TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power and Odisha Government Joint Venture)

NIT No.: TPNODL/OT/2021-22/220 Dtd.09.03.2022

OPEN TENDER NOTIFICATION

FOR

SUPPLY OF VARIOUS SIZE OF CONTROL CABLE

Tender Enquiry No.: TPNODL / OT / 2021-22 / 220 Dtd.09.03.2022

Due Date for Tender Fee Submission: 03.04.2022 [15.00 Hrs.]

Due Date for Bid Submission: 07.04.2022 [15.00 Hrs.]

TP NORTHERN ODISHA DISTRIBUTION LIMITED

(A Tata Power and Odisha Government Joint Venture)

Contracts & Material Management Department

Corporate office: Januganj, Balasore, Odisha-756019

Procedure to Participate in Tender

TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power and Odisha Government Joint Venture)

NIT No.: TPNODL/OT/2021-22/220 Dtd.09.03.2022

Tender Enquiry No- TPNODL/OT/2021-22/220 Dtd.09.03.2022

Tender Enquiry No.	Work Description	Unit	Qty.	EMD (Rs.)	Tender Fee (Rs.)	Last Date and Time for payment of Tender Fee
TPNODL/ OT/2021-22/220 Dated. 09.03.22	Cable 1.1kV PVC CU 4C x 2.5 Sq. mm Arm	Mtr	1500	2 Lac	5,000	30.03.2022, 15:00 Hrs
	Cable 1.1kV PVC CU 2C x 2.5 Sq. mm Un-Arm	Mtr	1000			
	Cable 1.1kV PVC CU 1C x 185 Sq. mm Un-Arm	Mtr	2000			
	Cable 1.1kV PVC CU 1C x 95Sq. mm Un-Arm	Mtr	2000			
	Cable 1.1kV PVC CU 1C x 35 Sq. mm Un-Arm	Mtr	5000			
	Cable 1.1kV PVC CU 1C x 55 Sq. mm Un-Arm	Mtr	2000			
	Cable 1.1kV PVC CU 4C x 300 Sq. mm Arm	Mtr	500			
	Cable 1.1kV PVC CU 4C x 240 Sq. mm Arm	Mtr	1000			
	Cable 1.1kV PVC CU 4C x 185 Sq. mm Arm	Mtr	1500			
	Cable 1.1kV PVC CU 4C x 150 Sq. mm Arm	Mtr	1500			

EMD is exempted for MSMEs registered in the State of Odisha.

***** MSMEs registered in the State of Odisha shall pay tender fee of Rs. 1,000/- including GST.***

Business Associates falling in MSME category can avail the following benefits-

a. Tender Fees: To participate in the tender, MSMEs registered in the State of Odisha shall pay Rs.1,000/- including GST towards cost of tender paper.

b. Earnest Money Deposit (EMD): EMD shall be exempted for MSME registered in the State of Odisha. However, Bidder shall be barred to participate in the tendering process for a period of 2 years in case it backs out post award of the contract.

c. Qualification Requirement for Open Tenders: Qualification Requirement of Financial Turnover for MSME registered in the State of Odisha shall be reduced to 20% of the existing criteria. For past experience, instead of relying on the volumes / value of earlier Supplies / Projects, assessment of the Bidder shall be done on the basis of feedback from Customers. Past performance experience at Tata Power/ TPNODL and its Group Companies shall supersede feedback from other Customers.

d. Reservation for MSME: TPNODL reserve the rights to procure at least 20% of the total volume of the procurement from MSME registered in the State of Odisha (however, it shall not apply where goods/services are not available with the MSME), subject to matching L1 discovered prices and meeting technical specifications including quality requirements.

e. Performance Bank Guarantees: Performance Bank Guarantee for MSME registered in the State of Odisha shall be 25% of the value normally prescribed.

Please note that corresponding details mentioned in this document will supersede any other details mentioned anywhere else in the Tender Document.

Procedure to Participate in Tender.

Following steps to be done before "Last date and time for Payment of Tender Fee" as mentioned:

1. Any pre-bid query regarding the tender shall be sent through mail to umesh.sahoo@tpnodl.com with copy to vipin.Chauhan@tpnodl.com before last date and time for Pre-bid query submission in TPNODL Pre-bid query format.

2. The response to the queries will be provided in www.tpnodl.com against the corresponding tender. Following steps to be done before "Last date and time for Payment of Tender Fee" as mentioned above:

3. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letter head indicating:

a. Tender Enquiry number
b. Name of authorized person
c. Communication Address
d. Contact Number
e. E-mail id:
f. Details of submission of Tender Fee
g. GST Registration No.:
h. ANID No. (for Ariba), If available

4. Non-Refundable Tender Fee, as indicated in table above, to be submitted in the form of Direct Deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference/ Enquiry Number –

Beneficiary Name – TP Northern Odisha Distribution Limited
Bank Name – Union Bank of India
Branch Name – Balasore Branch
Account No – 500601010280332
IFSC Code – UBIN0550060

E-mail with necessary attachment to be sent to umesh.sahoo@tpnodl.com before last date and time for payment of Tender Fee.

Interested bidders to submit Tender Fee and Authorization Letter before Last date and time as indicated above, after which link from TPNODL E-Tender system (Ariba) will be shared for further communication and bid submission.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc will happen only through TPNODL E-Tender system (Ariba). User manual to guide the bidders to submit the bid through E-Tender system (Ariba) is also enclosed.

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidders who have done the above step to participate in the Tender.

Also it may be strictly noted that once date of “Last date and time for Payment of Tender Participation Fee” is lapsed no Bidder will be sent link from TPNODL E-Tender System (Ariba). Without this link vendor will not be able to participate in the tender. Any last moment request to participate in tender will not be entertained.

Any payment of Tender Fee / EMD by Bidder who have not done the prerequisite will not be refunded. Also all future corrigendum to the said tender will be informed on Tender section on website https://www.tpnodl.com

CONTENTS OF THE ENQUIRY

1.0 Event Information

1.1 Scope of work

Bids are invited against the Open Tenders through e-tender bidding process from interested Bidders for entering into a Purchase Order as per the details mentioned below:

Line Item no.	Description	Unit	Qty.	EMD Amount (Rs.)	Tender Fee (Rs.)
1	Cable 1.1kV PVC CU 4C x 2.5 Sq. mm Arm	Mtr	1500	2 Lacs	5,000
2	Cable 1.1kV PVC CU 2C x 2.5 Sq. mm Un-Arm	Mtr	1000		
3	Cable 1.1kV PVC CU 1C x 185 Sq. mm Un-Arm	Mtr	2000		
4	Cable 1.1kV PVC CU 1C x 95Sq. mm Un-Arm	Mtr	2000		
5	Cable 1.1kV PVC CU 1C x 35 Sq. mm Un-Arm	Mtr	5000		
6	Cable 1.1kV PVC CU 1C x 55 Sq. mm Un-Arm	Mtr	2000		
7	Cable 1.1kV PVC CU 4C x 300 Sq. mm Arm	Mtr	500		
8	Cable 1.1kV PVC CU 4C x 240 Sq. mm Arm	Mtr	1000		
9	Cable 1.1kV PVC CU 4C x 185 Sq. mm Arm	Mtr	1500		
10	Cable 1.1kV PVC CU 4C x 150 Sq. mm Arm	Mtr	1500		

1.2 Availability of Tender Documents

Please refer “Procedure to participate in the e-tender”.

1.3 Calendar of Events

(a)	Last Date of receipt of Tender Fee	03.04.2022 ; 15:00 Hrs
(c)	Last Date of receipt of pre-bid queries, if any	03.04.2022 up to 18:00 Hrs
(b)	Date & Time of Pre-Bid Meeting (If any)	Not applicable due to COVID- 19. Queries to be answered through e-mail / TPNODL Tender Website.
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	05.04.2022 up to 18:00 Hrs
(e)	Last date and time of receipt of Bids	07.04.2022 up to 15:00 Hrs
(f)	Date & Time of opening technical bids & EMD	07.04.2022 up to 15:30 Hrs
(g)	Date & Time of opening of Price of qualified bids	Will be notified to the successful bidders through our website / e-mail.

Note :- In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for TPNODL, the last date of submission of bids and date of opening of bids will be the following working day at appointed times.

1.4 Mandatory documents required along with the Bid

1.4.1 EMD of requisite value and validity

1.4.2 Tender Fee in case the tender is downloaded from website

1.4.3 Requisite Documents for compliance to Qualification Criteria mentioned in Clause 1.7.

1.4.4 Drawing, Type Test details along with a sample of each item as specified at Annexure I (as applicable).

1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.

1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.

1.4.7 Proper authorization letter / Power of Attorney to sign the tender on the behalf of bidder.

1.4.8 Copy of PAN, GST (In case any of these documents is not available with the bidder, same to be explicitly mentioned in the 'Schedule of Deviations')

Please note that in absence of any of the above documents, the bid submitted by a bidder shall be liable for rejection.

1.5 Deviation from Tender

Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the 'Annexure III - Schedule of Deviations' and same shall be submitted as a part of the Technical Bid.

1.6 Right of Acceptance/ Rejection

Bids are liable for rejection in absence of following documents: -

1.6.1 EMD of requisite value and validity

1.6.2 Tender fee of requisite value

1.6.3 Price Bid as per the Price Schedule mentioned in Annexure-I

1.6.4 Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document.

1.6.5 Filled in Schedule of Deviations as per Annexure III

1.6.6 Filled in Schedule of Commercial Specifications as per Annexure IV

1.6.7 Receipt of Bid within the due date and time

TPNODL reserves the right to accept / reject any or all the bids without assigning any reason thereof.

1.7 Qualification Criteria

1. The average annual turnover of the bidder shall be a minimum of Rs. 5.0 Cr. for last three financial years. Copy of audited Balance Sheet and P&L
2. The bidders must be a manufacturer of control cables and must possess valid Type test report carried out at independent NABL accredited lab with in last 5 Years.
3. The Bidder shall have supplied 50kM of similar size and higher rating of cables to any major utilities / SEB in last 5 years.
4. Out of which 10kM must be in successful operation for at least 2 years for which performance Certificate shall be furnished from minimum 2 reputed companies. In case the bidder has a previous association TPNODL / TPWODL / TPCODL / TPSODL / TPDDL / TPC-Mumbai for similar products and services, the performance feedback for that bidder by association TPNODL / TPWODL / TPCODL / TPSODL / TPDDL / TPC-Mumbai User Group shall only be considered irrespective of performance certificates issued by any third organization.
5. Bidder should not be blacklisted by any Govt. Organization / Utility. Bidder to give the self-certification for it.

Note:- The indenting bidder(s) shall furnish the documentary evidence pertaining to the above qualifying criteria or else their bid shall be rejected outright without any further correspondence.

1.8 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts. Bidders must agree to these rules prior to participating. In addition to other remedies available, TPNODL reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the General Condition of Contracts. A bidder who violates the market place rules or engages in behaviour that disrupts the fair execution of the marketplace, may result in restriction of a bidder

from further participation in the marketplace for a length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honour prices submitted to the marketplace
- Breach of terms as published in TENDER / NIT

1.9 BAs Confidentiality

All information contained in this tender is confidential and shall not be disclosed, published or advertised in any manner without written authorization from TPNODL. This includes all bidding information submitted to TPNODL. All tender documents remain the property of TPNODL and all BAs are required to return these documents to TPNODL upon request. BAs who do not honour these confidentiality provisions will be excluded from participating in future bidding events.

2.0 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on the overall all-inclusive lowest cost for the overall BOQ as calculated in Schedule of Items [Annexure I]. TPNODL reserves the right to split the order line item wise and / or quantity wise among more than one Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.
- **NOTE:** In case of a new bidder not registered, existing sites shall be visited by TPNODL officials for confirming overall performance of the BA. However, TPNODL reserves the right to carry out sites inspection and evaluation for any bidder prior to technical qualification. In case a bidder is found as Disqualified in the sites visit evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of TPNODL shall be final and binding on the bidder in this regard.

