CONDUCTOR:

CONDUCTOR MATERIAL: Aluminium Alloy (AAAC) or Steel Reinforced Aluminium (ACSR).

NOMINAL CROSS SECTION: 50, 70, 99, 120, 160 and 241 sq mm for AAAC and 62 and 99 sq.mm for ACSR conductors.

CONDUCTOR DESIGN: The Conductor shall be stranded, round and should be Non Compacted.

Non Compacted Conductors shall comply with all the requirements of EN 50397-1-2006. The D.C. Resistance of the conductor shall not exceed that given in EN 50397-1-2006 by more than 5%.

2) FILLING (WATER BLOCKING):

The Stranded Conductor shall be longitudinally water blocked by means of a water blocking material incorporated during the extrusion process. The use of grease / water swellable tape / water swellable powder etc is not permitted. The water blocking material shall be stable at maximum operating conductor temperature of 90 Deg. Centigrade

The water blocking compound shall be compatible with the conductor material as well as the semi conducting polymer screen layer above it and not adversely affect its electrical or mechanical properties.

3) SEMICONDUCTING SCREEN:

A semi conductive polymeric screen should be applied over the filled stranded conductor to ensure a lower voltage stress on the Insulation applied over the screen.

The thickness of the semi conductive polymeric screen should be between 0.2 mm and 0.4 mm.

4) INSULATION:

Requirement for 11KV - The Insulation should be dual layered with the Inner Layer being XLPE (without carbon black) with a nominal thickness of 1.2 mm

and the Outer Layer being XLPE with carbon black or other than carbon black (UV stabilizer agent) added, with a nominal wall thickness of 1.1 mm. The nominal combined Insulation Thickness of both Layers should be 2.3 mm

Requirement for 22KV - The Insulation should be dual layered with the Inner Layer being XLPE (without carbon black) with a nominal thickness of 1.32 mm and the Outer Layer being XLPE with carbon black or other than carbon black (UV stabilizer agent) added, with a nominal wall thickness of 1.1 mm. The nominal combined Insulation Thickness of both Layers should be 2.42 mm

Requirement for 33KV - The Insulation should be dual layered with the Inner Layer being XLPE (without carbon black) with a nominal thickness of 2.43 mm and the Outer Layer being XLPE with carbon black or other than carbon black (UV stabilizer agent) added, non-tracking and erosion resistant with a nominal wall thickness of 1.2 mm. The nominal combined Insulation Thickness of both Layers should be 3.63 mm

The conductor manufacturing and stranding process shall incorporate the longitudinal water blocking also.

The conductor semi Conducting Screen, Inner Insulation and Outer Insulation should be extruded in one step ie triple extrusion to ensure a good, permanent bond between the three layers and also with the conductor.

It shall be possible to remove the Semi Conducting Screen, Inner and Outer Insulation Layers without damage to the conductor, but there shall be no slippage between the layers.

Figure 1 shows the Cross Section of a Covered Conductor with AAAC Conductor and Figure 2 shows the Cross Section of a Covered Conductor with ACSR Conductor.

FIGURE 1 (AAAC)

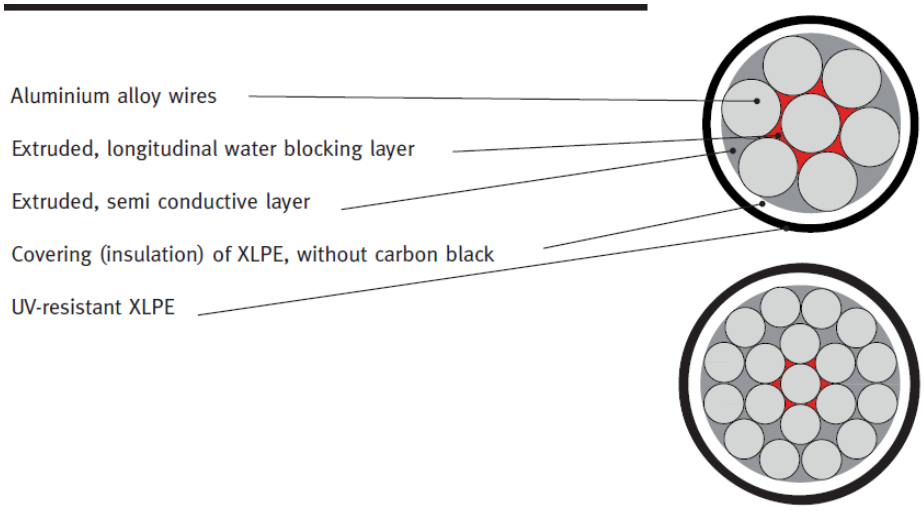
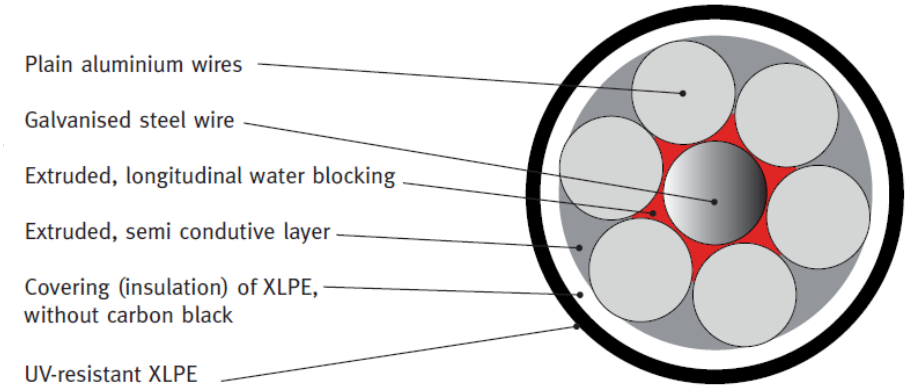


FIGURE 2 (ACSR)



Type Test – As per EN 50397-1

Conductor Resistance Test
High voltage test – Test duration 48 hours
Leakage Current Test voltage ac – 0.78 U
Tracking Resistance test – applicable only for 33KV Covered conductor
Thickness of Insulation & Covering
Conductor examination and Tensile strength (Breaking load)
Tensile and elongation at break of Insulation before ageing, after ageing & Completed Cable ageing
Water Absorption test on Insulation
Shrinkage test
Hot set test
Durability of Marking and legibility test
Test of the longitudinal water tightness
Carbon black content (If carbon black is used for UV-stabilisation)
Resistance to UV rays (If other than carbon black is used for UV-stabilisation)
Slippage Test

Sample Test – As per EN 50397-1

High voltage test – Test duration 4 hours
Visual and Thickness of Insulation & Covering
Construction and dimensions of conductor
Hot set test

Test of the longitudinal water tightness without heat cycle
Marking Content and legibility

Routine Test – As per EN 50397-1

Spark test on the covering
Visual and Thickness of Insulation & Covering
Marking Content and legibility

5) GTP

Bidder shall confirm by signing with stamp on the GTP

Si.No.	Parameters	offered Values for specified covered conductor
1	Conductor type	
2	Lay up of Conductors (mm)	
3	Conductor Dia (mm)	
4	Inner Semiconducting Layer thickness (mm)	
5	Inner XLPE Layer thickness (mm)	
6	Outer UV Resistance - XLPE Thickness (mm)	
7	Over all diameter (Min-Max) (mm)	
8	Weight (Kg/Km)	
9	Rated Operated Voltage (KV)	
10	DC-resistance at 20 Degree C, Maximum (Ohm/KM)	
11	Resistance Temperature coefficient (/^{0}C)	
12	Lightening Impulse withstand strength of XLPE Layer (KV)	
13	Maximum Continuos Operating temperature (^{0}C)	
14	Max load(IEC 61597), cond.temp 80 °C, air temp. 50 °C, wind speed 0.5 m/s, Solar radiation 1200W/m^2, Approximate value (A)	
15	Max short circuit current, 1 sec (KA)	
16	Tensile Strength of Conductors (kN)	
17	Aluminium Alloy	

Other Requirements

The offered triple extruded AAAC (AlMgSi alloy) conductor shall be suitable for use under operating condition as specified below:

1. Ambient air temperature : 50 deg C
2. Maximum temperature of conductor at rated current : 80 deg C
3. Wind condition at site : 0.5 meter / sec
4. Solar radiation at site : 1200 watts / sq m
5. Maximum allowable temperature under Short circuit condition : 250 deg C

Data sheet providing details of the conductor under data provided above shall be submitted along with the offer.

SECTION - 3

INSULATION PIERCING CONNECTORS

1.0 Body of Insulation Piercing Connector shall made of glass fibre reinforced polymer having Insulated and Waterproof seals where Insulation material should be Weather, UV and Corrosion resistant.

2.0 Insulation Piercing Connector should have Blades made of special tinned copper with End cup Design suitable for Covered Conductor.

3.0 Insulation Piercing Connector should have Shear-head with one screw design to ensure good contact properties and avoid damaging cables.

4.0 Insulation Piercing Connector should have Lowest Torque, easy to install & no special tools necessary to operate.

5.0 Piercing of Insulation Piercing Connector should have structural design.

6.0 Insulation Piercing Connector should have a design such that there is no stripping of insulation on the covered conductor. It shall be able to get the Lowest contact resistance& Superior insulation as well as sealing performance.

7.0 Material of Insulation Piercing Connector should withstand for all Type test as per EN 50397-2 listed below:

1. Water tightness & Voltage withstand test
2. Bolt tightening test
3. Branch pull out test
4. Die-electric test
5. Electrical ageing test
6. Electrical resistance test
7. Low temperature test
8. Mechanical damage test
9. Short circuit test
10. 10.0 Tightening test on branch connector

The superior material and process technology ensure operation regularity in corrosive environment

SECTION - 4

Fired Wedge Connectors

1.0 SCOPE

This specification covers the design, manufacture, testing & supply of wedge type connectors which are to be used for line jumpers, cut-points, T-connections, making connection to the equipment's like isolators, circuit breakers, CTs and PTs, Lightning Arresters, Busbars etc.

The connectors shall have maximum contact surface with the conductor, extremely low and stable contact resistance, resulting proven minimum power loss. These shall maintain constant force within the connection for the life of connector while compensating for thermal expansion and increased life span.

2.0 STANDARDS

Unless otherwise specified elsewhere in this specification, the rating as well as performance and testing of the HT & MV overhead line connectors shall conform to the latest revisions available at the time of placement of order of all the relevant standards as listed below: -

ANSI C 119.4 and IS 5561 - 2004.