2.1 Price Variation Clause:

The prices shall remain firm during the entire contract period.

3.0 Submission of Bid Documents

3.1Bid Submission

Bidders are requested to submit their offer in line with this Tender document. TPNODL shall respond to the clarification raised by various bidders and the replies will be sent to all participating bidders through e-mail.

Bids shall be submitted in 3 (Three) parts:

FIRST PART: "EMD" of Rs. 2,00,000/- (Rupees Two Lacs only) shall be submitted. The EMD shall be valid for 210 days from the due date of bid submission in the form of BG/ Bankers Pay Order favoring 'TP NORTHERN ODISHA DISTRIBUTION LIMITED", payable at Balasore only. The EMD has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted and the bid as submitted shall be liable for rejection.

The EMD in the form of BG shall be submitted in original hard copy and then placed in sealed envelope which shall be clearly marked as below:

EMD

"Supply of various size of Control cable"

NIT No. TPNODL / OT / 2021-22 / 220 Dtd.09.03.2022

The envelope shall be addressed to:

TP NORTHERN ODISHA DISTRIBUTION LIMITED

(A Tata Power and Odisha Government Joint Venture)

1st Floor NOCCi Business Park, Bamapada, Balasore- 756056, Odisha

Kind Attn.: Umesh Prasad Sahoo, AM (C&MM), Mob No.: 9438906445

The envelope shall also bear the Name and Address of the Bidder along with our Tender No. and subject.

EMD May also be submitted through NEFT / RTGS as per Bank details provided below with proper furnishing of submission details

A separate non-refundable tender fee of stipulated amount also needs to be transferred online through NEFT/ RTGS in case the tender document is downloaded from our website.

TPNODL Bank Details for transferring Tender Fee and EMD is as below:

Beneficiary Name – TP Northern Odisha Distribution Limited
Bank Name – Union Bank of India
Branch Name – Balasore Branch
Account No – 500601010280332
IFSC Code – UBIN0550060

SECOND PART: "TECHNICAL BID" shall contain the following documents:

a) Documentary evidence in support of qualifying criteria

b) Technical literature / GTP / Type test report etc. *(if applicable)*

c) Qualified manpower available *(if applicable)*

d) Testing facilities *(if applicable)*

e) No Deviation Certificate as per the Annexure III – Schedule of Deviations

f) Acceptance to Commercial Terms and Conditions viz Delivery schedule/period, payment terms etc. as per the Annexure IV – Schedule of Commercial Specifications.

g) Quality Assurance Plan/Inspection Test Plan for supply items *(if applicable)*

h) Acceptance of Annexure for Scope of work and Service level agreement.

The technical bid shall be properly indexed and is to be submitted through TPNODL E-tender platform (Ariba) only. Hard copy of Technical Bids need not be submitted.

THIRD PART: "PRICE BID" shall contain only the price details and strictly in format as mentioned in Annexure I along with explicit break up of basic prices, Taxes & duties, Freight etc. In case any discrepancy is observed between the item description stated in Schedule of Items mentioned in the tender and the price bid submitted by the bidder, the item description as mentioned in the tender document (to the extent modified through Corrigendum issued if any) shall prevail. Price Bid is to be submitted in soft copy through TPNODL E-Tendering system (Ariba) only. Hard copy of Price Bid not be submitted.

SIGNING OF BID DOCUMENTS:

The bid must contain the name, residence and place of business of the person or persons making the bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.

The Bid being submitted must be signed by a person holding a Power of Attorney authorizing him to do so, certified copies of which shall be enclosed.

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory

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

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

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

3.2 Contact Information

All the bidders are requested to send their pre-bid queries (if any) against this tender through e-mail within the stipulated timelines. The consolidated reply to all the queries received shall be posted on TPNODL website by the stipulated timelines as detailed in calendar of events.

Communication Details:

Package Owner - Contracts

Name: **Mr. Umesh Prasad Sahoo**

Contact No.:9438906445

E-Mail ID: umesh.sahoo@tpnodl.com

HOD- Contracts

Name: **Mr. Vipin Chauhan**

Contact No: 9717393121

E-Mail ID: vipin.Chauhan@tpnodl.com

Bidders are strictly advised to pay Tender Participation Fee to receive the Ariba log-in.

3.3 Bid Prices

Bidders shall quote for the entire Scope of Supply/ work with a break up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit rate for each item & total price with taxes, duties & freight up to destination at various sites of TPNODL. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply / work, breakup of price constituents.

The quantity break up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any

items not indicated in the price schedule but which are required to complete the job as per the Technical Specifications/ Scope of Work/ SLA mentioned in the tender, shall be deemed to be included in prices quoted.

Applicable GST to be specified clearly.

The quantity break up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any items not indicated in the price schedule but which are required to complete the job as per the Technical Specifications/ Scope of Work/ SLA mentioned in the tender, shall be deemed to be included in prices quoted.

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only.

3.5 Period of Validity of Bids

Bids shall remain valid for 180 days from the due date of submission of the bid.

Not withstanding clause above, the TPNODL may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

3.6 Alternative Bids

Bidders shall submit Bids, which comply with the Bidding documents. Alternative bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

3.7 Modifications and Withdrawal of Bids

The bidder is not allowed to modify or withdraw its bid after the Bid's submission. The EMD as submitted along with the bid shall be liable for forfeiture in such event.

3.8 Earnest Money Deposit (EMD)

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect the TPNODL against the risk of bidder's conduct which would warrant forfeiture.

The EMD shall be denominate in any of the following form:

- Banker's Cheque/ Demand Draft/ Pay order drawn in favour of "TP Northern Odisha Distribution Limited", payable at Balasore only
- Online transfer of requisite amount through NEFT/ RTGS.
- Bank Guarantee valid for 210 days after due date of submission.

The EMD shall be forfeited in case of:

a) The bidder withdraws its bid during the period of specified bid validity.

Or

b) The case of a successful bidder, if the Bidder does not
i) accept the purchase order, or
ii) furnish the required performance security BG

3.9 Type Tests (if applicable)

The type tests specified in TPNODL specifications should have been carried out within five years prior to the date of opening of technical bids and test reports are to be submitted along with the bids. If type tests carried out are not within the five years prior to the date of bidding, the bidder will arrange to carry out type tests specified, at his cost. The decision to accept/ reject such bids rests with TPNODL.

4.0 Bid Opening & Evaluation process

4.1 Process to be confidential

Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the TPNODL's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

4.2 Technical Bid Opening

Bids shall be opened as per the schedule mentioned in Calendar of Events. In case of limited tenders, the bids shall be opened internally by TPNODL. Owing to COVID Scenario, in case of Open Tenders also, the bids shall be opened internally by TPNODL. Technical bid must not contain any cost information whatsoever.

First the "EMD" will be checked. Bids without EMD/ cost of tender (if applicable) of required amount/ validity in prescribed format, shall be rejected.

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened, one by one. The salient particulars of the techno commercial bid will be read out at the sole discretion of TPNODL.

4.3 Preliminary Examination of Bids/ Responsiveness

TPNODL will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. TPNODL may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

Arithmetical errors will be rectified on the following basis: If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the Total Amount and the sum of the total price per item, the sum of the total price per item shall prevail and the Total Amount will be corrected.

Prior to the detailed evaluation, TPNODL will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

Bid determined as not substantially responsive will be rejected by the TPNODL and/or the TPNODL and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

4.4 Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, TPNODL may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the TPNODL specifications and attempt will be made to bring all bids on a common footing. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted owing to any clarifications sought by TPNODL. After all techno commercial issues are clarified, the date of price bid opening will be intimated to the technically accepted bidders and same shall also be notified at TPNODL website.

4.5 Price Bid Opening

Price bids will be opened at the stipulated date and time. The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of TPNODL without any further correspondence in this regard.

4.6 Reverse Auctions

TPNODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender and reserves the rights to conduct the manual negotiation with the BA who is declared L1 after Reverse Auction. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached as Annexure VI of this document. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form attached as Annexure VI as a token of acceptance for the same.

5.0 Award Decision

TPNODL will award the contract to the successful bidder whose bid has been determined to be the lowest-evaluated responsive bid as per the Evaluation Criterion mentioned at Clause 2.0. The Cost for the said calculation shall be taken as the all-inclusive cost quoted by bidder in Annexure I (Schedule of Items) subject to any corrections required in line with Clause 4.3 above. The decision to place award of contract order/LOI solely depends on TPNODL on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that TPNODL may deem relevant.

TPNODL reserves all the rights to award the contract to one or more bidders so as to meet the requirement or nullify the award decision without assigning any reason thereof.

In case any BAs is found unsatisfactory during the Contract period, the award will be cancelled and TPNODL reserves the right to award other BAs who are found fit.

6.0 Order of Preference/Contradiction:

In case of contradiction in any part of various documents in tender, following shall prevail in order of preference:

1. Schedule of Items (Annexure I)
2. Post Award Contract Administration (Clause 7.0)
3. Submission of Bid Documents (Clause 3.0)

4. Scope of Work and SLA (Annexure VII)
5. Technical Specifications (Annexure II)
6. Inspection Test Plan (Annexure VIII)
7. Acceptance Form for Participation in Reverse Auction (Annexure VI)
8. General Conditions of Contract (Annexure IX)

7.0 Post Award Contract Administration

8.1 Special Conditions of Contract

- After finalization of tender, PO shall be issued on successful bidder. Prices shall remain firm till validity of issued Purchase Order.
- Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 21 days of issuance of Purchase Order. PBG applicable shall 10% of Purchase Order Value. PBG submitted, shall be released after completion of applicable guarantee period plus one month.
- Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
- Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.
- Within 15 days of Purchase Order issuance by TPNODL, it is the responsibility of BA to get manufacturing clearance and CAT-A issued from TPNODL. In case BA does not get necessary approvals for issuance of CAT-A within mentioned / mutually agreed timelines, then TPNODL reserve the right to cancel issued Purchase order and also reserve the right to forfeit EMD / PBG.

- Delivery period shall be 90 days from date of receipt of Purchase Order.
- TPNODL shall short close the issued Purchase Order, in case of any quality issues.
- Any change in statutory taxes, duties and levies shall be borne by TPNODL.
- All other terms and conditions of TPNODL GCC- Supply shall be applicable.

8.2 Drawing Submission & Approval

- The relevant drawings and GTPs need to be submitted as per special condition of contract mentioned in point no. 8.1.

8.3 Delivery Terms

- The delivery of material shall be made as per special condition of contract mentioned in point 8.1.

8.4 Guarantee Period

- Guarantee Period of the supplied material shall be as per technical specification attached separately with this tender.

8.5 Payment Terms

The payment shall be released within 45 days from the date of submission of certified bills / invoices.

8.6 Climate Change:

Significant quantities of waste are generated during the execution of project and an integrated approach for effective handling, storage, transportation and disposal of the same shall be adopted. This would ensure the minimization of environmental and social impact in order to combat the climate change.

8.4 Ethics:

- TPNODL is an ethical organization and as a policy TPNODL lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.
- TPNODL work practices are governed by the Tata Code of Conduct which emphasizes on the following:
- We shall select our suppliers and service providers fairly and transparently.
- We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.

- Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
- We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
- We respect our obligations on the use of third party intellectual property and data.

Bidder is advised to refer GCC attached at Annexure IX for more information.

Any ethical concerns with respect to this tender can be reported to the following e-mail ID: ceooffice@tpnodl.com

9 Specification and standards:

NA

10 General Condition of Contract:

Any condition not mentioned above shall be applicable as per GCC for Service attached along with this tender at Annexure IX.

11 Safety:

Safety related requirements as mentioned in our safety Manual put in the Company's website which can be accessed by:

http:// www.tpnodl.com

All Associates shall strictly abide by the guidelines provided in the safety manual at all relevant stages during the contract period.

All jobs are this tender have to be executed strictly in compliance to the Safety terms and Conditions of TP Northern Odisha Distribution Limited. Please refer attached Safety terms and conditions, Annexure-X, for details. Violation of Safety norms will result in Penalty as mentioned in the above document.

ANNEXURE I
Schedule for Items

Sr. No.	Description	HSN Code	UoM	Qty	Unit Price (Rs.)	GST (Rs.)	Unit Price with GST (Rs.)	Amount (Rs.)
1	Cable 1.1kV PVC CU 4C x 2.5 Sq. mm Arm		Mtr	1500				
2	Cable 1.1kV PVC CU 2C x 2.5 Sq. mm Un-Arm		Mtr	1000				
3	Cable 1.1kV PVC CU 1C x 185 Sq. mm Un-Arm		Mtr	2000				
4	Cable 1.1kV PVC CU 1C x 95Sq. mm Un-Arm		Mtr	2000				
5	Cable 1.1kV PVC CU 1C x 35 Sq. mm Un-Arm		Mtr	5000				
6	Cable 1.1kV PVC CU 1C x 55 Sq. mm Un-Arm		Mtr	2000				
7	Cable 1.1kV PVC CU 4C x 300 Sq. mm Arm		Mtr	500				
8	Cable 1.1kV PVC CU 4C x 240 Sq. mm Arm		Mtr	1000				
9	Cable 1.1kV PVC CU 4C x 185 Sq. mm Arm		Mtr	1500				
10	Cable 1.1kV PVC CU 4C x 150 Sq. mm Arm		Mtr	1500				
TOTAL AMOUNT								

NOTE:

- All rates are to be quoted on delivered basis at TPNODL Sites / Store, Odisha, and should be inclusive of freight, insurance, loading & unloading, handling charges and any other charges which may be applicable.
- The quantity mentioned above is for evaluation purpose only and may vary during the execution.
- The unit price with GST in column no. 7, is landed price FOR TPNODL Odisha Locations. Exact delivery location shall be specified in the Release Order.
- The bidders are advised to quote prices strictly in the above format. Failing to do so, bids are liable for rejection.
- The bidder must fill each and every column of the above format. ***Mentioning "extra/inclusive" in any of the column may lead for rejection of the price bid.***
    - No cutting / overwriting in the prices is permissible.

ANNEXURE II

Technical Specifications attached separately with the tender.

ANNEXURE III

Schedule of Deviations

Bidders are advised to refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender document shall be set out by the Bidders, Clause by Clause in this schedule and submit the same as a part of the ***Technical Bid.***

Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the TPNODL's specifications:

S. No.	Clause No.	Tender Clause Details	Details of deviation with justifications

By signing this document we hereby withdraw all the deviations whatsoever taken anywhere in this bid document and comply to all the terms and conditions, technical specifications, scope of work etc. as mentioned in the standard document except those as mentioned above.

Seal of the Bidder:

Signature:

Name:

ANNEXURE IV

Schedule of Commercial Specifications

(The bidders shall mandatorily fill in this schedule and enclose it with the offer Part I: Technical Bid. In the absence of all these details, the offer may not be acceptable.)

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1c.	Inclusive of Excise Duty	Yes / No (If Yes, indicate % rate)
1d.	Sales tax applicable at concessional rate	Yes / No (If Yes, indicate % rate)
1e.	Octroi payable extra	Yes / No (If Yes, indicate % rate)
1f.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of technical bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Small Scale and Ancillary Industrial Undertaking Act 1992	Yes / No (If Yes, indicate, SSI Reg'n No.)

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

Bidder has to mandatorily fill in the checklist mentioned below:-

S. No.	Documents attached	Yes / No / Not Applicable
1	EMD of required value	
2	Tender Fee as mentioned in this RFQ	
3	Company profile/ organogram	
4	Signed copy of this RFQ as an unconditional acceptance	
5	Duly filled schedule of commercial specifications (Annexure IV)	
6	Sheet of commercial/ technical deviation if any (Annexure III)	
7	Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement	
8	Acknowledgement for Testing facilities if available (duly mentioned on bidder letter head)	
9	List of Machine/ tools with updated calibration certificates if applicable	
10	Details of order copy (duly mentioned on bidder letter head)	
11	Order copies as a proof of quantity executed	
12	Details of Type Tests if applicable (duly mentioned on bidder letter head)	
13	All the relevant Type test certificates as per relevant IS/ IEC (CPRI/ ERDA/ other certified agency) if applicable	
14	Project/ Supply Completion certificates	
15	Performance certificates	
16	Client Testimonial/ Performance Certificates	
17	Credit rating/ Solvency certificate	
18	Undertaking regarding non blacklisting (On company letter head)	
19	List of trained/ Untrained Manpower	

Annexure VI

Acceptance Form for Participation In Reverse Auction Event

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, TPNODL intends to use the reverse auctions as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. TPNODL shall provide the user id and password to the authorized representative of the bidder. *(Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).*
2. TPNODL will make every effort to make the bid process transparent. However, the award decision by TPNODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPNODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPNODL.
6. In case of intranet medium, TPNODL shall provide the infrastructure to bidders. Further, TPNODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out-rightly rejected by TPNODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPNODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPNODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

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1.0 ORGANIZATIONAL VALUES

The Tata Group has always been a value driven organization. These values continue to direct the Group's growth and businesses. The six core Tata Values underpinning the way we do business are:

Integrity - We must conduct our business fairly, with honesty and transparency. Everything we do must stand the test of public scrutiny.

Understanding - We must be caring, respectful, compassionate and humanitarian towards our colleagues and customers around the world and always work for the benefit of India.

Excellence - We must constantly strive to achieve the highest possible standards in our day to day work and in the quality of goods and services we provide.

Unity - We must work cohesively with our colleagues across the group and with our customers and partners around the world to build strong relationships based on tolerance, understanding and mutual co-operation.

Responsibility - We must continue to be responsible and sensitive to the countries, communities and environments in which we work, always ensuring that what comes from the people goes back to the people many times over.

Agility - We must work in a speedy and responsive manner and be proactive and innovative in our approach.

2.0 Tata Code of Conduct

The Business Associate and TPNODL shall be bound by the provisions/ clauses mentioned in Tata Code of Conduct (TCoC) in all their dealings with stakeholders. The Associate is advised to go through the TCoC document available as Annexure-J.

3.0 CONTRACT PARAMETERS

3.1 Issue/Award of Contract

TPNODL awards the contract to the Associate in writing in the form of Purchase Order (PO) or Rate Contract (RC), hereafter referred as Contract, through in any or all of following modes physical handover / post / e-mail / web document / fax with all the attachments/enclosures which shall be part of the contract document.

On receipt of the contract, the associate shall return to TPNODL copy of the contract document duly signed by legally authorized representative of associate, within two days of Effective Date of Contract for contracts having contract execution time less than 30 days and within five days for all other contracts.

Note- In case of RC though, further Release Orders (RO) shall be issued by TPNODL on RC rates and terms & Conditions as per the requirement of TPNODL.

3.2 Contract Commencement Date

The date of issue/award of contract shall be the Effective Date of Contract or Contract Commencement date.

3.3 Contract Completion Date

The date of expiry of Guarantee Period shall be deemed as the Contract Completion Date.

3.4 Contract Period/Time

The period from Contract Commencement Date to Contract Completion Date shall be deemed as the Contract Period/Time.

3.5 Contract Execution Completion Date

The stipulated date for completing the supply as per schedule of quantities shall be deemed as the Contract Execution Completion Date.

3.6 Contract Price /Value

The total all-inclusive price/value mentioned in the PO/RC is the Contract Price/Value and is based on the quantity, unit rates and prices quoted and awarded and shall be subject to adjustment based on actual quantities supplied and accepted and certified by the authorized representative of the company unless otherwise specified in schedule of quantities or in contract documents.

3.7 Contract Document

The Contract Document shall mean and include but not limited to the following:

- NIT/Tender Enquiry, QR, Instruction to Bidders, Special Condition of Contract (SCC) of tender, GCC, Technical & Commercial Specifications including relevant annexure and attachments).
- Bids & Proposals Received from Associate including relevant annexure/attachments.
- RC/PO with agreed deviations from the tender/bid documents.
- All the Inspection and Test reports, Detailed Engineering Drawings.
- Material Dispatch Clearance Certificate (MDCC).
- Minutes of Meeting (MoM)

3.8 Contract Language

All documents, instructions, catalogues, brochures, pamphlets, design data, norms and calculations, drawings, operation, maintenance and safety manuals, reports, labels, on deliveries and any other data shall be in English Language.

The Contract documents and all correspondence between the TPNODL, Third Parties associated with the contract, and the Associate shall be in English language.
However, all signboards required indicating "Danger" and/or security at site and otherwise statutory required shall be in English, Hindi, and local languages.

3.9 Reverse Auction

TPNODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached in Annexure F. The

bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form as mentioned in the Annexure J as a token of acceptance for the same.

4.0 SCOPE OF WORK

All the activities that are to be undertaken by the Associate to realize the contractual deliverables in completeness form Scope of Work. Following clauses list, but not limited to, major requirements of the scope of work.

The associate shall satisfy himself and undertake fully the technical/commercial requirements of items to be supplied as listed in the Schedule of Quantities together with the tests to be performed /test reports to be furnished before dispatch, arrangement of stage and final inspections during manufacturing as per terms and conditions of contract, technical parameters & delivery terms and conditions including transit insurance to be met in order to fully meet TPNODL's requirements.

Completeness: Any supplies and services which might have not been specifically mentioned in the Contract but are necessary for the scope mentioned in Special Terms & Conditions and/or completeness of the works at the highest possible level, including any royalties, license fees & compensation to be paid, whether incurred by the associates or by a third party for the work covered in the scope, regardless of when incurred, shall be supplied/provided by the associate without any extra cost and within the time schedule for efficient , smooth and satisfactory operation and maintenance of the works at the highest possible level under Indian conditions (but according to international standards for facility of this type), unless expressly excluded from the scope of supplies and services in this Contract.

TPNODL have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract by submitting a request in writing to the Associate. The Associate shall, within fifteen days of receipt of such request from the TPNODL, provide Purchaser with a reasonably detailed estimate of the cost of the change outlined in the request.

In the event, TPNODL requests a change, the Contract price and time shall be adjusted upwards or downwards, as the case may be and shall be mutually agreed to. The associate shall not be entitled to any extension of time unless such changes adversely affect the time schedule.

The Associate shall not proceed with the changes as requested till adjustment of contract price and time schedule where so applicable in terms of or otherwise directed by the TPNODL.

4.1 Bid Evaluation- Commercial & Technical

TPNODL reserves the right to evaluate the bid on below parameters as per the requirement:

Commercial Evaluation: The bid shall be evaluated on the basis of Qualifying Requirement parameters and other commercial parameters as mentioned in tender.

Technical Evaluation: The bid shall be evaluated on the parameters and not limited to Bidder Experience, Bidder Performance with other utility/company, internal performance feedback, Technical Specification, General Technical Parameters (GTP), Layout, Drawings etc.

TPNODL reserves the right to carry out Factory Evaluation of Manufacturer along with the Visit to executed Sites for further evaluation to ascertain bidder's manufacturing capability, quality procedures & Performance of executed works.

5.0 PRICES/RATES/TAXES

Unless specified elsewhere in the contract document, the prices/rates are inclusive of cost of finished product for which MDCC will be issued by TPNODL, packaging and forwarding charges, freight and transit insurance charges covering loading at Associate's works, transportation to TPNODL store/site & unloading & delivery at TPNODL stores/TPNODL site, cost of documentation including all the relevant test certificates and other supportive documents to be furnished.

The Prices/Rates are inclusive of all taxes, levies, cess and duties, particularly Goods and Services Tax as applicable. All government levy / taxes shall be paid only when the invoice is submitted according to the relevant act.