3.0 HT & MV WEDGE CONNECTOR: "FIRED WEDGE CONNECTORS"

The connector shall confirm Electrically to Extra Heavy Duty, Class AA and Mechanically to Class 1 as per ANSI C 119.4. It also shall confirm to Indian Standard - IS 5561. It consists of a spring 'C' member and a Wedge, both made from a special Aluminium alloy of high ductility and electrical conductivity. The 'C' member and a Wedge shall be factory coated with a conductive inhibitor containing abrasive particles to help in cleaning the contact surface during Installation.

The connector shall be useful for the conductor size of diameter more than 10mm such as RABBIT, RACOON, DOG, COYATE, PANTHER and above.

It shall use a power tool with booster for installation to ensure installation quality and repeatability. This is also needed to eliminate operator dependency. During the assembly, the wedge shall be inserted at a speed of about 40 m/s using the specified tool. High-speed insertion with the specified inhibitor shall be very effective in abrading all sliding surfaces and in disrupting surface oxide film to generate large number of contact spot in the electrical surfaces. When connected, this tap shall provide a reliable electrical and mechanical connection for solid, stranded or compressed conductor combinations including AAC, AAAC and ACSR. Wedge locking nothing but Notch formation at the end of wedge shall be observed. This will ensure that in any case wedge will not loosen and come back.

During disassembly of connector, take-off clips are designed for use with the

specified tool. Upon disassembly, the conductor as well as connector can be reused.

'C' MEMBER:

The C member shall be formed from extruded Aluminium so that the grain (extrusion direction) runs perpendicular to the conductor (e.g. from C-groove end to C-groove end). This orientation of grain direction provides for lower rates of stress relaxation in the metal and will maintains the level of contact pressure at or near the value at initial installation for the life of connection.

Susceptibility to stress corrosion cracking will also improve. The material used shall be specially designed with tighter tolerances on the chemical composition to ensure consistency of the C- member production regarding dimensions and mechanical properties.

Wedge:

The dimensions for the wedges are manufactured to close tolerances to ensure repeatability and reliability of the connection.

Inhibitor:

An oxidation inhibitor shall be applied to the surface there by elimination of oxidation of metallic surface. The chemical composition of the inhibitor shall be synthetic and compatible with the rubber gloves used by the utilities. This inhibitor shall contain special Aluminium abrasive particles, optimized in size and quantity, to ensure repeatability and reliability of the electrical contact made in every connection.

The connectors shall have maximum contact surface with conductor and, extremely low and stable contact resistance and minimum power loss. These shall maintain constant force within the connection for the life of the connector/clamp while compensating for thermal expansion or creep and increased life span.

The mechanical stresses generated during the wedge insertion shall cause plastic deformation of the C-clamp and shall increase the geometrical confirmation of the clamp to the conductor.

Installation Tool:

Tool is to be used for HT Wedge Connectors installations, due to which operator dependency & human errors in connector installations are eliminated.

(NOTE: "Wedge Connector to be installed manual efforts" i.e. by using tools like hammer/spanner are NOT acceptable)

The tool is having 4 moving parts: the ram, the power unit, the breech cap and the gas release knob. The gas produced by the power booster during the installation is captive inside the power unit. This allows the tool to remain self-supporting on the lines during installations until the gas release knob is turned counter clockwise. This allows the gas produced by the power-booster to be

released and the tool to be removed.

Power-Booster:

Power charge repeatability (PCR) is critical to the supply of a reliable product, which can be applied safely and consistently every time. These power-boosters are designed with the primer cap enclosed to ensure that it can only be used with the specified tool and to ensure that there is no incorrect installations.

FREEDOM FROM DEFECTS: -

The wedge type connectors shall be smooth and free from cavities, blowholes, and such other defects, which would likely cause them to be unsatisfactory in service.

The wedge type connectors shall be so designed and proportioned that they are capable of safely withstanding stresses to which they may be subjected (including those due to short circuit and climatic conditions) and that the effects of vibration both on conductor and connector itself are minimized.

They shall be designed, manufactured, and finished to avoid sharp radius of curvature, ridges and excrescences, which might lead to, localized pressure on or damage to the conductor in service.

Sufficient contact pressure should be maintained at the joint by the provision of the required number of bolts or other fixing arrangements. But the contact pressure should not be so great as to cause relaxation of the joint by cold flow. The joint should be such that the pressure is maintained within this range under all conditions of service.

4.0TESTS:

4.1 TYPE TESTS

The following Type Tests shall be carried out as specified in respective standard as per ANSI C119.4 for any one of the connector from same design

Current Cycle Test (CCT) or Current Cycle Submersion Test (CCST)

Mechanical test / Wire Pull-out Test

4.2 As per IS 5561

1. Tensile Test.
2. Resistance Test
3. Temperature Rise Test.
4. Short Time Current Test.
5. For Raccoon and Dog conductors: 25KA for 3 secs
6. For higher sizes: as per electrical fault system requirements
7. Dimensional Check

5.0ACCEPTANCE TESTS

a) Tensile Test.

b) Resistance Test.

c) Dimensional

The acceptance tests are to be carried out in presence of Company's representative. The supplier shall, therefore, give sufficient notice to the Company for arranging witnessing of the tests.

6.0 ROUTINE TESTS

Visual inspection.

Dimensional Check.

7.0 TESTING FACILITIES AND DETAILS OF EQUIPMENTS

The supplier / tenderer shall clearly state as to what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out type, routine and acceptance tests as per specification. The bidder shall provide the facilities to purchaser's representative for witnessing the tests in the manufacturer's works. If any test cannot be carried out at manufacturer's works reason should be clearly stated in the tender.

8.0 DRAWING

The bidders shall supply the material as per drawing approved by customer/testing lab.

Guaranteed Technical Particulars (GTP)

GTP of LT & HT Wedge Connectors shall be as per Annexure respectively.

9.0 MARKING

Each C- member and wedge is marked with distinct identification code. This identification code is also marked on the packaging to ensure that the correct parts are used for the application. The installer can make a quick visual check before installing.

10.0 PACKING

For packing, Polythene Bags, Corrugated Boxes, Wooden Boxes shall be used. The packing shall be fit to withstand rough handling during transit and storage at destination. The heads and threaded portion of fasteners fitting should be properly protected against damage. The gross weight of the packing shall not normally exceed 50 kg per box or case. All different fitting components shall be packed in different cases and shall be completed with minor accessories fitted in places. The tenderer should be approved the packing list before dispatching the material.

11.0 PERFORMANCE OF WEDGE CONNECTORS

Bidder shall submit performance certificates/Purchase orders to prove satisfactory performance of connectors for minimum 10 years after installation.

Annexure-1

Guaranteed Technical Particulars for MV & HT Wedge Connectors				
Sr. No	**Description**	**Unit**	**As per Tender**	**Bidder's offer**
1	Name of the Manufacturer			
2	Place of Manufacture			
3	Connector Type		Fired Wedge Connector	Yes/No
4	Applicable Standard/s		ANSI 119.4 & IS5561	
	Material of Connector			
5	a. 'C' Member		As per Specification	Yes/No
	b. Wedge Member			
	c. Inhibitor			
6	Connector Suitable for		Mention Conductor	
			Name, Type and Diameter	
7a	Tooling & Power Booster required		Yes	Yes/No
7b	Speed of Wedge during	m/s	40	
	Notch at the end of wedge after			
7c	installation (Wedge Locking provision)		Yes	Yes/No
8	Rated Current	Amps		
9	Short Time Current Rating	kA	As per Specification	
10	Rated Tensile Strength	Kgf		
11	Type Test Reports			
	a. Current Cycle Test (Class AA)		As per ANSI C 119.4	Yes/No
	b. Mechanical Test (Class 1)			
	c. Salt fog test		ASTM B117	
12	Type Test Reports		As per IS-5561	Yes/No
13	Dimension	mm		

SECTION - 5

Suspension & Tension String Hardware

A. String Insulators & Hardware

1. The insulator hardware for suspension and tension strings shall conform to IS: 2486
2. Suspension Clamps & Bolted type Tension Clamps shall be made of Aluminium alloy casting, conforming to Gr. 4600 of IS: 617.
3. Bolts, nuts & plain washers shall be Hot Dip Galvanized.
4. Spring washers shall be Electro-galvanised mild steel suitable for at least service condition-3 as per IS:1573
5. Necessary Forged Steel Hardware items like Anchor Shackle, Ball Link/Clevis, Socket Clevis/Eye, Clevis Eye, etc… & Mild Steel items like Yoke Plates, Cross Arm, Link, Brackets, Arcing Horns, etc. suitable for stringing shall be supplied along with the Suspension/Tension Clamps. The string hardware items supplied must be suitable for the Insulators used in the project i.e. as per the Insulator coupling provided. All ferrous items shall be hot dip galvanised.
6. All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off.
7. String hardware shall be designed to carry the load as per the requirement.

B. Tests

In accordance with the stipulations of the specification, the suspension and tension strings, the string hardware components shall be subjected to the following type tests, acceptance tests and routine tests:

1. Type Tests on Insulator Strings: The test reports for following type tests shall be submitted for approval on same/similar string items.

a) Mechanical strength test: The test shall be carried out as per following procedure.

The complete insulator string along with its hardware fitting excluding arcing horn, tension/suspension clamps shall be subjected to a load equal to 50% of 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. After removal of the load, the string components shall not show any visual deformation and it shall be possible to dismantle them by hand. Hand tools may be used to remove cotter pins and loosen the nuts initially. The string shall then be reassembled and loaded to 50% of UTS and the load shall be further increased at a steady rate till the specified minimum UTS and held for one minute. No fracture should occur during this period. The applied load shall then be increased until the failing load is reached and the value recorded.

2. Acceptance Test on Hardware Fitting

a) Visual Examination as per Cl. 5.10 of IS: 2486 (Part-I).
b) Verification of Dimensions as per Cl. 5.8 of IS: 2486 (Part-I)
c) Galvanising/Electroplating tests as per Cl. 5.9 of IS: 2486 (Part-I).
d) Slip strength test as per Cl. 5.4 of IS: 2486 (Part-I)
e) Mechanical strength test for each component.

The load shall be so applied that the component is stressed in the same way as it would be in actual service and the procedure as given in 2.2.1.(a) above should be followed.

f) Test on locking devices for ball and socket coupling as per IEC -60372(2).