The prices/rates shall remain firm till actual completion of entire supply of goods/material/equipment as per contract is achieved and shall remain valid till the completion of the contract.

The prices shall remain unchanged irrespective of TPNODL making changes in quantum in all or any of the schedules of items of contract.

5.1 Changes in Statutory Tax Structure

If rate of any or all of the statutory taxes and duties applicable to the contract changes, such changes shall be incorporated by default if the changes occur within the contract execution time and shall be applicable if the contract is executed by the Associate within the Contract Execution Time.

For execution of contracts beyond contract execution time, where the delay is not attributable to TPNODL no upward revision in tax /duties shall be considered irrespective of changes in the statutory tax structure either within the contract execution time or beyond. However, in such cases, benefits due to any downward revisions in statutory tax rates shall be passed on to TPNODL.

6.0 TERMS OF PAYMENT

On delivery of the materials in good condition and certification of acceptance by TPNODL official, Associate shall submit the Bills/Invoices in original in the name of "TPNODL" to invoice desk, complete with all required documents as under:

- Test Reports (4 sets).
- MDCC issued by TPNODL.
- Packing List.
- Drawing and Catalogue.
- Guarantee/Warrantee Card.
- Delivery Challan.
- O&M Manual.
- Copy of Order.
- Minutes of Meeting.

- E-Way challan (if applicable)

Bills/ invoices shall mention Supplier's GST Number. TPNODL will make 100% payment within 45 days of submission of the Bill/Invoice complete in all respects and along with all the requisite documents mentioned above, subject to condition that Associate has furnished the requisite Security-cum-Performance Guarantee as stipulated in the contract.

6.1 Quantity Variation

Payment will be made on the basis of actual quantity of supplies/actual measurement of works accepted by TPNODL and not on the basis of contract quantity.

6.2 Full and Final Payment

Full & Final Payment in all contracts shall be made subject to the associate submitting "No Demand Certificate" in the format as per Annexure-C.

7.0 MODE OF PAYMENT

Payment shall be made through crossed RTGS/ NEFT/ Online Net banking mode whichever of the two modes chosen by the Associate, in favour of Associate's Bank Account on TPNODL records, on whose name Contract has been issued. Those Associates opting for the RTGS mode shall submit the details of Bank Account and other details as per annexure G. Further, for any payments made, TPNODL is not responsible for any consequences/disputes Associate have among the owners channel partners, sub-Associates and all such dispute/concerns shall be settled solely by the Associate.

8.0 SECURITY CUM PERFORMANCE DEPOSIT

Associates shall submit within 21 days from the effective date of issue of PO/RC, Security Performance Bank Guarantee (SPBG) in the format as per Annexure B of this document from banks acceptable to TPNODL for:

(a) 5% of the PO value if purchase order value is more than Rs 5 Crores.
(b) 10% of the PO value if purchase order value is less than Rs 5 Crores.
(c) 5% of the RC value in case of Rate Contract. This shall remain valid till the Guarantee period plus one month.

In case, PBG will not submitted by BA within 21 days post awarding the contract, TPNODL will reserve the right to take any appropriate action. However, in case of non-submission of PBG till the date of first bill submission, the amounts towards PBG shall be retained by TPNODL from Bills.

The validity of PBG shall be Guarantee Period of contract, plus one month.

- For PO/RC values less than Rs. 5 lacs, Associate may request for deduction of amount equivalent to SPBG value from their first invoice. Such amount shall be withheld by TPNODL while processing the invoice and shall be released after completion of Guarantee Period plus one month.
- For PO/RC values less than Rs. 3 lacs, the clause (8.0) for Security cum Performance Bank Guarantee (SPBG) shall not be applicable.

- In case of RC (Rate Contract) after the expiry of RC validity, Associate shall have to submit SPBG. However, the Associate has the option to re-submit the SPBG as per actual RO

  (Release Order) value issued against the RC, valid for Guarantee Period plus one month. The Guarantee Period shall be considered as per the last RO issued against the said RC. The original SPBG as submitted against the RC shall be released on submission of the new SPBG to TPNODL. Alternatively, Associate may extend the validity of original SPBG only till the requisite period, i.e. Guarantee Period plus one month.

9.0 STATUTORY COMPLIANCE

9.1 Compliance to Various Acts

Associate should ensure adherence to all applicable laws, rules and regulation applicable under this contract from time to time. In case of violation any risk, costs etc shall be in associates account and keep TDPPL indemnified always till completion of contracts.

9.2 SA 8000

As TPNODL/ Tata Power is SA 8000 compliant, it expects its Associates to follow guidelines of SA 8000:2014 on the following aspects

1. Child Labour
2. Forced or Compulsory Labour
3. Health & Safety
4. Freedom of Association & Right to Collective Bargaining
5. Discrimination
6. Disciplinary Practices
7. Working Hours
8. Remuneration
9. Management System

9.3 Affirmative Action

TPNODL appreciate and welcome the engagement/employment of persons from SC/ST community or any other deprived section of society by their business associates.

Relaxation in Contract Clauses under Affirmative Action for SC/ ST Business Associates**

TPNODL believes that inclusive growth is the key to sustainable development, and to promote the same Policy on Affirmative Action for Scheduled Caste & Scheduled Tribe Communities has been adopted across the company.

Under the same pre-text, and to promote entrepreneurship among SC/ST community TPNODL has taken initiative by proposing relaxations in contract clauses as per below:

S. No	Initiative	for SC/ ST BA's	Guideline Document
1	Tender Fees	100% waiver for SC/ST community	All Open Tenders

2	Earnest Money Deposit	50 % relaxation of estimated EMD value	All limited and Open Tenders
3	Performance Bank Guarantee	50% relaxation in PBG for order value above 50 lacs else 25% relaxation	All limited and Open tenders
4	Turnover	25% relaxation in company turnover under qualifying requirement criteria	All Open Tenders

****Classification of BAs under SC/ST shall be governed under following guidelines:**

- Proprietorship/ Single Ownership Firm: Proprietor of the firm should be from SC/ST community. Governing document shall be duly audited balance Sheet for the last FY bearing the name of proprietor.
- Partnership Firm: Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed and audited balance sheet/ ITR for last FY.
- Private limited company: Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Note: Certification from SC/ST commission shall be required for deciding upon SC/ST status of a person.

9.4 MSME Development ACT 2006

Provisions for Firms falling in The Micro, Small and Medium Enterprise Development Act 2006:-

- Business Associate is requested to inform the TPNODL if they fall under provisions of The Micro, Small and Medium Enterprises Development Act, 2006 legislation, and provide necessary documents to TPNODL. The Associate also needs to mention the relevant details on their invoice/ bill.
- Business Associate shall submit the self-undertaking of registration in MSME category at the time of bidding as well as on an annual basis to TPNODL, enabling them to avail the consequent benefits, failing which TPNODL may take appropriate action against such defaults.
- Business Associates falling in MSME category can avail the following benefits-

  a. **Tender Fees:** To participate in the tender, MSMEs registered in the State of Odisha shall pay Rs.1,000/- including GST towards cost of tender paper.

  b. **Earnest Money Deposit (EMD):** EMD shall be exempted for MSME registered in the State of Odisha. However, Bidder shall be barred to participate in the tendering process for a period of 2 years in case it backs out post award of the contract.

  c. **Qualification Requirement for Open Tenders:** Qualification Requirement of Financial Turnover for MSME registered in the State of Odisha shall be reduced to 20% of the existing criteria. For past experience, instead of relying on the volumes / value of earlier Supplies / Projects, assessment of the Bidder shall be done on the basis of feedback from Customers. Past performance experience at

Tata Power/ TPNODL and its Group Companies shall supersede feedback from other Customers.

d. **Reservation for MSME:** TPNODL reserve the rights to procure at least 20% of the total volume of the procurement from MSME registered in the State of Odisha (however, it shall not apply where goods/services are not available with the MSME), subject to matching L1 discovered prices and meeting technical specifications including quality requirements.

e. **Performance Bank Guarantees:** Performance Bank Guarantee for MSME registered in the State of Odisha shall be 25% of the value normally prescribed.

9.5 ISO 14001

The vendor to confirm whether their organization is ISO 14001 certified. If not, the Vendor must certify that the handling, use and disposal of their product/ by-products conform to practices consistent with sound environment management and local statues. The Vendor shall ensure that all the wastes are disposal in environmental friendly way with strict compliance to applicable laws including adherence to MoEF guidelines with respect to the disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc. which shall be disposed through MoEF approved parties only. The vendor shall also dispose off the e-waste generated at the end of the product life cycle at its own costs and risk as per the MoEF guidelines/ Orders

10.0 QUALITY

10.1 Knowledge of Requirements

The Associate shall be deemed to have carefully examined and to have knowledge of the equipment, the general and other conditions, specifications, schedules, drawings, etc. forming part of the Contract and also to have satisfied himself as to the nature and character of the work to be executed and the type of the equipment and duties required including wherever necessary of the site conditions and relevant matters and details. Any information thus procured or otherwise obtained from TPNODL/Consultants shall not in any way relieve the Associate from his responsibility and executing the works in accordance with the terms of contract.

10.2 Material/Equipment/Works Quality

The items / works under the scope of the Associate shall be of the best quality and workmanship according to the latest engineering practice and shall be manufactured from materials of best quality considering strength and durability for their best performance and, in any case, in accordance with the specifications set forth in this Contract. All material shall be new. Substitution of specified material or variation from the process of fabrication/ construction/ manufacture may be permitted but only with the prior written approval of the TPNODL.

10.3 Adherence to Rules & Regulations

The Associate shall procure and/or fabricate/erect all materials and equipment in accordance with all requirements of Central and State enactment, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Associate from complying with any requirement of TPNODL as enumerated in the Contract which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Technical

Specification from the laws, ordinance, rules and regulations governing the work, the Associate shall immediately notify the same to the TPNODL. It is the sole responsibility of the Associate, however, to determine that such variance exists. Wherever required by rules and regulations, the Associate shall also obtain the statutory authorities' approval for the plant, machinery and equipment to be supplied by the Associate.

10.4 Specifications and Standards

The Associate shall follow all codes and standards referred in the Contract Document. Codes and standards of other may be followed by the Associate with the prior written approval of TPNODL, provided materials, supplies and equipment according to the standard are equal to or better than the corresponding standards specified in the Contract.

Brand names mentioned in the Contract documents are for the purpose of establishing the type and quality of products to be used. The Associate shall not change the brand name and qualities of the bought out items without the prior written approval of the TPNODL. All such products and equipment shall be used or installed in strict accordance with original manufacturer's recommendations, unless otherwise directed by the TPNODL. In any circumstances the codes, specimen and standards prescribed by any government agency should not be violated.

11.0 INSPECTION/PARTICIPATION

11.1 Right to Carry Out Inspection

TPNODL reserves the right to send its representatives for inspection or participation at various stages of contract execution listed below, applicable as per contract construction.

- During basic design and detail engineering of material/ Equipment carried out by Associate /Outsourced Agencies.
- During manufacturing stages of the product at Associate's/Associate's Outsourced Agency's Plant/Facility.
- During Pre-dispatch Inspection and Testing of finished/manufactured product at Associate's/Associate's outsourced Agency's Plant/Facility.
- During Installation & Commissioning Activities/Stages.
- Prior to Clearing of the completed installation for commissioning.
- Any other stage as find appropriate by TPNODL during contract execution time.

All inspections and participations shall be carried out by TPNODL giving written intimation to the Associate or receiving appropriate advance written inspection call from the Associate, unless otherwise specified elsewhere in the contract document.

MDCC request shall be submitted by BA to TPNODL at least 7 days before inspection date.

11.2 Facilitating Inspection

The Associate shall provide all opportunities and information to TPNODL's engineers to get acquainted with the technical know-how and the methods and practices adopted by the Associate in basic and detail engineering. The Associate shall provide documents, drawings, calculations etc. as may be required by TPNODL's Engineers.

The Associate shall provide free of charge office accommodation, office facilities, secretarial services, communication facilities, general and drawing office stationary, etc. as may be

reasonably required by the TPNODL's engineers. Similarly, facilities shall also be provided by Associate's outsource agencies/partners/authorized dealers (collectively termed as sub associates) if such basic and detail engineering activities are carried out in the design offices of sub-Associates.

The Associate shall be responsible for the safety of employees of TPNODL/Third Party Agency when they are at the Associate's /Associate's outsource agency's plant or facility for carrying out/witnessing inspection/testing. All statutory safety precautions as applicable shall be followed by the Associate during Inspection Testing. If TPNODL inspectors are not satisfied with the safety arrangements at the plant, TPNODL have the right to call off inspection till such time corrective action is taken by the Associate.
Before raising the call for pre-dispatch final inspection and testing, the Associate shall conduct all the tests—type tests, routine tests etc-as specified in the contract document and submit copies of the test certificates to TPNODL along with the inspection call, for scrutiny of TPNODL.

The Associate and TPNODL shall jointly document all the observations, comments and action points after completion of inspection and it shall be binding on the Associate to provide compliance on all the points requiring compliance and furnish the compliance report to the designated authority of TPNODL for receiving clearance for dispatch of materials

11.3 Third Party Nomination

TPNODL also may nominate a third party for the purpose of carrying out the inspection and such an agency shall be entitled to all the rights and privileges of TPNODL as far as conducting the inspection.

11.4 Waiver of Inspections

TPNODL on its own discretion shall chose to waive off any inspection and ask the Associate to submit all the test reports as applicable as per contract specifications, related to inspection and testing of the goods ordered for scrutiny and clearance for dispatch.

11.5 Incorrect Inspection Call

In case it is observed that the material offered for inspection is not ready at the time of TPNODL inspection visit rendering it as futile, all costs towards such inspection shall be recovered from the BA. Taxes as applicable on such recoveries shall be borne by the BA.

12.0 MDCC & DELIVERY OF MATERIALS

12.1 Material Dispatch Clearance Certificate

Associate shall deliver material/goods/equipment against Supply Contracts or Supply Part of Composite/Service Contracts only after receiving Material Dispatch Clearance Certificate (hereafter termed as MDCC) issued by designated authority of TPNODL. Material delivered at TPNODL stores or at project site without a valid MDCC issued by the designated official of TPNODL shall be rejected. MDCC shall be issued to associate furnishing compliance report on the action points documented during pre-dispatch inspection and testing at Associate's/ Sub Associate's plant/ facility. In case Pre-dispatch inspection is waived at the discretion of TPNODL, then, MDCC shall be issued on receiving all the test reports-routine& type-from the Associate and finding them in order.

The associate shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling and transport by air, sea, rail and road or any other means.

All such packing shall allow to the extent possible for easy removal and checking at Site. The associate shall take special precautions to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be utilized by the associate for protection against moisture during transit of all Plant and Equipment.

Each Equipment or parts of Equipment shall be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the associate, item description, quantity, item / package identification.

All packing cases, containers, packing and other similar materials shall be new and supplied free by the associate and it shall not be required to be returned to the associate.
Notwithstanding anything stated in this clause, the associate shall be entirely responsible for loss, damage or depreciation or deterioration to the materials and supplies due to faulty and/or insecure packing or otherwise during transportation to the Site until otherwise provided herein.

In case of the consignments dispatched by road, the associate shall ensure that it or its subcontractors:

i) Identify and obtain the correct type of trucks/trailers, keeping in view the nature of consignments to be dispatched.

ii) Take such actions as may be necessary to avoid all possible chances of damages during transit and to ensure that all packages are firmly secured.

Timelines for inspection and MDCC is as below:

S. No.	Inspection	MDCC issuance time including Inspection time (max.)
1	Outside Odisha	12 days
2	Within Odisha	5 days
3	Waiver*	3 working days

* Associate is expected to raise the inspection call assuming that Inspection shall be carried out by TPNODL. The decision for waiver of inspection shall be on sole discretion of TPNODL.

12.2 Right to Rejection on Receipt

Goods/Material/Equipment delivered in condition physically damaged & incomplete as a product ordered, or not packed and transported as per the terms and conditions of the contract is liable to be rejected. Such item shall be lifted back by Associates within 15 days from receipt of rejection note from TPNODL and have to supply back the material within next 30 days or within the timeframe mutually decided by Associate and TPNODL.

If delivery of the material is beyond the agreed time, Liquidated damage clause, mentioned in this GCC separately shall be applicable; but the period for levy of LD shall be considered as per the original delivery schedule and not from the agreed timelines for material rectification.

12.3 Consignee

Unless otherwise specified in the Contract Document, Materials/Goods/Equipment shall be consigned to “Stores-In-Charge”, TPNODL, Balasore/ Jajpur/ others.

12.4 Submission of mandatory documents on Delivery

Following documents shall be mandatorily submitted by BA along with supply of material to TPNODL stores/site:

S. No.	Documents	Requisite
1	Invoice copy in original	With all consignments
2	LR copy	Wherever required
3	Packing list	With all consignments
4	MDCC	With all consignments
5	Purchase order / Release order	Signed copy
6	Test certificates	With all consignments
7	Inspection/JVR report	In case pre-dispatch inspection is conducted
8	Device data in CD as per template for metering items	Wherever applicable

12.5 Dispatch and Delivery Instructions

S. No.	Instructions
1	Purchase order/ Release order no. shall be mentioned on invoice and on material
2	TPNODL material code and material description shall be mentioned in invoice and on material.
3	“Property of TPNODL” shall be embossed on material.
4	The material shall be properly sealed and packed in standard packing as per purchase order terms & conditions.
5	The weight and quantity of material shall be mentioned wherever applicable
6	The material supplied shall be co-related with the packing list.
7	The name plate detail on equipment shall include Material code, Material description, specification detail of material [as applicable], Serial No. Year of manufacturing, PO/RO no. and date, “PROPERTY OF TPNODL”, Guarantee period and Associate’s name.
8	In case of manual unloading, supplier / transporter shall deploy sufficient Labour for unloading the material at TPNODL central store. For heavy item(s), crane shall be arrange by the BA. However, in case, BA is not able to arrange the Crane, then TPNODL reserve the rights to hire the crane from market/ within internal resources and all expenditure/ unloading shall be recovered from BA.
9	The driver should have valid License and one helper in truck. All the documents of truck like registration papers, PUC etc. should be available in Truck.
10	BA representative should accompany the material and get it unloaded / stacked in his presence wherever possible.

13.0 GUARANTEE

13.1 Guarantee of Performance

Associates shall stand guarantee that the equipment and material supplied under the contract is free from design, manufacturing, material, construction, erection & installation and workmanship & quality defects and is capable of its due, rated and intended quality

performance, as an integrated product delivered under the contract, for a specific period termed as Guarantee Period(as elaborated elsewhere in this clause). The Associate should also guarantee that the equipment/material is new and unused except for the usage required for the tests and checks required as part of quality assurance.

13.2 Guarantee Period

The Guarantee Period will be equipment/service/work specific and shall be as specified in the Standard Specifications of TPNODL for the equipment/material/service/work and where standard specifications are not part of contract documents or guarantee period is not specified in the standard specifications,, the guarantee period shall be as per the Special Terms and Conditions of the Contract. In case of no mention of the guarantee period in standard specifications or SCC Guarantee Period will be 12 Months from the Date of Commissioning or 24 months from the date of delivery of final lot of supplies made, whichever is earlier.

13.3 Failure in Guarantee Period (GP)

If the equipment and material supplied under the contract fails to perform its due, rated & intended quality performance, during the Guarantee period, the associate is liable to undertake repair/rectify/replace the equipment and material supplied within time frame specified in the SCC or elsewhere in the contract documents at associate's cost to make the equipment and material supplied/service or work rendered under the contract of performing its due, rated and intended quality performance. If Associate fails to repair/rectify/replace the equipment or material supplied rendered under the contract, failed in Guarantee Period, TPNODL will be at liberty to get the same done at Associate's risks and costs and recover all such expenses plus the TPNODL's own charges (@ 20% of expenses incurred), from the Associate or from the "Security cum Performance Deposit" as the case may be.

If during the Warranty/ Guarantee period some parts of the supplies are replaced owing to the defects/ damages under the Warranty, the Warranty period for such replaced parts shall be until the expiry of twelve months from the date of such replacement or renewal or until the end of original Guarantee period, whichever is later.

Any repairs during the Guarantee Period shall be carried out by the Associate within 30 days of reporting the issue to Associate by TPNODL. However, if replacement of the Equipment is required, Associate shall notify the same to TPNODL within 7 days of reporting the issue by TPNODL. Thereafter, the total time for supply of new equipment/ material shall be equal to the original delivery period of that equipment/ material as specified in the Contract. In case the Associate is not able to rectify/ replace the faulty equipment/ material within the stipulated timelines as mentioned above, penalty shall be levied as per the Liquidated Damages clause mentioned in this document. The penalty amount shall be recovered from the payment due to the vendor or by encashment of the SPBG as the case may be.

13.4 Cost of repairs on failure in GP

The cost of repairs/rectification/replacement, required transportation, site inspection /mobilization/dismantling and re-installation costs as applicable, to be borne by Associate. The Associate has to ensure that the interruption in the usage of intended purpose of the equipment is minimized to the maximum extent In lieu of the time taken for repairs/rectification/replacement.

13.5 Guarantee period for Goods Outsourced

If the Associate outsources partly equipment/materials/services from third party as mutually agreed upon at the pre award stage of contract, TPNODL shall have the benefit of any additional guarantee period if provided by the third party for the part supplied/executed by them.

13.6 Latent Defect

Hidden defects in manufacturing or design of the product supplied and which could not be identified by the tests conducted but later manifested during operation of the equipment are termed as latent defects. Associates shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company.

13.7 Support beyond the Guarantee Period

The Associate shall ensure availability of spares and necessary support for a period of atleast 10 years post completion of guarantee period of equipment supplied against the contract.

14.0 LIQUIDATED DAMAGES

a) For supplies which are of standalone use, multiple in quantities and having a single final delivery schedule, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPNODL, as described below:

   For delay of each week and part thereof from the delivery schedule specified in the contract, 1% of contract value corresponding to undelivered quantity, provided full quantity is supplied within 130% of the original contract time. If full contractual quantity is not delivered within 130% of contract time for delivery, TPNODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value.

b) For Supplies having phased delivery schedule as per contract terms, standalone use and multiple in quantities, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPNODL, as described below:

For the purpose of calculating and applying LD, each delivery lot shall be considered separately. For delay of each week and part thereof, from the delivery schedule specified for the lot, 1% of the contract value corresponding to the undelivered quantity of the lot subject to a maximum of 10% of the total contract value of the subject lot. However, if full contractual quantity is not delivered within 130% of contract time for delivery, TPNODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value. Deduction of LD shall be on landed cost i.e contract value inclusive of taxes and in pursuant statutory compliance GST would be applicable at the stipulated rate and the same shall be borne by Business Associate. In case of LD deduction, a GST invoice shall be issued by TPNODL as a proof of deduction/ recovery.

14.1 LD Waiver Request

Any request of LD waiver shall be submitted within thirty (30) days of deducting LD. Request submitted beyond the timeline shall not be entertained.

15.0 UNLAWFUL ACTIVITIES

The Associate shall have to ensure that none of its employees are engaged in any unlawful activities (whether covered under the scope of the present GCC or not) subversive of the

TPNODL's interest failing which appropriate action (legal or otherwise) may be taken against the Associate by the TPNODL, in accordance with the terms of the present GCC.