3. Routine Test on Hardware Fittings

Tests on hardware fittings to be done as per IS: 2486 (Part-I).

SECTION - 6

Mid Span Jointing Kit & Termination Kit

The mid span Insulated jointing kit & Termination kit shall be of the Heat Shrink type. Material of Tubing shall be Cross linked Polyolefin. Non-Tracking material for Termination shall confirm to ASTM D-2303. Outer Heat Shrink type Insulating Material for Joints shall be Polyolefin Cross Linked Through radiation.

SECTION - 7

Cable Ties

The ties shall be designed suitably to hold the MVCC in its position on top of the insulator and shall confirm to EN 50397-2. The Ties shall be Non-metallic Helical type to ensure tracking resistance and to avoid any insulation damage to covered conductor due abrasion while mechanical or wind induce vibration.

These non-metallic helical ties should be manufactured from rigid, high impact polyvinyl chloride having excellent chemical properties which retain good physical characteristics without deteriorating in function from the effects of severe weather conditions and industrial fumes.

SECTION - 8

Insulators

SECTION 8A - TECHNICAL SPECIFICATION 11 KV COMPOSITE INSULATORS

1.0 SCOPE :

This specification covers the design, manufacture, testing and supply of 11KV Composite Insulators. The composite insulators shall be of the following type:

i) Disc insulators
ii) Pin insulators

2.0 SERVICE CONDITIONS :

The insulators to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1.1	Maximum ambient temperature (Degree C)	...	50
2.1.2	Minimum ambient temperature (Degree C)	...	3.5
2.1.3	Relative Humidity (%)	...	10 to
2.1.4	Maximum Annual Rainfall (mm)	...	1450
2.1.5.	Maximum Wind pressure (kg/m.sq.)	...	150
2.1.6	Maximum wind velocity (km/hour)	...	45
2.1.7	Maximum altitude above mean sea level	...	1000
2.1.8	Isoceraunic level (days/year)	...	50
2.1.9	Seismic level (Horizontal acceleration)	...	0.3 g
2.1.10	Moderately hot and humid tropical climate Conductive to rust and fungus growth		

3.0 SYSTEM PARTICULARS:

a) Nominal System Voltage	11 kV
b) Corresponding highest system	12 kV
c) Frequency	50 Hz with 3% tolerance
d) Number of phase	3
e) Neutral earthing	Effectively grounded.

4.0 STANDARDS :

Unless otherwise specified elsewhere in the specifications insulators shall confirm to the latest revisions of all relevant standards available at the time of placement of the order. The standards are listed as below;

Sr. No.	Indian Standard	Title	International
1	-	Definition, test methods and acceptance criteria for composite insulators for A.C. overhead	IEC: 61109
2	-	Insulators for overhead lines – Composite line post insulators for alternative current with a nominal voltage >1 000 V	IEC: 62217
3	IS: 731	Porcelain insulators for overhead power lines	IEC: 60383
4	IS: 2071	Methods of High Voltage Testing	IEC: 60060-1
5.	IS: 2486	Specification for Insulator fittings for Overhead power Lines with a nominal voltage greater than 1000V General Requirements and	IEC: 60120 IEC: 60372
6.	IS: 13134	Guide for the selection of insulators in respect	IEC: 60815
7.	-	Hydrophobicity Classification Guide	STRI guide 1.92/1
8.	IS: 8263	Methods of RI Test of HV insulators	IEC: 60437
9.	IS: 2629	Recommended Practice for Hot, Dip Galvanization for iron and steel	ISO: 1461 (E)
10.	IS: 6745	Determination of Weight of Zinc Coating on Zinc coated iron and steel articles	ISO: 1460
11.	IS: 3203	Methods of testing of local thickness of electroplated coatings	ISO: 2173
12.	IS: 2633	Testing of Uniformity of Coating of zinc coated	
13.	-	Standard specification for glass fiber	ASTM D 578-05

5.0 GENERAL REQUIREMENTS

5.1 The composite insulators shall generally conform to latest Standards as listed in Clause 4.

5.2 The insulators should withstand the conductor tension, the reversible wind load as well as the high frequency vibrations due to wind.

5.3 Bidder must be an indigenous manufacturer and supplier of composite insulators of rating 11 kV or above OR must have developed proven in house technology and manufacturing process for composite insulators of above rating OR possess technical collaboration /association with a manufacturer of composite insulators of rating 11kV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid, which can be in the form of certification from the utilities concerned, or any

other documents to the satisfaction of the owner.

5.4 Insulator shall be suitable for both the suspension and strain type of load & shall be of Tongue & Clevis type. The diameter of Composite Insulator shall be less than 200 mm.

5.5 Insulators shall have sheds with good self-cleaning properties. Insulator shed profile; spacing, projection etc. and selection in respect of polluted conditions shall be generally in accordance with the recommendation of IEC-60815/IS: 13134.

5.6 The size of Composite insulator, minimum creepage distance and mechanical strength along with hardware fittings shall be as follows:

Sr. No.	**Type of composite insulators**	**Nominal System voltage kV (rms)**	**Highest System voltage kV(rms)**	**Visible discharge test voltage kV rms**	**Wet Power Frequency Withstand voltage kV(rms)**	**Impulse Withstand voltage kV(rms)**	**Minimum Creepage Distance (mm)**	**SML (kN)**	**Minimum FRP Rod Dia (mm)**
i.	Disc insulato	11	12	9	35	75	320	70	16
Sr. No.	**Type of composite insulators**	**Nominal System voltage kV**	**Highest System voltage kV(rms)**	**Visible discharge test voltage kV(rms)**	**Wet Power Frequency Withstand voltage kV(rms)**	**Impulse Withstand voltage kV(rms)**	**Minimum Creepage Distance (mm)**	**SCL (kN)**	**Minimum FRP Rod Dia**
ii.	Pin Insulator	11	12	9	35	75	320	5	24

Disc Insulator – SML (Specified Tensile Load) should be applied in axial direction to the insulator axis.

Pin Insulators – SCL (Specified Cantilever Load) should be applied in transverse direction to Insulator axis.

5.7 Dimensional Tolerance of Composite Insulators

The tolerances on all dimensions e.g. diameter, length and creepage distance shall be allowed as follows in line with-IEC 61109:

± (0.04d+1.5) mm when d≤300mm.

± (0.025d+6) mm when d>300 mm.

Where, d being the dimensions in millimeters for diameter, length or creepage distance as the case may be. However no negative tolerance shall be applicable to creepage distance.

5.8 Interchangeability:

The composite insulator together with the tongue & clevis fittings shall be of standard
design suitable for use with the hardware of any other indigenous make conforming to relevant standards referred above.

5.9 Corona and RI Performance

All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating conditions.

6.0 TECHNICAL DESCRIPTION OF COMPOSITE INSULATORS

Polymeric Insulators shall be designed to meet the high quality, safety and reliability and are capable of withstanding a wide range of environmental conditions.

Polymeric Insulators shall consist of THREE parts, at least two of which are insulating parts:- (a) Core- the internal insulating part (b) Housing- the external insulating part
(c) Metal end fittings.

6.1 CORE

It shall be a glass-fiber reinforced epoxy resin rod of high strength (FRP rod). Glass fibers and resin shall be optimized in the FRP rod. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pultrusion process. The FRP rod shall be void free.

6.2 POLYMER HOUSING:

The FRP rod shall be covered by a seamless sheath of high voltage grade Silicone rubber housing of thickness 3mm minimum. It shall be one- piece housing using only Injection Molding process to cover the core. Primer should be used to bond the housing with FRP rod. The housing shall be designed to provide the necessary creepage distance and protection against environmental influences. Housing shall conform to the requirements of IEC 60815 with latest amendments.

The high voltage grade Silicone rubber polymer material should be as per requirement specified in clause 8.2.2

6.3 WEATHERSHEDS

The composite polymer weathersheds made of high voltage grade Silicone rubber polymer shall be molded as part of the sheath and shall be free from

imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The interface, if any, between sheds and sheath (housing) shall be free from voids.

The high voltage grade Silicone rubber polymer material should be as per requirement specified in clause 8.2.2

6.4 METAL END FITTINGS:

End fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminium alloy. They shall be connected to the rod by means of a controlled compression technique. Disc Insulator Metal end fittings shall be suitable for Tongue & Clevis hard wares of respective specified mechanical load and shall be hot dip galvanized after, all fittings have been completed. As the main duty of the end fittings is the transfer of mechanical loads to the core the fittings should be properly attached to the core by a coaxial or hexagonal compression process & should not damage the individual fibers or crack the core. The dimensions of end fittings of insulators shall be in accordance with the standard dimensions stated in IEC: 60120/ IS: 2486 - Part-II /1989.

7.0 WORKMANSHIP

7.1 All the materials shall be of latest design and conform to the best engineering practices adopted in the high voltage field. Bidders shall offer only such insulators as are guaranteed by them to be satisfactory and suitable for continued good service in power transmission lines.

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

7.3 The design of the insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration.

7.4 The core shall be sound and free of cracks and voids that may adversely affect the insulators.

7.5 Weather sheds shall be uniform in quality. They shall be clean, sound, smooth and shall be free from defects and excessive flashing at parting lines.

7.6 End fittings shall be free from cracks, seams, shrinks, air holes and rough edges. End fittings should be effectively sealed to prevent moisture ingress; effectiveness of sealing system must be supported by test documents. All surfaces of the metal parts shall be perfectly smooth without projecting points or irregularities, which may cause corona.

All load bearing surfaces shall be sooth and uniform so as to distribute the loading stresses uniformly.

7.7 All ferrous parts shall be hot dip galvanized to give a minimum average coating of zinc equivalent to 610 gm/sq.m. or 87 micron thickness and shall be in accordance with the requirement of IS:4759. the zinc used for galvanizing shall be of purity 99.5% as per IS:4699. The zinc coating shall be uniform, adherent, smooth, reasonably bright continuous and free from imperfections such as flux, ash rust stains, bulky white deposits and blisters. The galvanized metal parts shall be guaranteed to withstand at least four successive dips each lasting for one (1) minute duration under the standard preece test. The galvanizing shall be carried out only after any machining.

8.0 TESTS AND STANDARDS

Insulators offered shall be manufactured with the same configuration & raw materials as used in the insulators for which type test reports are submitted. The manufacturer shall submit a certificate for the same.