16.0 CONFIDENTIALITY

Associate and its employees or representatives thereof shall strictly maintain the confidentiality of various information they come across while executing the contract as detailed below.

16.1 Documents

All maps, plans, drawings, specifications, schemes and other documents or information related to the Contract/Project and the subject matter contained therein and all other information given to the Associate by the TPNODL in connection with the performance of the contract shall be held confidential by the Associate and shall remain the property of the TPNODL and shall not be used or disclosed to third parties by the Associate for any purpose other than for which they have been supplied or prepared. The Associate may disclose to third parties, upon execution of confidentiality agreements, such part of the drawings, specifications or information if such disclosure is necessary for the performance of the Work provided such third parties agree in writing to keep such information confidential to the same extent and degree as provided herein, for the benefit of the TPNODL.

16.2 Geographical Data

Maps, layouts and photographs of the unit/plant including its surrounding regions showing vital installation for national security of country or those of TPNODL shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the TPNODL and upon execution of confidentiality agreements satisfactory to the TPNODL with such third parties prior to disclosure.

16.3 Associate's Processes

Title to secret processes if any developed by the Associate on an exclusive basis and employed in the design of the equipment shall remain with the Associate. TPNODL shall hold in confidence such processes and shall not disclose such processes to the third parties without prior approval of the Associate and execution by such third parties of secrecy agreements satisfactory to the Associate prior to disclosure. Upon completion of contract, such processes shall become the property of the TPNODL. Title to technical specifications, drawings, flow sheets, norms, calculations, diagrams, interpretations of test results, schematics, layouts and such other information, which the Associate has supplied to the TPNODL under the Contract shall be passed on to the TPNODL. The TPNODL shall have the right to use these for construction, erection, start-up, Trial Run, operation, maintenance, modifications and/or expansion of the works including for the manufacture of spare parts.

16.4 Exclusions

The provision of Clauses 16.1 to 16.3 shall not apply to information:

- Which at the time of disclosure are in the public domain which later on become part of public domain through no fault of the party concerned, or
- Which were in the possession of the party concerned prior to disclosure to him by the other party, or
- Which were received by the party concerned after the time of disclosure without restriction on disclosure or use, from a third party who did not acquire such information

directly or indirectly from the other party or has no obligation of confidentiality for such information.

16.5 Violation

In case of violation of this clause, the Associate is liable to pay compensation and damages as may be determined by the competent authority of TPNODL.

17.0 INTELLECTUAL PROPERTY RIGHTS

If, in the course of performance of its functions and duties as envisaged by the scope of the present GCC, the Associate acquires or develops, any unique knowledge or information which would be covered, or, is likely to be covered within the definition of a trademark, copyright, patent, business secret, geographical indication or any other form of intellectual property right, it shall be obliged, under the terms of this present GCC, to share such knowledge or information with the TPNODL. All rights, with respect to, or arising from such intellectual property, as afore mentioned, shall solely vest in TPNODL.
Moreover, the Associate undertakes not to breach any intellectual property right vesting in a third party/parties, whether by breach of statutory provision, passing off, or otherwise. In the event of any such breach, the Associate shall be wholly liable to compensate, indemnify or make good any loss suffered by such third party/parties, or any compensation/damages arising from any legal proceeding/s, or otherwise. No liability of TPNODL shall arise in this respect, and any costs, damages, expenses, compensation payable by TPNODL in this regard to a third party/parties, arising from a legal proceeding/s or otherwise, shall be recoverable from the Associate.

18.0 INDEMNITY

The Associate shall at all times indemnify, keep indemnified and hold harmless the TPNODL and its officers, directors, employees, affiliates, agents, successors and assigns against all actions, claims, demands, costs, charges and expenses arising from or incurred by reason of any infringement of patent, trade mark, registered design, copy rights and/or industrial property rights by manufacture, sale or use of the equipment supplied by the Associate whether or not the TPNODL is held liable for by any court judgement. In this connection, the TPNODL shall pass on all claims made against him to the Associate for settlement.

The Associate assumes responsibility for and shall indemnify and save harmless the TPNODL from all liability, claims, costs, expenses, taxes and assessments including penalties, punitive damages, attorney's fees and court costs which are or may be required to be paid by the TPNODL and its officers, directors, employees, affiliates, agents, successors and assigns arising from any breach of the Associate's obligations under the Contract or for which the Associate has assumed responsibilities under the Contract including those imposed under any local or national law or laws, or in respect to all salaries, wages or other compensation for all persons employed by the Associate or his Sub-Associates or suppliers in connection with the performance of any work covered by the Contract. The Associate shall execute, deliver and shall cause his Sub-Associate and suppliers to execute and deliver, such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary there under to conform and effectuate the Contract and to protect the TPNODL.

The TPNODL shall not be held responsible for any accident or damages incurred or claims arising, due to the Associate's error there from prior to completion of work. The Associate shall be liable for such accidents and after completion of work for such accidents as the case may be

due to negligence on his part to carry out Work in accordance with Indian laws and regulations and the specifications set forth herein.

19.0 LIABILITY & LIMITATIONS

19.1 Liability

Except for any specific liability which may be identified in the Contract and which may be payable hereunder, Associate shall not be liable for any special, incidental, indirect, or consequential Damages or any loss of business Contracts, revenues or other financial loss (or equivalents thereof no matter how claimed, computed or characterized) arising out of or in connection with the Performance of the Work or supply of Goods ***unless caused by Associate's negligence, willful misconduct or breach of contract.***

If the Associate is a joint venture or consortium, all concerned parties shall be jointly and severally bound to the TPNODL for the fulfillment of the provisions of the Contract. The consortium or the joint venture shall designate one party as their leader, who will be the coordinator between the parties and TPNODL. The constituents & leader of the consortium or joint venture shall not be changed without the prior consent of TPNODL.

TPNODL shall have no liability or any special, incidental, indirect or consequential Damages for any loss of Business Contracts, revenues or other financial loss arising out of this Contract.

19.2 Limitation of Liability

The total liability of Associate against any contract shall be limited to the Total All Inclusive Contract Value.

20.0 FORCE MAJEURE

Force Majeure applies if the performance by either Party ("the Affected Party") of its obligations under Contract is materially and adversely affected.

"Force Majeure" shall mean any event or circumstance or combination of events or circumstances referred below and their consequences that wholly or partly prevents or unavoidably delays any Party in the performance of its obligations under this Agreement, but only and to the extent that such events and circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided even if the Affected Party had taken reasonable care:

- Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, embargo, blockade, revolution, riot, bombs, religious strife or civil commotion, etc. ▪ Politically motivated sabotage, or terrorism, etc.
- Action or Act of Government or Governmental agency for which remedy is beyond the control of the affected parties. ▪ Any act of God.

Note: Causes like power breakdown/ shortages/fire/strikes, accidents etc do not fall under Force Majeure.

Time being the essence of the Contract, if either party is prevented from the performance of its obligations in whole or in part due to an event of Force Majeure, then provided Notice of happening of any event by the Affected Party is given to the other party within seven (7) days from the date of occurrence of such event, which DIRECTLY has impact on works and submitted details and quantum of resulting effect, but at the same time had made all possible efforts to mitigate and overcome effects thereof, the Affected Party's performance under this

Contract shall be suspended until such event ceases and the Scheduled Completion shall be delayed accordingly.

If Force Majeure event(s) continue for a period of more than three months, the parties shall hold consultation to discuss the further course of action.

Neither party shall be considered to be in default or in breach of its obligation under the Contract to the extent that performance of such obligation by either party is prevented by any circumstances of Force Majeure which arise after effective date of Contract.

Neither party can claim any compensation from the other party on account of Force Majeure.

21.0 SUSPENSION OF CONTRACT

21.1 Suspension for Convenience

TPNODL may, at any time and at its sole option, suspend execution of all or any portions of the schedule of items of contract to be supplied/work to executed by Associate under the contract by providing to the Associate atleast two business days written notice for contracts having contract completion period less than sixty days and atleast seven business days' notice for all other contracts.

Upon receipt of any such notice, the Associate shall respond as follows as applicable as per contract construction.

- Immediately discontinue further supply of material/goods specified in the suspension notice for supply contracts
- Immediately discontinue further service/work and supply of materials of those services/materials/work specified in the suspension notice for service /composite contract
- Promptly make every reasonable effort to obtain suspension, upon terms satisfactory to TPNODL, of all orders, outsourcing arrangements, and rental Contracts to the extent that they relate to performance of the portion of Work suspended by the notice.
- Protect and maintain the portion of the service/Work already completed, including the portion of the Work suspended hereunder, unless otherwise specifically stated in the notice.
- Continue delivering/carrying out the supply/service/work items as per contract conditions, which do not fall under purview of the suspension notice.

On receipt of resumption notice from TPNODL, the Associate shall resume execution of contract as specified in the resumption notice, within the time frame specified in the resumption notice.

21.2 Suspension for Breach of Contract conditions.

TPNODL shall suspend execution of whole/or part thereof the contract till such time Associate complies with the conditions stipulated under section clause 22.1 for breach/default of contract conditions.

21.3 Compensation in lieu of Suspension

If the suspension of the contract in whole or in part is for convenience of TPNODL and not due to any breach of contract conditions by the associate, TPNODL at its discretion shall consider compensating all reasonable additional costs incurred by Associate in lieu of suspension of

whole or part of contract, on representation of the Associate providing justified estimates of such additional costs and such estimates are found acceptable and approved by competent authority of TPNODL.

If the suspension of contract in whole or part thereof is due to breach of contract conditions (refer clause 22.1) by the Associate, Associate shall not be entitled for any compensation for any cost incurred in lieu of suspension of whole or part of contract and also shall be liable for compensating all the losses arising to TPNODL in lieu of suspension of contract. Resumption notice shall be subject to the Associate taking corrective action for the breach of contract conditions within the time frame and as per the terms specified in the suspension notice.

22 TERMINATION OF CONTRACT

22.1 Termination for Default/Breach of Contract

The contract / PO /RC shall be subject to termination by TPNODL in case of breach of the contract by the Associate which shall include but not be limited to the following:

a. Withdrawal or intimation by the Associate of its intent to withdraw or surrender the execution / completion of the contracted work /PO or failure in ensuring adherence to any delivery schedules, in deviation of the contract/PO.

b. Refusal or neglect on the part of the Associate to supply material/equipment of quantity or quality as specified by TPNODL and within the timeframe as specified in the contract document or refusal or neglect to execute the services/work in terms of the agreed standards of quantity or quality and/or within the timeframe specified in the contract/PO.

c. Failure in any respect to perform any portion of the Work contracted with promptness, diligence, or in accordance with the terms of the contract.

d. Failure to furnish guarantees as specified and /or failure to comply with the terms thereof.

e. Failure to furnish such relevant documents or information within the time specified which may be necessary for due execution / completion of the works and documentation.

f. Liquidation, bankruptcy either voluntary or involuntary OR entering into any composition or compromise with its creditors, or Insolvency.

g. In case any reasonable information has been received by TPNODL that Associate has adopted/ or attempted to adopt any unethical conduct, action in award of the contract /PO or at any time thereafter.

h. Failure to comply with applicable statutory provisions as contained in the contract or failure to comply with the applicable laws.

i. Failure to comply with safety regulations/clauses stipulated in the contract or as may be generally instructed by TPNODL.

If the default or breach as specified under clause 22 (except sub clause g thereof) be committed by the associate for the first time, TPNODL shall issue, along the with notice of default or breach, a warning notice instructing the associate to take remedial/corrective action within the time frame stipulated in the warning notice and not to repeat the same in future. The timeframe for corrective action by the associate shall be specific to the nature of breach of contract and the same shall not be objected to by the Associate. If the Associate fails to comply with the instructions in the warning notice or in taking corrective action to the satisfaction of

TPNODL then TPNODL may terminate the entire or part of contract at its discretion by issuing termination notice without incurring any liability on this ground.