8.1 TYPE TESTS :

The type tests are intended to verify the main characteristics of a composite insulator. The type tests shall be applied to composite insulators, the class of which has passed the design tests.

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The bidder shall submit type test reports as per IEC 61109 along with the bid. Additional type tests required if any shall be carried out by the manufacturer, after award of contract for which no additional charges shall be payable. In case, the tests have already been carried out, the manufacturer shall submit reports for the same.

8.1.1 Tests on the high voltage grade Silicone rubber material used in manufacture of the insulator housing and weather sheds:

The bidder shall furnish following type test reports conducted on High voltage Silicone rubber material used for Polymer housing confirming following properties along with their bid.

Sl. No	Property	Requirement	Standard
1	Tensile Strength (MPa)	3 Mpa min	ASTM D 412-06a
2	Elongation (%)	300%	ASTM D 412-06a
3	Inclined plane Tracking & Erosion resistance test	(4.5KV 360 min)	ASTM D2303
4	Volume Resistivity (Ohm –cm)	2.2 x 10^3	ASTM D257
5	Dielectric constant	4	ASTM D150
6	Dielectric Strength (kv/mm)	10 kV /mm min	ASTM D149
7	Density	1.5 min	ASTM D792

8	Hardness (shore A)	60 nominal	ASTM D 2240
19	Arc Resistance	> 220 Seconds	ASTM D 495-99
10	Silicone Content	Min 30%	BS: 2782-Pt10
11	Flammability	V-0	UL 94

8.2 ACCEPTANCE TESTS :

The test samples after having withstood the routine test shall be subject to the following acceptance tests in order indicated below:

(a)	Verification of dimensions	: Clause 7.2 IEC: 61109,
(b)	Verification of the locking system (if applicable)	: Clause 7.3 IEC: 61109,
(c)	Verification of tightness of the interface Between end fittings & Insulator	: Clause 7.4 IEC: 61109 amendment 1of 1995
(d)	Verification of the specified mechanical load & SCL	: Clause 7.4 IEC: 61109, amendment 1of 1995 / IS 731
(e)	Galvanizing test	: IS:2633/IS:6745

8.3 ROUTINE TESTS:

Sr.No.	Description	Standard
1	Identification of marking	As per IEC: 61109 Clause 8.1
2	Visual Inspection	As per IEC: 61109 Clause 8.2
3	Mechanical routine test	As per IEC: 61109 Clause 8.3

Every polymeric insulator shall withstand mechanical routine test at ambient temperature tensile load at RTL corresponding to at least 50 % of the SML for at least
10 sec.

8.4 TESTS DURING MANUFACTURE:

Following tests shall also be carried out on all components as applicable

(a)	Chemical analysis of zinc used for galvanizing
(b)	Chemical analysis, mechanical, metallographic test and magnetic particle
(c)	Chemical analysis, hardness tests and magnetic particle inspection for

8.5 SAMPLE TESTING :

8.5.1 Samples from offered inspection lot / production line shall be send to third party NABL accredited laboratory for checking the SML / SCL withstand capability.

9.0 QUALITY ASSURANCE PLAN :

9.1 The successful bidder shall submit following information along with the bid:

9.1.1 Test certificates of the raw materials and bought out accessories.

9.1.2 Statement giving list of important raw material, their grades along with names of sub- suppliers for raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of bidder's representative.

9.1.3 List of manufacturing facilities available.

9.1.4 Level of automation achieved and lists of areas where manual processing exists.

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

9.1.6 List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports.

9.1.7 The manufacturer shall submit Manufacturing Quality Assurance Plan (QAP) for approval & the same shall be followed during manufacture and testing.

9.2 The successful bidder shall submit the routine test certificates of bought out raw materials/accessories and central excise passes for raw material at the time of inspection.

9.3 The Owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where insulator, and its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the Supplier's and sub-Supplier's works, raw materials, manufacture of the material and for conducting necessary test as detailed herein.

9.4 The material for final inspection shall be offered by the Supplier only under packed condition. The owner shall select samples at random from the packed lot for carrying out acceptance tests. The lot offered for inspection shall be homogeneous and shall contain insulators manufactured in 3-4 consecutive weeks.

9.5 The Supplier shall keep the Owner informed in advance of the time of starting and the progress of manufacture of material in their various stages so that arrangements could be made for inspection.

9.6 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested unless the owner in writing waives off the inspection. In the later case also the material shall be dispatched only after satisfactory testing specified herein has been completed.

9.7 The acceptance of any quantity of material shall in no way relieve the

Supplier of his responsibility for meeting all the requirements of the specification and shall not prevent subsequent rejection, if such material are later found to be defective

10.0 TESTING FACILITIES :

The tenderer must clearly indicate what testing facilities are available in the works of the manufacturer and whether facilities are adequate to carry out all Routine & acceptance Tests. These facilities should be available to Engineers if deputed or carry out or witness the tests in the manufacturer works. If any test cannot be carried out at the manufacturer's work, the reasons should be clearly stated in the tender. The insulators shall be tested in accordance with the procedure detailed in IEC 61109 / 92-93 with latest amendments.

11.0. DRAWINGS :

11.1 The Bidder shall furnish full description and illustration of the material offered.

11.2 The Bidder shall furnish along with the bid the outline drawing (3 copies) of each insulator unit including a cross sectional view of the long rod insulator unit. The drawing shall include but not be limited to the following information:

(a) Long rod diameter with manufacturing tolerances
(b) Minimum Creepage distance with positive tolerance
(c) Diameter of FRP Rod
(d) Unit mechanical and electrical characteristics
(e) Size and weight of ball and socket and Pin top and bottom.
(f) Weight of composite long rod units
(g) Materials
(h) Identification mark

11.3 After placement of award, the Supplier shall submit three sets of full dimensioned manufacturing insulator drawings containing all the details.

11.4 After placement of award the Supplier shall also submit fully dimensioned insulator crate drawing for different type of insulators for approval of the owner.

12.0 MARKINGS :

14.1 Each insulator shall be legibly and indelibly marked with the following details as per IEC- 61109:

a) Name or trademark of the manufacturer. b) Voltage & Type

c) Month and year of manufacturing.

d) Min. failing load/guaranteed mechanical strength in kilo Newton followed by the word 'KN' to facilitate easy identification.

13.0 PACKING :

13.1 All insulators shall be packed in strong corrugated box of min. 5 ply. The gross weight of the crates along with the material shall not normally exceed 100 Kg to avoid hackling problem

13.2 The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

13.3 Suitable cushioning, protective padding, or Dunn age or spacers shall be provided to prevent damage or deformation during transit and handling.

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

13.5 The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

14.0 GUARANTEE

The Supplier of insulators shall guarantee overall satisfactory performance of the insulators. The tenderer shall furnish in the form attached (Schedule 'A') all the guaranteed technical particulars.

Annexure-B

Tests on Insulator units

1 RIV Test (Dry)

The insulator string along with complete hardware fittings shall have a radio
interference voltage level below 100 micro volts at one MHz when subjected to 50 Hz AC voltage of 10kV & 30 kV for 11 kV & 33 kV class insulators respectively under dry condition. The test procedure shall be in accordance with IS:8263 /IEC:437/CISPR 18-2.

2 Brittle Fracture Resistance Test

Brittle fracture test shall be carried out on naked rod along with end fitting by applying
"1n HNO3 acid" (63 g conc. HNO3 added to 937 g water) to the rod. The rod should be held 80% of SML for the duration of the test. The rod should not fail within the 96-hour test duration. Test arrangement should ensure continuous wetting of the rod with Nitric acid.

3 Recovery of Hydrophobicity & Corona test

The test shall be carried out on 4mm thick samples of 5cm
X 7cm.

(i) The surface of selected samples shall be cleaned with isopropyl alcohol. Allow the surface to dry and spray with water. Record the Hydrophobicity classification in line with STRI guide for Hydrophobicity classification. Dry the sample surface.

(ii) The sample shall be subjected to mechanical stress by bending the sample over a ground electrode. Corona is continuously generated by applying 12 kV to a needle like electrode placed 1mm above the sample surface. The test shall be done for 100 hrs.

(iii) Immediately after the corona treatment, spray the surface with water and record the HC classification. Dry the surface and repeat the corona treatment as at clause 2 above. Note HC classification. Repeat the cycle for 1000 hrs. or until an HC of 6 or
7 is obtained. Dry the sample surface.

(iv) Allow the sample to recover and repeat hydrophobicity measurement at several time intervals. Silicone rubber should recover to HC 1 – HC 2 within 24 to 48 hours, depending on the material and the intensity of the corona treatment.

Guaranteed Technical Particulars of 11kV Disc Insulator

Sr .No.	Description	Unit	Min. requirement	Offered
1.	Type of Insulator		Polymeric Disc Insulator	
2.	Standard according to which the insulators manufactured and tested		IEC 61109	
3.	Material of Housing and Weather Sheds		High voltage grade Silicone rubber	
(a)	Material of core(FRP rod)		ECR BORRON FREE	
(b)	Material of end fittings		SGI Cast/Forged steel	
(c)	Sealing compound for end fittings		Silicone sealent	
4.	Colour of housing		Grey/Light grey	
5.	Electrical characteristics			
(a)	Nominal system voltage		11 KV	
(b)	Highest system voltage		12 KV	
(c)	Wet Power frequency withstand voltage		35 KV	
(d)	Dry lighting impulse withstand voltage		75 kV	
(e)	Visible Discharge Test Voltage		9	
(f)	Creepage distance (Min.)		320 MM	
(g)	Inclined Plane Tracking and Erosion Resistance of Housing		4.5 kV for 360 minutes	
6. (a)	Mechanical characteristics : SML (kN)		70 KN	
7.	Dimensions of insulator			
(i)	Weight	Kg.		
(ii)	Dia of FRP rod	mm	16mm (min) for Disc Insulator	
(iii)	Length of FRP rod	mm		
(iv)	Dia of weathersheds	mm		
(v)	Thickness of housing	mm	3mm (min)	
(vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.	mm		
8.	Method of fixing of sheds to housing (specify). Single mould or Modular construction (injection moulding)		Injection Moulding	

9.	No of weathersheds			
10.	Type of sheds			
i)	Aerodynamic		Aerodynamic	
11.	Packing details			
(a)	Type of packing		Corrugated Box	
(b)	No. of insulators in each pack			
(c)	Gross weight of package.			
12.	Any other particulars which the bidder may like to give.			
13	Type Test as per requirement of Clause 8.2.1 and 8.2.2		Required	

Guaranteed Technical Particulars of 11kV Pin Insulator

Sr.No.	**Description**	**Unit**	**Min. requirement**	**Offered**
1.	Type of Insulator		Polymeric Pin Insulator	
2.	Standard according to which the insulators manufactured and tested.		IS 731 & IEC 61109	
3.	Material of Housing and weather Sheds		high voltage grade Silicone rubber	
(a)	Material of core(FRP rod)		ECR BORRON FREE	
(b)	Material of end fittings		SGI Cast/Forged steel	
(c)	Sealing compound for end fittings		Silicone Sealent	
4.	Colour of housing		Grey	
5.	Electrical characteristics			
(a)	Nominal system voltage		11KV	
(b)	Highest system voltage		12 KV	
(c)	Wet Power frequency withstand voltage		35 KV	
(d)	Dry lighting impulse withstand voltage		75 kV	
(e)	Visible Discharge Test Voltage		9	
(f)	Creepage distance (Min.)		320 MM	
(g)	Inclined plane Tracking and Erosion Resistance of Housing		4.5 kV for 360 minutes	
(h)	FRP rod leakage Current at 175 V/mm		< 0.05 mA	
6. (a)	Mechanical characteristics : SCL (kN)		5 KN	
7.	Dimensions of insulator			
(i)	Weight	Kg.		
(ii)	Dia of FRP rod	mm	11kV- 24mm	

(iii)	Length of FRP rod	Mm		
(iv)	Dia of weathersheds	mm		
(v)	Thickness of housing	mm	3mm (min)	
(vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.	mm		
8.	Method of fixing of sheds to housing (specify). Single mould or Modular construction (injection moulding)		Injection moulding	
9.	No of weathersheds			
10.	Type of sheds			
i)	Aerodynamic		Aerodynamic	
11.	Packing details			
(a)	Type of packing		Corrugated Box	
(b)	No. of insulators in each pack			
(c)	Gross weight of package.			
12.	Any other particulars which the bidder may like to give.			
13	Type Test as per requirement of Clause 8.2.1 and 8.2.2		Required	

SECTION 8B - TECHNICAL SPECIFICATION 33 KV COMPOSITE INSULATORS

1.0 SCOPE :

This specification covers the design, manufacture, testing and supply of 33 KV Composite Insulators. The composite insulators shall be of the following type:

i) Disc insulators
ii) Pin insulators

2.0 SERVICE CONDITIONS :

The insulators to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

2.1.1	Maximum ambient temperature (Degree C)	...	50
2.1.2	Minimum ambient temperature (Degree C)	...	3.5
2.1.3	Relative Humidity (%)	...	10 to
2.1.4	Maximum Annual Rainfall (mm)	...	1450
2.1.5.	Maximum Wind pressure (kg/m.sq.)	...	150
2.1.6	Maximum wind velocity (km/hour)	...	45
2.1.7	Maximum altitude above mean sea level	...	1000
2.1.8	Isoceraunic level (days/year)	...	50
2.1.9	Seismic level (Horizontal acceleration)	...	0.3 g
2.1.10	Moderately hot and humid tropical climate Conductive to rust and fungus growth		

3.0 SYSTEM PARTICULARS:

a) Nominal System Voltage		33 kV
b) Corresponding highest system		36 kV
c) Frequency	50 Hz with 3% tolerance	
d) Number of phase		3
e) Neutral earthing	Effectively grounded.	

4.0 STANDARDS:

Unless otherwise specified elsewhere in the specifications insulators shall confirm to the latest revisions of all relevant standards available at the time of placement of the order. The standards are listed as below

Sr. No.	Indian Standard	Title	International Standard
1	-	Definition, test methods and acceptance criteria for composite insulators for A.C. overhead lines	IEC: 61109

		above 1000V	
2	-	Insulators for overhead lines – Composite line post insulators for alternative current with a nominal voltage >1 000 V	IEC: 62217
3	IS: 731	Porcelain insulators for overhead power lines with a nominal voltage greater than 1000V	IEC: 60383
4	IS: 2071	Methods of High Voltage Testing	IEC: 60060-1
5	IS: 2486	Specification for Insulator fittings for Overhead power Lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements Locking Devices	IEC: 60120 IEC: 60372
6	IS: 13134	Guide for the selection of insulators in respect of polluted condition	IEC: 60815
7	-	Hydrophobicity Classification Guide	STRI guide 1.92/1
8	IS: 8263	Methods of RI Test of HV insulators	IEC: 60437
9	IS: 2629	Recommended Practice for Hot, Dip Galvanization for iron and steel	ISO: 1461 (E)
10	IS: 6745	Determination of Weight of Zinc Coating on Zinc coated iron and steel articles	ISO: 1460
11	IS: 3203	Methods of testing of local thickness of electroplated coatings	ISO: 2173/2178
12	IS: 2633	Testing of Uniformity of Coating of zinc coated Articles	
13	-	Standard specification for glass fiber strands	ASTM D 578-05
14		METAL END FITTINGS:	IEC: 60120/ IS: 2486 - Part-II /1989.
15		high voltage grade Silicone rubber polymer	ASTM
16		Wedge Connectors for MV & HT	**As per IS5561** ANSI C119.4ASTM

5.0 GENERAL REQUIREMENTS

5.1 The composite insulators shall generally conform to latest Standards as listed in Clause 4.

5.2 The insulators should withstand the conductor tension, the reversible wind load as well as the high frequency vibrations due to wind.

5.3 Bidder must be an indigenous manufacturer and supplier of composite insulators of rating 33 kV or above OR must have developed proven in house technology and manufacturing process for composite insulators of above rating OR possess technical collaboration /association with a manufacturer of composite insulators of rating 33kV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid, which can be in the form of certification from the utilities concerned, or any other documents to the satisfaction of the owner.

5.4 Insulator shall be suitable for both the suspension and strain type of load & shall be of Tongue & Clevis type. The diameter of Composite Insulator shall be less than 200 mm.

5.5 Insulators shall have sheds with good self-cleaning properties. Insulator shed profile; spacing, projection etc. and selection in respect of polluted conditions shall be generally in accordance with the recommendation of IEC-60815/IS: 13134.

5.6 The size of Composite insulator, minimum creepage distance and mechanical strength along with hardware fittings shall be as follows:

Sr. No.	**Type of composite insulators**	**Nominal System voltage kV (rms)**	**Highest System voltage kV(rms)**	**Visible discharge test voltage kV rms**	**Wet Power Frequency Withstand voltage kV(rms)**	**Impulse Withstand voltage kV(rms)**	**Minimum Creepage Distance (mm)**	**SML (kN)**	**Minimum FRP Rod Dia (mm)**
i.	Disc insulator								
		33	36	27	110	235	900	90	16
Sr. No.	**Type of composite insulators**	**Nominal System voltage Kv (rms)**	**Highest System voltage kV(rms)**	**Visible discharge test voltage kV(rms)**	**Wet Power Frequency Withstand voltage kV(rms)**	**Impulse Withstand voltage kV(rms)**	**Minimum Creepage Distance (mm)**	**SCL (kN)**	**Minimum FRP Rod Dia**
ii.	Pin Insulator								
		33	36	27	105	215	900	10	33.5

Disc Insulator – SML (Specified Tensile Load) should be applied in axial direction to the insulator axis.

Pin Insulators – SCL (Specified Cantilever Load) should be applied in transverse direction to Insulator axis.

5.7 Dimensional Tolerance of Composite Insulators

The tolerances on all dimensions e.g. diameter, length and creepage distance shall be allowed as follows in line with-IEC 61109:

± (0.04d+1.5) mm when d≤300mm.
± (0.025d+6) mm when d>300 mm.
Where, d being the dimensions in millimetres for diameter, length or creepage distance as the case may be. However no negative tolerance shall be applicable to creepage distance.

5.8 Interchangeability:

The composite insulator together with the tongue & clevis fittings shall be of standard design suitable for use with the hardware of any other indigenous make conforming to relevant standards referred above.

5.9 Corona and RI Performance

All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating conditions.

6.0 TECHNICAL DESCRIPTION OF COMPOSITE INSULATORS

Polymeric Insulators shall be designed to meet the high quality, safety and reliability and are capable of withstanding a wide range of environmental conditions.

Polymeric Insulators shall consist of THREE parts, at least two of which are insulating parts:-

(a) Core- the internal insulating part
(b) Housing- the external insulating part
(c) Metal end fittings.

6.1 CORE

It shall be a glass-fiber reinforced epoxy resin rod of high strength (FRP rod). Glass fibers and resin shall be optimized in the FRP rod. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pultrusion process. The FRP rod shall be void free.

6.2 POLYMER HOUSING:

The FRP rod shall be covered by a seamless sheath of high voltage grade Silicone rubber housing of thickness 3mm minimum. It shall be one-piece housing using only Injection Molding process to cover the core. Primer should be used to bond the housing with FRP rod. The housing shall be designed to provide the necessary creepage distance and protection against environmental influences. Housing shall conform to the requirements of IEC 60815 with latest amendments.

The high voltage grade Silicone rubber polymer material should be as per requirement specified in clause 8.2.2

6.3 WEATHERSHEDS

The composite polymer weathersheds made of high voltage grade Silicone rubber polymer shall be molded as part of the sheath and shall be free

from imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The interface, if any, between sheds and sheath (housing) shall be free from voids.

The high voltage grade Silicone rubber polymer material should be as per requirement specified in clause 8.1.1

6.4 METAL END FITTINGS:

End fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminium alloy. They shall be connected to the rod by means of a controlled compression technique. Disc Insulator Metal end fittings shall be suitable for Ball & socket type hard wares of respective specified mechanical load and shall be hot dip galvanized after, all fittings have been completed. As the main duty of the end fittings is the transfer of mechanical loads to the core the fittings should be properly attached to the core by a coaxial or hexagonal compression process & should not damage the individual fibers or crack the core. The dimensions of end fittings of insulators shall be in accordance with the standard dimensions stated in IEC: 60120/ IS: 2486 - Part-II /1989.

7.0 WORKMANSHIP

7.1 All the materials shall be of latest design and conform to the best engineering practices adopted in the high voltage field. Bidders shall offer only such insulators as are guaranteed by them to be satisfactory and suitable for continued good service in power transmission lines.