In case the contract is terminated for any breach of the nature specified in clause 22 g stated above, TPNODL shall have the right to terminate all the contracts TPNODL is having with the Associate by issuing termination notice which shall be without prejudice to the other rights of TPNODL available to it under law.
Without prejudice to its right to terminate for breach of contract, TPNODL may, without assigning any reason, terminate the Contract in whole or in part at any time at its discretion while the contract is in force by serving a written notice of two weeks to the Associate.

In the event of TPNODL having proceeded with termination of the contract the associate shall comply and proceed further in the following manner:

a) Associate shall discontinue the supply, on the expiry of the said period of two weeks.

b) Associate shall ensure that no further steps are being taken towards discharge of the obligations, terms and conditions as contained in the contract/PO. This shall include initiation of actions not limited to discontinuation of other allied and associated arrangements which the associate might have entered into with third parties for due discharge of its obligations under the contract with TPNODL.

c) The Associate shall perform thereafter such tasks as may be necessary to preserve and protect the terminated portion of the material/service/work in progress and the materials and equipment at TPNODL sites or in transit thereto. However the associate shall continue to fulfill its contractual obligations with regard to the part of contract not terminated.

d) It shall be open for TPNODL to conduct a joint assessment with the associate of the material, supplies, equipment ,works or in general as to the subject matter of the contract in regard to which the associate claims having completed its obligations before or during such termination.

e) It shall be open to TPNODL to seek invocation of the performance bank guarantee or any other guarantee or other security deposit by whatever name called submitted by the associate, which shall not be objected to or protested against by the associate.

In case of termination of the contract the parties agree to be governed inter alia by the following:

a) In case TPNODL exercises its right of termination as stated above the associate shall not dispute or object to the same.

b) The Associate shall be entitled to receive and claim only such payments OR sums of money from TPNODL as may be found payable to it in regard to works executed by it under the terms of the contract and no other claim of any nature whatsoever shall be made by the Associate.

c) All such provisions which the parties have agreed to survive and prevail even after termination of the contract shall remain effective despite the termination.

In the event of such termination, TPNODL may finish the Work by whatever method it may deem expedient, including the hiring of services and /or purchase of material equipment from such third parties as TPNODL may deem fit or may itself provide any labor or materials and

perform any part of the Work. The associate undertakes to bear the incremental costs if any paid by TPNODL in such a case attributable to failure on the part of the associate. The Associate in such a case shall not be entitled to receive any further payments and any sums found payable to it may be adjusted by TPNODL against the amount recoverable from him on this ground. The same shall be without prejudice to other rights available to TPNODL under law against the associate.

Upon the termination of any of the contract due to occurrence of any circumstances provided in clauses stated above and constituting repeated breach or misconduct , TPNODL shall be entitled to bar the associates its agents , affiliates from undertaking any negotiation / tendering, bidding , participation activities concerning TPNODL for a period of two years from date of such termination. The same shall be without prejudice to other rights available to TPNODL.

22.2 Termination for Convenience of Associate

Associate at its convenience may request for termination of contract, clearly assigning the reason for such request. TPNODL has full right to accept, reject or partially accept such request. However, associate shall continue its supply as per contract till final approval is given to associates for such termination.

22.3 Termination for Convenience of TPNODL

TPNODL at its sole discretion may terminate the contract by giving 30 days prior notice in writing or through email to the Associate. TPNODL shall pay the Associate for all the supplies/ services rendered till the actual date of contract termination against submission of invoice by the Associate to that effect.

23.0 DISPUTE RESOLUTION & ARBITRATION

In case of any dispute or difference the parties shall endeavour to resolve the same through conciliatory and amicable measures within 15 Days failing which the matter may be referred by either party for resolution by the sole arbitrator to be appointed mutually by both the parties. The arbitral proceedings shall be conducted in accordance with Arbitration and Conciliation Act 1996 and the place of arbitration shall be Bhubaneswar. The language to be used at proceedings shall be English and the award of the arbitrator shall be final and binding on the parties. The parties shall bear their respective costs of arbitration. The associate shall continue to discharge its obligations towards due performance of the works as per the terms of the contract during the arbitration proceedings unless otherwise directed in writing by TPNODL or suspended by the arbitrator. Further, TPNODL shall continue making such payments as may be found due and payable to the associate for such works.

23.1 Governing Laws and Jurisdiction

The parties shall be subject to the jurisdiction of the courts of law in Bhubaneswar and any matter arising here from shall be subject to applicable law in force in India.

24.0 ATTRIBUTES OF GCC

24.1 Cancellation

The Company reserves the right to cancel, add, delete at its sole discretion, all or any terms of this GCC or any contract, order or terms agreed between the parties in pursuance without assigning any reasons and without any compensation to the Associates.

24.2 Severability

If any portion of this GCC is held to be void, invalid, or otherwise unenforceable, in whole or part, the remaining portions of this GCC shall remain in effect.

24.3 Order of Priority

In case of any discrepancies between the stipulations in General Conditions of the Contract (GCC) and Special Conditions of Contract (SCC), the GCC shall stand superseded by the SCC to the extent stipulated hereinabove while balance portion of respective clauses of GCC shall continue to be applicable.

25.0 ERRORS AND OMISSIONS

The Associate shall be responsible for all discrepancies, errors and omissions in the drawings, documents or other information submitted by him, irrespective of whether these have been approved, reviewed or otherwise accepted by the TPNODL or not. However any error in design/drawing arising out of any incorrect data/written information from TPNODL will not be considered as error and omissions on part of the Associate.

26.0 TRANSFER OF TITLES

The title of ownership and property to all equipment, materials, drawings & documents shall pass to the TPNODL on acceptance of material by store/site after Inspection.

However, such passing of title of ownership and property to the TPNODL shall not in any way absolve, dilute or diminish the responsibility and obligations of the Associate under this Contract including loss or damages and all risks, which shall vest with the Associate.

27.0 INSURANCE

The Contractor shall take out the Insurance Policies which shall cover all risks including the following, as applicable:-

a) The value of the policy shall cover the total value of all the items till they are handed over to TPNODL.

b) TPNODL shall be the principal holder of the policy. The Associate shall be the loss payee under the policy. Associate / Sub-contractor of the Associate shall not be holders or beneficiaries in the policy nor shall they be named in the policy. TPNODL reserves the exclusive right to assign the policy.

c) While the payment of premium may be phased in agreement with the insurance company, at no time shall goods and services required to be provided by the associate shall remain uninsured in accordance with (a) above.

d) A copy of the Insurance policy shall be made available to TPNODL prior to first dispatch lot of any Equipment and policy shall be kept alive and valid at all times up to the stage of final acceptance.

e) TPNODL reserves the right to take out whatever policy that is deemed necessary by him if the associate fails to keep the said policy alive and valid at all times and/or causes lapses in payment of premium thereby jeopardizing the said policy. The cost of such policy(s) shall be recovered / deducted from the amount payable to the associate.

f) The policy shall ensure that the TPNODL's decision regarding replacement of goods damaged, lost or rendered unusable shall be final.

In all cases, the associate shall lodge the claims with the underwriters and also settle the claims and shall also notify TPNODL of any filed claims. However, the associate shall proceed with the repairs and/or replacement of the equipment/components without waiting for the settlement of the claims. In case of seizure of materials by concerned authorities, the associate shall arrange prompt release against bond, security or cash as required. TPNODL, upon request by the associate, will extend all reasonable assistance to the associate in such a case.

All the insurance claims shall be processed and settled by the associate and the missing/damaged items shall be replaced/repaired by them without any extra cost to TPNODL and without affecting the completion time.

28.0 SUGGESTIONS & FEEDBACK

We welcome all our Business Associates to write to us about their experience with TPNODL; be it our Company, our services or our people. Each and every concern, issue, query and suggestion from you will help us to become a better company to work with and shall help us develop a strong bonding of trust and a long term relationship with you.

You may send your feedback to HOD Contracts by filling up our Business Associate Feedback Form enclosed herewith as *Annexure-I.*

29.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, he may contact to HoD-Contracts and Finance.

30.0 LIST OF ANNEXURES

S. No.	Subject	Annexure
1.	Performa for Bid Security Bank Guarantee	A
2.	Performa for Performance Bank Guarantee (CP cum EP)	B
3.	Performa for No Demand Certificate by Associate	C
4.	Performa For Application For Issuance of Consolidated TDS Certificate	D
5.	Business Associate Feedback Form	E
6.	Acceptance Form For Participation In Reverse Auction Event	F
7.	Form for RTGS Payment	G
8.	Vendor Appraisal Form	H
9.	Manufacturer Authorization Form	I
10.	Tata Code of Conduct	I

ANNEXURE-A

Approved Copy of GCC (TPNODL)-Rev01

PROFORMA FOR BID SECURITY BANK GUARANTEE

TP Northern Odisha Distribution Limited
Balasore

WHEREAS, (Name of the Bidder) _____

(hereinafter called "the BIDDER") has submitted his bid dated_____ for the (Tender No. & Name of Contract) _____ (hereinafter called "the BID").

KNOW ALL men by these presents we (Name of the Bank) _____ of (Name of the Country) _____ having our registered office at_____(hereinafter called "the BANK) are bound unto TPNODL in the sum of _____ for which payment well and truly to be made to the TPNODL the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20_____.

The CONDITIONS of this obligation are**:**

i) If the Bidder withdraws his Bid during the period of bid validity specified in the Proforma of Bid or

ii) If the Bidder having been notified of the acceptance of his Bid by the TPNODL during the period of bid validity fails or refuses to furnish the Contract Performance Bank Guarantee, in accordance with the Instructions to Bidders.

We undertake to pay the TPNODL upto the above amount upon receipt of its first written demand, provided that in its demand the TPNODL will note that amount claimed by it is due to it owing to the occurrence of one or both conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force upto and including the date (No of days as mentioned in tender enquiry) days after the closing date of submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.

DATE …… SIGNATURE OF THE BANK ……..
WITNESS …… SEAL ……..
(Signature, Name & Address) (At least 2 witnesses)

ANNEXURE- B

PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)

(On Rs.100/- Stamp Paper) Note:

a) Format shall be followed in toto
b) Claim period of six months must be kept up

c) The guarantee to be accompanied by the covering letter from the bank confirming the signature to the guarantee

---

TP Northern Odisha Distribution Ltd.

Balasore

CP cum EP BG No…….

Order/Contract No……dated……

1. You have entered into a Contract No _____ with M/s._____ (hereinafter referred to as "the Vendor") for the supply cum erection / civil work of _____ (hereinafter referred to as" the said Equipment") for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of the said contract, "the Vendor" agreed to furnish you with an irrevocable, unconditional and acceptable bank guarantee for 10% of the value of contract and to be valid till the end of Guarantee period plus one month towards "Contract cum Equipment performance". For this purpose you have agreed to accept the guarantee.
3. In consideration thereof, we, _____ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of Rs._____ (Rupees _____ only) being _____% (_____ percent) of the total value of the contract on receipt of your intimating that "the Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.
4. You shall have the right to file / make your claim on us under the guarantee for a **further period of one month** from the date of expiry.
5. This guarantee shall not be revoked without express consent and shall not be affected by your granting time or any other indulgence to "the Vendor", which shall include but not be limited to, postponement from time to time of the exercise the same in you or any right which you may have against "the Vendor" and to exercise the same in any covenant contained or implied in the said contract or any other course or remedy or security available to you, and our Bank shall not be released from its obligations under this guarantee by

your exercising any of your rights with reference to matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under the law would, but for this provision have the effect of relieving our bank from its obligation under this guarantee.