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

7.3 The design of the insulators shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration.

7.4 The core shall be sound and free of cracks and voids that may adversely affect the insulators.

7.5 Weather sheds shall be uniform in quality. They shall be clean, sound, smooth and shall be free from defects and excessive flashing at parting lines.

7.6 End fittings shall be free from cracks, seams, shrinks, air holes and rough edges. End fittings should be effectively sealed to prevent moisture ingress; effectiveness of sealing system must be supported by test documents. All surfaces of the metal parts shall be perfectly smooth without projecting points or irregularities, which may cause corona.

All load bearing surfaces shall be sooth and uniform so as to distribute the loading stresses uniformly.

7.7 All ferrous parts shall be hot dip galvanized to give a minimum average coating of zinc equivalent to 610 gm/sq.m. or 87 micron thickness and shall be in accordance with the requirement of IS:4759. the zinc used for galvanizing shall be of purity 99.5% as per IS:4699. The zinc coating shall be uniform, adherent, smooth, reasonably bright continuous and free from imperfections such as flux, ash rust stains, bulky white deposits and blisters. The galvanized metal parts shall be guaranteed to withstand at least four successive dips each lasting for one (1) minute duration under the standard preece test. The galvanizing shall be carried out only after any machining.

8.0 TESTS AND STANDARDS

Insulators offered shall be manufactured with the same configuration & raw materials as used in the insulators for which type test reports are submitted. The manufacturer shall submit a certificate for the same.

8.1 TYPE TESTS :

The type tests are intended to verify the main characteristics of a composite insulator. The type tests shall be applied to composite insulators, the class of which has passed the design tests.

The bidder shall submit type test reports as per IEC 61109 along with the bid. Additional type tests required if any shall be carried out by the manufacturer, after award of contract for which no additional charges shall be payable. In case, the tests have already been carried out, the manufacturer shall submit reports for the same.

8.1.1 Tests on the high voltage grade Silicone rubber material used in manufacture of the insulator housing and weather sheds:
The bidder shall furnish following type test reports conducted on High voltage Silicone rubber material used for Polymer housing confirming following properties along with their bid.

Sl. No	Property	Requirement	Standard
1	Tensile Strength (MPa)	3 Mpa min	ASTM D 412-06a
2	Elongation (%)	300%	ASTM D 412-06a
3	Inclined plane Tracking & Erosion resistance test	(4.5KV 360 min)	ASTM D2303
4	Volume Resistivity (Ohm – cm)	2.2 x 10^3	ASTM D257
5	Dielectric constant	4	ASTM D150
6	Dielectric Strength (kv/mm)	10 kV /mm min	ASTM D149
7	Density	1.5 min	ASTM D792
8	Hardness (shore A)	60 nominal	ASTM D 2240
19	Arc Resistance	> 220 Seconds	ASTM D 495-99
10	Silicone Content	Min 30%	BS: 2782-Pt10
11	Flammability	V-0	UL 94

8.2 ACCEPTANCE TESTS :

The test samples after having withstood the routine test shall be subject to the following acceptance tests in order indicated below:

(a)	Verification of dimensions	: Clause 7.2 IEC: 61109,
(b)	Verification of the locking system (if applicable)	: Clause 7.3 IEC: 61109,
(c)	Verification of tightness of the interface Between end fittings & Insulator	: Clause 7.4 IEC: 61109 amendment 1of 1995
(d)	Verification of the specified mechanical load & SCL	: Clause 7.4 IEC: 61109, amendment 1of 1995 / IS 731
(e)	Galvanizing test	: IS:2633/IS:6745

8.3 ROUTINE TESTS:

Sr. No.	Description	Standard
1	Identification of marking	As per IEC: 61109 Clause 8.1
2	Visual Inspection	As per IEC: 61109 Clause 8.2
3	Mechanical routine test	As per IEC: 61109 Clause 8.3

Every polymeric insulator shall withstand mechanical routine test at ambient temperature tensile load at RTL corresponding to at least 50 % of the SML for at least 10 sec.

8.4 TESTS DURING MANUFACTURE:

Following tests shall also be carried out on all components as applicable

(a)	Chemical analysis of zinc used for galvanizing
(b)	Chemical analysis, mechanical, metallographic test and magnetic particle
(c)	Chemical analysis, hardness tests and magnetic particle inspection for

8.5 SAMPLE TESTING :

8.5.1 Samples from offered inspection lot / production line shall be send to third party NABL accredited laboratory for checking the SML / SCL withstand capability.

9.0 QUALITY ASSURANCE PLAN :

9.1 The successful bidder shall submit following information along with the bid:

9.1.1 Test certificates of the raw materials and bought out accessories.

9.1.2 Statement giving list of important raw material, their grades along with names of sub- suppliers for raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of bidder's representative.

9.1.3 List of manufacturing facilities available.

9.1.4 Level of automation achieved and lists of areas where manual processing exists.

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

9.1.6 List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports.

9.1.7 The manufacturer shall submit Manufacturing Quality Assurance Plan (QAP) for approval & the same shall be followed during manufacture and testing.

9.2 The successful bidder shall submit the routine test certificates of bought out raw materials/accessories and central excise passes for raw material at the time of inspection.

9.3 The Owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where insulator, and its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the Supplier's and sub-Supplier's works, raw materials, manufacture of the material and for conducting necessary test as detailed herein.

9.4 The material for final inspection shall be offered by the Supplier only under packed condition. The owner shall select samples at random from the packed lot for carrying out acceptance tests. The lot offered for inspection shall be homogeneous and shall contain insulators manufactured in 3-4 consecutive weeks.

9.5 The Supplier shall keep the Owner informed in advance of the time of starting and the progress of manufacture of material in their various stages so that arrangements could be made for inspection.

9.6 No material shall be dispatched from its point of manufacture before it has been satisfactorily inspected and tested unless the owner in writing waives off the inspection. In the later case also the material shall be dispatched only after satisfactory testing specified herein has been completed.

9.7 The acceptance of any quantity of material shall in no way relieve the Supplier of his responsibility for meeting all the requirements of the specification and shall not prevent subsequent rejection, if such material are later found to be defective

10.0 TESTING FACILITIES :

The tenderer must clearly indicate what testing facilities are available in the works of the manufacturer and whether facilities are adequate to carry out all Routine & acceptance Tests. These facilities should be available to Engineers if deputed or carry out or witness the tests in the manufacturer works. If any test cannot be carried out at the manufacturer's work, the reasons should be clearly stated in the tender. The insulators shall be tested in accordance with the procedure detailed in IEC 61109 / 92-93 with latest amendments.

11.0. DRAWINGS :

11.1 The Bidder shall furnish full description and illustration of the material offered.

11.2 The Bidder shall furnish along with the bid the outline drawing (3 copies) of each insulator unit including a cross sectional view of the long rod insulator unit. The drawing shall include but

not be limited to the following information:

(a) Long rod diameter with manufacturing tolerances
(b) Minimum Creepage distance with positive tolerance
(c) Diameter of FRP Rod
(d) Unit mechanical and electrical characteristics
(e) Size and weight of ball and socket and Pin top and bottom.
(f) Weight of composite long rod units
(g) Materials
(h) Identification mark

11.3 After placement of award, the Supplier shall submit three sets of full dimensioned manufacturing insulator drawings containing all the details.

11.4 After placement of award the Supplier shall also submit fully dimensioned insulator crate drawing for different type of insulators for approval of the owner.

12.0 MARKINGS :

12.1 Each insulator shall be legibly and indelibly marked with the following details as per IEC- 61109:

a) Name or trademark of the manufacturer. b) Voltage & Type
c) Month and year of manufacturing.
d) Min. failing load/guaranteed mechanical strength in kilo Newton followed by the word 'KN' to facilitate easy identification.

13.0 PACKING :

13.1 All insulators shall be packed in strong corrugated box of min. 5 ply duly paletted or wooden crates. The gross weight of the crates along with the material shall not normally exceed 100 Kg to avoid hackling problem. The crates shall be suitable for outdoor storage under wet climate during rainy season.

13.2 The packing shall be of sufficient strength to withstand rough handling during transit, storage at site and subsequent handling in the field.

13.3 Suitable cushioning, protective padding, or Dunn age or spacers shall be provided to prevent damage or deformation during transit and handling.

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

13.5 The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

14.0 GUARANTEE

The Supplier of insulators shall guarantee overall satisfactory performance of the insulators. The tenderer shall furnish in the form attached (Schedule 'A') all the guaranteed technical particulars.

Guaranteed Technical Particulars of 33 kV Disc Insulator

Sr. No.	Description	Unit	Min. requirement	Offered
1.	Type of Insulator		Polymeric Disc Insulator	
2.	Standard according to which the insulators manufactured and tested		IEC 61109	
3.	Material of Housing and Weather Sheds		High voltage grade Silicone rubber	
(a)	Material of core(FRP rod)		ECR BORRON FREE	
(b)	Material of end fittings		SGI Cast/Forged steel	
(c)	Sealing compound for end fittings		Silicone sealent	
4.	Colour of housing		Grey	
5.	Electrical characteristics			
(a)	Nominal system voltage		33 KV	
(b)	Highest system voltage		36 KV	
(c)	Wet Power frequency withstand voltage		110 KV	
(d)	Dry lighting impulse withstand voltage		235 kV	
(e)	Visible Discharge Test Voltage		27	
(f)	Creepage distance (Min.)		900 MM	
(g)	Inclined Plane Tracking and Erosion Resistance of Housing		4.5 kV for 360 minutes	
6. (a)	Mechanical characteristics : SML (kN)		90 KN	
7.	Dimensions of insulator			
(i)	Weight	Kg.		
(ii)	Dia of FRP rod	mm	16mm (min) for Disc Insulator	
(iii)	Length of FRP rod	mm		
(iv)	Dia of weathersheds	mm		
(v)	Thickness of housing	mm	3mm (min)	
(vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.	mm		
8.	Method of fixing of sheds to housing (specify). Single mould or Modular construction (injection moulding)		Injection Moulding	
9.	No of weathersheds			
10.	Type of sheds			
i)	Aerodynamic		Aerodynamic	
11.	Packing details			
(a)	Type of packing		Corrugated Box	
(b)	No. of insulators in each pack			

(c)	Gross weight of package.			
12.	Any other particulars which the bidder may like to give.			

Guaranteed Technical Particulars of 33 kV Pin Insulator

Sr. No.	Description	Unit	Min. requirement	Offered
1.	Type of Insulator		Polymeric Pin Insulator	
2.	Standard according to which the insulators manufactured and tested.		IS 731 & IEC 61109	
3.	Material of Housing and weather Sheds		high voltage grade Silicone rubber	
(a)	Material of core (FRP rod)		ECR BORRON FREE	
(b)	Material of end fittings		SGI Cast/Forged steel	
(c)	Sealing compound for end fittings		Silicone Sealent	
4.	Colour of housing		Grey	
5.	Electrical characteristics			
(a)	Nominal system voltage		33 KV	
(b)	Highest system voltage		36 KV	
(c)	Wet Power frequency withstand voltage		105 KV	
(d)	Dry lighting impulse withstand voltage		215 kV	
(e)	Visible Discharge Test Voltage		27	
(f)	Creepage distance (Min.)		900 MM	
(g)	Inclined plane Tracking and Erosion Resistance of Housing		4.5 kV for 360 minutes	
(h)	FRP rod leakage Current at 175 V/mm		< 0.05 mA	
6. (a)	Mechanical characteristics : SCL (kN)		10 KN for 33kv)	
7.	Dimensions of insulator			
(i)	Weight	Kg.		
(ii)	Dia of FRP rod	mm	33kV- 33.5mm	
(iii)	Length of FRP rod	Mm		
(iv)	Dia of weathersheds	mm		
(v)	Thickness of housing	mm	3mm (min)	
(vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.	mm		

8.	Method of fixing of sheds to housing (specify). Single mould or Modular construction (injection moulding)		Injection moulding	
9.	No of weathersheds			
10.	Type of sheds			
i)	Aerodynamic		Aerodynamic	
11.	Packing details			
(a)	Type of packing		Corrugated Box	
(b)	No. of insulators in each pack			
(c)	Gross weight of package.			
12.	Any other particulars which the bidder may like to give.			

SECTION – 9
Surge Arresters

Section 9A - 10kV 5kA Surge Arrester Distribution Class

1. GENERAL

This specification covers the design, manufacture, assembly, testing at manufacturer's works, packing and delivery of Metal Oxide (gapless) Surge arresters with ***Silicone Rubber housing***.

The surge arresters shall conform in general to IEC-60099-4 and IS: 3070 part-3

Arresters shall be completely molded units with ***absolutely no air volume inside***, suitable for mounting on bracket. ***Arresters of tubular construction i.e arresters assembled in hollow core insulators with enclosed gas volume are not acceptable*** due to abrupt short circuit performance and poor sealing mechanism.

Surge arresters must be type tested as per relevant IEC at international accredited laboratory.

The Test sequence should include all material and design test applicable for polymeric housed surge arrester including Short Circuit Test, 1000 hrs Weather Aging Test, Tracking & erosion resistance test etc.

Offer received without submission of valid type test reports shall be ignored.

2. DUTY REQUIREMENTS

The surge arresters shall be capable of discharging over voltages occurring due to switching on unloaded transformer, reactors and long lines. **The arrester should have minimum line discharge current withstand capability of 200A, 1000 micro sec.**

The surge arrester shall be fully stabilized thermally, operating duty & TOV tests should be done with equivalent thermal model of surge arrester.

The surge arresters shall protect transformers, circuit breakers, disconnecting switches, instrument transformers, shunt reactors etc with insulation level specified in the specifications.

The surge arresters shall be capable of withstanding meteorological and short circuit forces under site conditions.

The surge arrester should have short circuit rating of 20kA & 600A as per requirement of IEC 60099-4.

3. CONSTRUCTIONAL FEATURES

Polymer housing shall be free from lamination cavities or other flaws affecting the mechanical and electrical strengths. ***Properties of the polymeric materials shall be specified in the offer and test reports for the same from a reputed Indian laboratory shall be submitted for approval of purchaser.***

Polymeric housing shall be made of Silicone Rubber with min 30% silicone content

The rain sheds / petticoats shall be of ***polymeric material and shall confirm to the properties and test reports submitted. The petticoats shall not be pre-molded push on type in view of weak interface between the housing and assembled disc.***

Each surge arrester shall be sealed single phase unit. The surge arrester shall not have any air volume enclosed within.

The non linear blocks shall be sintered metal oxide material. The surge arrester shall be robust with excellent mechanical and electrical properties.

Surge arresters shall be of cage type construction with no gas volume to ensure that the arrester does not explode during the short circuit test condition. The MOV blocks should be housed in cage of FRP rods appropriately crimped at both end fittings. The housing should be directly molded on stack of MOV blocks without any intermediate interface.

The surge arrester shall not fail due to housing contamination. ***TERT (Tracking & Erosion resistance test) Test shall be carried out on the material used for housing as per ASTM D 2303 and test report shall be submitted.***

Housing shall be so coordinated that external flashover will not occur due to application of any impulse or switching surge voltage up to maximum design value of surge arrester. The polymer housing should comply with the requirement of IEC 60815-3

The end fittings shall be non magnetic and of corrosion proof material.

The end fittings used in polymer arrester shall be made out of aluminum through machining process/pressure die-casting process. Sand casted and gravity casted end fittings are not acceptable due to poor microstructure and porosity issues.

MOV blocks shall have full metallization to have full face contact and to reduce contact resistance between adjacent discs. MOV blocks should be 100% tested for 200A, 1000 micro second LD.

MOV blocks shall have lead free insulating collar and The insulation thickness must be consistent and of sufficient thickness to pass the 65kA, 4/10µs test.

MOV blocks shall be tested 100% at source and as a confirmation should have the following values printed on Aluminium sprayed surface

a. ***Batch No.***
b. ***AC reference voltage measured at reference current***
c. ***Residual voltage measured at nominal discharge current***

The manufacturer shall furnish the following for MOV discs:

The batch test reports with necessary quality checks used for individual blocks along with insulation layer formed across each block.

Details of ageing test carried out on individual batch.

Detailed tests carried out on individual disc during routine tests

Fittings and accessories

Surge arresters should be supplied with suitable mounting bracket made of SMC material.

4. TESTS

Surge arrester shall conform to all type tests as per IEC and shall be subjected to routine and acceptance tests in accordance with IEC-99-4.

The resistive current drawn by the arrester at rated voltage shall be indicated in the routine test report.

The tenderer shall furnish detailed type test reports of the offered Surge Arrester

All Type Tests shall be carried out at reputed and accredited laboratories to prove that Surge Arresters offered meet the requirements of the specification.

There should be no change in the design of type tested Surge Arrester and those offered against this tender

The surge arrester should be short circuit tested for 20kA & 600A as per requirement of IEC 60099-4. The Surge Arrester Offered should have same dimension as used for short circuit test.

The purchaser reserves the right to demand repetition of some or all the Type Tests in presence of purchaser's representative at purchaser's cost. For this purpose, the tenderer shall quote unit rates for carrying out each Type Test. However, such unit rates will not be considered for evaluation of the offer. In case the unit fails in the type tests, the complete supply shall be rejected.

List of type test Reports to be submitted along with offer

1) Residual Voltage test
2) Long duration discharge test 200A, 1000 micro sec

3) Operating duty test
4) Insulation withstand test
5) Power frequency voltage vs time characteristic
6) High current short circuit test 16kA
7) Low current short circuit test 600A
8) Accelerated aging test 1000 hrs
9) Weather aging test on full arrester 1000 hrs
10) Bending Moment
11) Partial discharge test

5. Drawings and Documentation

All dimensions and data shall be in System International Units.

The tenderer shall furnish one sets of following drawings along with this offer:

General outline drawings of the complete Arrester with technical parameters.

Drawing showing clearance from grounded and other live objects and between adjacent poles of Surge arresters.

Mounting details, installation and commissioning instructions of Surge arresters. Details of line terminal and ground terminals.

The offered surge arrester should meet or exceed the technical particulars given below

General

System neutral earthing	Effectively earthed
Installation	Outdoor
Nominal discharge current	5kA of 8/20microsecond wave
Rated frequency	50Hz
Long duration discharge class	Distribution
Prospective symmetrical fault current	**20kA for 0.2 second**
Partial discharge at 1.05MCOV (continuous operating voltage)	not more than 10pico coulomb
Reference ambient temperature	50 degree Celsius

Guaranteed Technical Particulars

Sr. No	Particulars	Value
1	Rating (kVrms)	10
2	Continuous operating voltage (kVrms)	8
3	Installation	Outdoor
4	Class	Distribution class
5	Arrester construction	Polymeric cage design with FRP rod crimped at end fittings forming the cage
6	Nominal discharge current (kAp)	5
7	Long duration line discharge capability	
	Time (µs)	1000
	Current (A)	200
8	Rated frequency (Hz)	50
9	Reference current (mAp)	5
10	Reference voltage (min) (kVrms)	10
11	Max residual voltage at (8/20 µs impulse wave)	
	2.5KAp (kVp)	24.3
	5KAp (kVp)	26.1
	10 KAp (kVp)	28.5

12	Max steep current impulse residual at 5kAp (kVp)	27.2
13	Temporary overvoltage withstand capability for	
	1 sec (kVrms)	10.5
	10.0 sec (kVrms)	10
	100.0 sec (kVrms)	9.5
14	Lightning impulse voltage withstand capability (Dry) (kVp)	145
15	Power frequency voltage withstand capability (wet) (kVrms)	47
16	Max Partial discharge (μC)	< 10
17	High current impulse withstand capability (4/10μs impulse wave) (kAp)	65
18	Total Creepage distance (min) (mm)	370
19	Pull strength	2000 N (Min)
20	Cantilever strength	250NM (Min)
21	Torsion	50 Nm

Section 9B – 18kV & 30kV, 10kA Surge Arrester Class 1

1. GENERAL

This specification covers the design, manufacture, assembly, testing at manufacturer's works, packing and delivery of Metal Oxide (gapless) **Surge arresters (*polymer housed) along with Disconnector* and mounting bracket**

The surge arresters shall conform in general to IEC-60099-4 and IS: 3070 part-3

Arresters shall be completely molded units with ***absolutely no air volume inside***, The arresters should be suitable for bracket mounting. ***Arresters of tubular construction i.e arresters assembled in hollow core insulators with enclosed gas volume are not acceptable*** due to abrupt short circuit performance and poor sealing mechanism.

Surge arresters must be type tested as per relevant IEC at international accredited laboratory.

2. DUTY REQUIREMENTS

The surge arresters shall be capable of discharging over voltages occurring due to switching on unloaded transformer, reactors and long lines. **The surge arrester should be of line discharge class-1 with minimum energy handling capability of 2.5kJ/kV of Ur (Line discharge). The arrester should have minimum line discharge current withstand capability of 250A, 2000 micro sec.**

The reference current of surge arresters shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage. Values and calculations shall be furnished with offer.

The surge arrester shall be fully stabilized thermally to give a life expectancy of one hundred (100) years under site conditions and take care of effect of direct solar radiation.

The surge arrester shall be suitable for circuit breaker duty cycle in the given system.

The surge arresters shall protect transformers, circuit breakers, disconnecting switches, instrument transformers, shunt reactors etc with insulation level specified in the specifications.

The surge arresters shall be capable of withstanding meteorological and short circuit forces under site conditions.

The surge arrester should have short circuit rating of 21kA & 600A as per requirement of IEC 60099-4.

Surge arrester shall be capable of discharging energy equivalent to class 1 of IEC for a 33kV system on two successive operations followed immediately by 50Hz energisation with a sequential voltage profile as specified in TOV characteristics.

The Surge Arresters should be provided with Disconnector to isolate the arrester in the event of arrester failure. The Disconnector should be suitable for Class 1 duty of surge arrester. The 5kA disconnectors supplied for distribution class arresters are not acceptable.

The Surge Arrester should be suitable for bracket mounting. The Insulating bracket should be made of SMC material.

The Name plate should be able to withstand the outdoor conditions & UV radiations. The marking on Name plate should not get erase due to outdoor working conditions during life time of surge arrester.

3. CONSTRUCTIONAL FEATURES

Polymer housing shall be free from lamination cavities or other flaws affecting the mechanical and electrical strengths. ***Properties of the polymeric materials shall be specified in the offer and test reports for the same from a reputed Indian laboratory shall be submitted for approval of purchaser.***

The rain sheds / petticoats shall be of ***polymeric material and shall confirm to the properties and test reports submitted. The petticoats shall not be pre-molded push on type.***

Each surge arrester shall be sealed single phase unit. The surge arrester shall not have any air volume enclosed within.

The non linear blocks shall be sintered metal oxide material. The surge arrester shall be robust with excellent mechanical and electrical properties.

Surge arresters shall be of cage or wrap type construction with no gas volume to ensure that the arrester does not explode during the short circuit test condition.

The surge arrester shall not fail due to housing contamination. ***TERT (Tracking & Erosion resistance test) Test shall be carried out on the material used for housing as per ASTM D 2303 and test report shall be submitted.***

Housing shall be so coordinated that external flashover will not occur due to application of any impulse or switching surge voltage up to maximum design value of surge arrester. The polymer housing should comply with the requirement of IEC 60815-3

The end fittings shall be non magnetic and of corrosion proof material.

The end fittings used in polymer arrester shall be made out of aluminum through machining process/pressure die-casting process. Sand casted and gravity casted end fittings are not acceptable due to poor microstructure and porosity issues.

MOV blocks shall have full metallization to have full face contact and to reduce contact resistance between adjacent discs.

MOV blocks shall have lead free insulating collar and The insulation thickness must be consistent and of sufficient thickness to pass the 100kA, 4/10µs test.

MOV blocks shall be tested 100% at source and as a confirmation should have the following values printed on Aluminium sprayed surface

a. ***Batch No.***
b. ***AC reference voltage measured at reference current***
c. ***Residual voltage measured at nominal discharge current***
d. ***Power loss value measured at continuous operating voltage***

The manufacturer shall furnish the following for MOV discs:

The batch test reports with necessary quality checks used for individual blocks along with insulation layer formed across each block.

Details of ageing test carried out on individual batch.

Detailed tests carried out on individual disc during routine tests

Fittings and accessories

Surge arrester should be provided with terminal connection suitable for ACSR single Zebra. Disconnector suitable for Class-1 arrester and insulating bracket should be part of supply of surge arrester.

4. TESTS

Surge arrester shall conform to all type tests as per IEC and shall be subjected to routine and acceptance tests in accordance with IEC-99-4.

Following type tests shall be conducted on as per relevant standard.

1. Insulation withstand test.
2. Residual voltage test.
3. Bending test on arrester housing assembly.
4. Long duration current impulse withstand test.
5. Operating duty test.
6. Short circuit test

7. Partial discharge test.

8. TERT testing on offered housing material as per ASTM D2303

9. Ageing test on MOV Blocks

10. Power frequency voltage vs time characteristics.

11. Weather ageing test on polymer housed surge arrester.

12. Moisture ingress test

The resistive current drawn by the arrester at rated voltage shall be indicated in the routine test report.

The tenderer shall furnish detailed type test reports of the offered Surge Arrester.

All Type Tests shall be carried out at reputed and accredited laboratories to prove that Surge Arresters offered meet the requirements of the specification.

The purchaser reserves the right to demand repetition of some or all the Type Tests in presence of purchaser's representative at purchaser's cost. For this purpose, the tenderer shall quote unit rates for carrying out each Type Test. However, such unit rates will not be considered for evaluation of the offer. In case the unit fails in the type tests, the complete supply shall be rejected.

5. Drawings and Documentation

All dimensions and data shall be in System International Units.

The tenderer shall furnish one sets of following drawings along with this offer:

General outline drawings of the complete Arrester with technical parameters.

Drawing showing clearance from grounded and other live objects and between adjacent poles of Surge arresters.

Mounting details, installation and commissioning instructions of Surge arresters.

Details of line terminal and ground terminals.

The offered surge arrester should meet or exceed the technical particulars given below

General

System neutral earthing	Effectively earthed
Installation	Outdoor

Nominal discharge current	10kA of 8/20microsecond wave
Rated frequency	50Hz
Long duration discharge class	1
Prospective symmetrical fault current	**21kA for 0.2 second**
Partial discharge at 1.05MCOV	not more than 10pico coulomb
(continuous operating voltage)	
Reference ambient temperature	50 degree Celsius

Guaranteed Technical Particulars

Sr. No	**Technical Particulars**	**30kV**	18kV
1	Rated Voltage (kV) Ur	30	18
2	Continuous operating Voltage (kV) Uc	24	14.4
3	Nominal Discharge Current	10kA	10kA
4	Line Discharge Class	Class-1	Class-1
5	Energy absorption capability (kJ/kV of Ur)	2.5	2.5
6	Long duration current impulse withstand	250A, 2000 µSec	250A, 2000 µSec
7	High current impulse withstand 4/10 µSec	100kA	100kA
8	Rated short circuit current High Current	21kA	21kA
	Rated short circuit current Low Current	600A	600A
9	Lightning impulse current residual voltage 8/20 µSec		
	5kA	74.7 kVp	44.8
	10kA	79.5 kVp	47.7
	20kA	87.2 kVp	52.3
10	Steep current impulse residual voltage @ 10kA	83.6 kVp	50.2

	1/20 µSec		
11	Switching current impulse residual voltage		
	500A	63.3 kVp	38
12	Lightning impulse withstand capability of arrester housing 1.2/50 µSec	273 kVp	205
13	Power frequency withstand voltage of arrester housing (Dry/Wet)	122 kVp	75
14	Creepage distance (min)	925 mm	627
15	Cantilever strength	250 N-M	250 N-M
16	TOV Capability with prior energy (kV rms)		
	1 Sec	33.0	19.8
	10 Sec	30.9	18.6
	100 Sec	29.4	17.6

Details of 33kV Lines of 33/11kV Substations passing through Reserve Forest and requiring Covered Conductor						
Sl. No	**Name of Substation**	**Name of 33kV Feeder**	**Route Length (in Km)**	**Name of Reserve Forest**	**Name of forest Division**	**Approval Letter of Forest Division**
1	Ainlachat	Ulunda-Ainlachat	4.5	Chandli & Daltangar	DFO, Sonepur	Letter No-1987 Dt. 23.04.2019
2	Batagaon	Naktideul-Batagaon	4.5	Jharbeda - Hinjamura & Bhetiaberni - Batagaon	DFO, Rairakhol	Letter No- 88 & 95 both Dt. 13.01.2020
3	Bondega	Balisankara-Bondega	6.5	Kuraibanrai & Tilia	DFO, Sundargarh	Letter No-9168 & 9163 both Dt. 15.12.2018
4	Deulpadar	Sonepur-Deulpadar	4.5	Arjunpur	DFO, Sonepur	Letter No -4673 Dt.01.10.2019
5	Hemgir	Garjanbahal-Hemgir	5	Garjanbahal & Garjanpahad	DFO, Sundargarh	Letter No -7537 & 7522 both Dt. 03.11.2018
6	Jharibahal	Bamra-Jhariabahal	0.45	Banarai	DFO, Jharsuguda	Letter No -91 Dt. 28.03.2019
7	Rangiatikra	Kesaibahal-Rangiatikra	3.2	Niktimal – Parimunda	DFO, Bamra	Letter No -02 Dt. 11.01.2019

Details of 11kV Lines of 33/11kV Substations passing through Reserve Forest and requiring Covered Conductor						
Sl. No	**Name of Substation**	**Name of 11kV Feeder**	**Route Length (in Km)**	**Name of Reserve Forest**	**Name of forest Division**	**Approval Letter of Forest Division**
1	Ainlachat	Sulia Feeder	0.5	Chandli & Daltangar	DFO, Sonepur	Letter No-1987 Dt. 23.04.2019
2	Batagaon	Batagaon Feeder & Bhalugaria Feeder	5	Musakani & Sahebi	DFO, Rairakhol	Letter No- 102 Dt. 13.01.2020
3	Deulpadar	Lachipur Feeder	5	Barapahad	DFO, Sonepur	Letter No-4673 Dt.01.10.2019
4	Hemgir	Julumbahar Feeder	4.9	Garjanbahal & Garjanpahad	DFO, Sundargarh	Letter No-7537 & 7522 both Dt. 03.11.2018
5	Rangiatikra	Lachipur Feeder	3	Niktimal – Parimunda	DFO, Bamra	Letter No-01 Dt. 11.01.2019
6	Seledi	Kaintara & Basuni Feeder	5.88	Gadgadbahal	DFO, Sonepur	Letter No-1462 Dt. 28.03.2019