6. We also agree that you shall be entitled at your option to enforce this guarantee against our bank as a principal debtor, in the first instance, notwithstanding any other security or guarantee that you may have in relation to “the Vendor’s” liabilities in respect of the premises
7. This guarantee shall not be affected by any change in the constitution of our Bank or “the Vendor” or for any other reason whatsoever.
8. Any claim / extension under the guarantee can be lodge-able at outstation banks or at Balasore branch and claim will also be payable at Balasore Branch (to be confirmed by Balasore Branch by a letter to that effect in case BG is from the branch outside Balasore).
9. Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____ (Rupees_____ only and the guarantee will remain in force upto and including _____(Date) and shall be extended from time to time for such period or period as may be desired by “the Vendor”.
10. Unless a demand or claim under this guarantee is received by us in writing within six months from_____ (expiry date) i.e. on or before _____ (claim period end date), we shall be discharged from all liabilities under this guarantee thereafter.

Dated at_____ this_____ day of _____ 20__

Bank’s rubber stamp

1. Banks full address

Designation of Signatory

2. Bank official number

ANNEXURE-C

PROFORMA FOR "NO DEMAND CERTIFICATE" BY ASSOCIATE

(On Company's Letter head or with Company Seal)
(To be submitted by the Associate to TPNODL Accounts Department at the time of receipt of full and final payment)

(Certificate No. CCP/002)

Name of the Project Order/

Contract No.

Dated

Name of the Associate Scheme

No. / Job No.

We, M/s._____ (Associate) do hereby acknowledge and confirm that we have received the full and final payment due and payable to us from TPNODL, in respect of our aforesaid Order No _____ dated_____ including amendments, if any, issued by TPNODL to our entire satisfaction and we further confirm that we have no claim whatsoever pending with TPNODL under the said contract / W.O.

Notwithstanding any protest recorded by us in any correspondence, documents, measurement books and / or final bills etc., we waive all our rights to lodge any claim or protest in future under this contract.

We are issuing this "NO DEMAND CERTIFICATE" in favour of TPNODL, with full knowledge and with our free consent without any undue influence, misrepresentation, coercion etc.

Place **Name**

(Company Seal)

ANNEXURE-D

PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS CERTIFICATE

To be printed on the letterhead

To,

TPNODL,

Balasore

Sub: Application for issuance of Consolidated TDS Certificate for the FY _____

Dear Sir,

I / we hereby request / authorize you to issue me / us a consolidate TDS Certificate for the financial year _____ against tax deducted at source by you from my / our payments / bills during the said year from time to time under Chapter XVII – B of the Income Tax Act, 1961.
For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

ATTACH THE COPY OF PAN CARD

ANNEXURE-E

BUSINESS ASSOCIATE FEEDBACK FORM

With an objective to improve our internal processes and systems, and serve you better, we solicit your valuable feedback & suggestions. It is estimated that it will take about 10 minutes to complete this survey. We assure you that your feedback shall be kept confidential. Please send the duly filled feedback form in the "TPNODL addressed - attached envelop"

You are associated with us as

☐ OEMs ☐ Service Contractor ☐ Material Suppliers ☐ Material & Manpower Supplier

You are associated with us for

☐ Less than 1 year ☐ More than 1 year but less than 3 years ☐ More than 3 years

Your office is located at

☐ Balsore ☐ Within 200 kms from Balsore ☐ More than 200 kms from Balsore

Your nearly turnover with TPNODL

☐ Less than 25 Lacs ☐ 25 Lacs to 1 Crore ☐ More than 1 Cr.

Additional Information

Your Name	
Your Designation	
Your Organization	
Contact Nos.	
Email	

We once again thank you for your participation in this survey. Please spare 10 minutes to give your feedback on following pages (Section A to E)

SECTION – A

(Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement).

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
1	You receive all relevant queries / tenders from us in timely manner.						
2	We provide you enough lead time to respond to our queries / tenders.						
3	We provide you adequate support (drawings, documents, clarifications, briefing etc.) to enable you meet our requirements.						
4	All following elements of our contract / purchase order are rational :						
4.1	Scope of Work						
4.2	Delivery / Execution Schedule						
4.3	Payment Terms						
4.4	Liquidated Damages						
4.5	Performance Guarantee						
5	Our purchase orders / contracts are simple, specific & easy to understand						
6	TPNODL demonstrate willingness to be flexible in administration of Contract / Purchase Order						
7	We provide timely responses / clarifications to your queries						
8	TPNODL representative you interact / coordinate with is adequately empowered to support you in meeting contractual obligations						
9	TPNODL provide you all necessary infrastructure support for timely and quality completion of work (including AMC)						
10	TPNODL Engineer-in-Charge timely certifies the jobs executed/ material supplied						
11	TPNODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	BIRD (Bill Inward Receipt Desk) initiative has improved payment disbursement process						

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPNODL never defaults on contractual terms						
15	In TPNODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPNODL Employees follow Ethical behaviour						

SECTION – B

SECTION – B (Please rate the following parameters on a scale of 1 to 5, where 1 - Minimum; 5 - Maximum)

S. No.	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPNODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	District / Zones						
1.3	Projects/HOG (TS &P)						
1.4	Inspection & Quality Assurance						
1.5	Stores						
1.6	Metering & Billing						
1.7	Accounts / Finance						
1.8	Administration						
1.9	IT & Automation						
2	How would you rate TPNODL in comparison to your other clients in terms of **fairness of treatment and transparency** with its Business Associates?						
3	How would you rate TPNODL in comparison to your other clients in terms of **processes and systems to manage partnership** with its Business Associates						
4	How would you rate TPNODL in comparison to your other clients in terms of **building long term & mutually relations**hip with its Business Associates						

SECTION – C

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

S. No.	Parameters	Certainly No	Probably No	Certainly Yes	Probably Yes	Remarks/ Suggestion
1	Based on your experience with TPNODL, would you like to continue your relationship with TPNODL?					
2	If someone asks you about TPNODL, would you talk “positively” about					

	TPNODL?					
3	Would you refer TPNODL name to others in your community, fraternity and society as a professional & dynamic organization?					

SECTION - D

If we ask you to rate us on a scale of 1 to 10, how will you rate TPNODL, that truly represents your overall satisfaction with us (please tick appropriate box) -

1	2	3	4	5	6	7	8	9	10

SECTION – E

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

Please spare your thoughts for TPNODL's improvement in particular areas of weaknesses, particularly relating to some great practices, attitudes that you have seen elsewhere in Indian and International Organizations, which you recommend TPNODL to adopt. Please give your valuable salient recommendations.

Please spare your thoughts for TPNODL's improvement in particular areas of major concerns for you. We also welcome your suggestions to adopt any best practices, altitudes that you

Recommendation	*Please tick (√) your top 5 expectations out of the following 10 points listed below -*	
(Please list down improvement you expect from TPNODL)	*Timely payment*	
1	*Flexibility in Contracts/PO*	
	Clarity in PO,s & Contracts	
2	*Timely response to quarries*	
	Timely certification of works executed	
3	*Clarity in Specs, drawings, other docs etc.*	
	Adequate information provided on website for tender notification, parties qualified etc.	
4	*Timely receipt of material at site for execution*	
	Performance Guarantee/EMD released in time	

5	*Inspection & quality assurance support for timely job completion*	

We thank you for your time and courtesy!!

ANNEXURE-F

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder prior to participation in the auction event)

In a bid to make our entire procurement process more fair and transparent, TPNODL intends to use the reverse auctions through ARIBA tool as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid event:

1. TPNODL shall provide the user id and password to the authorized representative of the bidder. (Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).
2. TPNODL will make every effort to make the bid process transparent. However, the award decision by TPNODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPNODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPNODL.
6. In case of intranet medium, TPNODL shall provide the infrastructure to bidders. Further, TPNODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by TPNODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPNODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPNODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

ANNEXURE-G

To,

DGM (Finance)
TPNODL
Balasore

Sub: **e-Payments through National Electronic Fund Transfer (NEFT) OR Real Time Gross Settlement System (RTGS)**

Dear Sir,

We request and authorize you to affect e-payment through NEFT/RTGS to our Bank Account as per the details given below:-

Vendor Code :

Title of Account in the Bank :

Account Type :

(Please mention here whether account is Savings/Current/Cash Credit)

Bank Account Number :

Name & Address of Bank :

Bank Contact Person's Names :

Bank Tele Numbers with STD Code :

Bank Branch MICR Code :

(Please enclose a Xerox a copy of a cheque. This cheque should not be a payable at par cheque)

Bank Branch IFSC Code :

(You can obtain this from branch where you have your account)

Email Address of accounts person: :
(to send payment information)

Name of the Authorized Signatory: :

Contact Person's Name:

Official Correspondence Address:

We confirm that we will bear the charges, if any, levied by our bank for the credit of NEFT/RTGS amounts in our account. Any change in above furnished information shall be informed to TPNODL well in time at our own. Further, we kept TPNODL indemnified for any loss incurred due to wrong furnishing of above information.

Thanking you,

For _____

(Authorised Signatory)

(Signature with Rubber Stamp)

Certification from Bank:

We confirm that we are enabled for receiving NEFT/RTGS credits and we further confirm that the account number (specify Bank a/c no.) of (Please mention here name of the account holder), the signature of the authorised signatory and the MICR and IFSC Code of our branch mentioned above are correct.

This also is certified that the above information is correct as per Bank record

(Manager's/ Officers Signature under Bank Stamp)

ANNEXURE-H

VENDOR APPRAISAL FORM

TO BE SUBMITTED BY VENDOR (To be filled as applicable)			
Part A			
1.0	DETAILS OF THE FIRM		
	1.1	NAME (IN CAPITAL LETTERS)	
	1.2	TYPE OF CONCERN (PROPRIETORY) PARTNERSHIP PVT.LTD., PUBLIC LTD. ETC.	
	1.3	YEAR OF ESTABLISHMENT	
	1.4	LOCATION OF OFFICE POSTAL ADRESS	
	1.5	CONTACT DETAIL OF BA's REPRESENTATIVE NAME E-MAIL ID CELL NO.	
	1.6	LOCATION OF MANUFACTURING UNITS	:
		i) UNITS 1	:
		ii) OTHER UNITS	:
2.0	PRODUCTS / SERVICES BEING OFFERED		:
3.0	TURNOVER DURING THE LAST 3 YEARS (TO BE VERIFIED WITH THE LATEST PROFIT & LOSS STATEMENT).		:
4.0	AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF PAN CARD		:
5.0	AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF GST REGISTRATION		÷
6.0	APPLICABILITY UNDER MSME CERTIFICATION		÷
7.0	BA BELONGS TO AA COMMUNITY (SC/ST)		÷
8.0	DOCUMENTS VERIFYING ADDRESS PROOF (SUPPORTED BY ANY GOVT. ISSUED DOCUMENT)		÷

9.0	TECHNICAL		
	9.1	NO.OF DESIGN ENGINEERS (INDICATE NO.OF YEARS EXPERIENCE IN RELATED FIELDS)	:
	9.2	NO.OF DRAUGHTSMEN	:
	9.3	COLLABORATION DETAILS (IF ANY)	:
		9.3.1 DATE OF COLLABORATION	:
		9.3.2 NAME OF COLLABORATOR	:
		9.3.3 RBI APPROVAL DETAILS	:
		9.3.4 EXPERIENCE LIST OF COLLABORATOR	:
		9.3.5 DURATION OF AGREEMENT	:
	9.4	AVAILABILITY OF STANDAR0DS / DESIGN PROCEDURES / COLLA-BORATOR'S / DOCUMENTS (CHECK WHETHER THESE ARE LATEST/CURRENT	:
	9.5	TECHNICAL SUPPORT, BACK-UP GUARANTEE, SUPERVISION, QUALITY CONTROL BY COLLABORATOR (WHEREVER ESSENTIAL). (THIS CLAUSE IS RELEVANT WHEN VENDOR'S EXPERIENCE IS INADEQUATE)	:
	9.6	QUALITY OF DRAWINGS	:
10.0	MANUFACTURE		
	10.1	SHOP SPACE, LAYOUT LIGHTING, VENTILATION, ETC.	:
	10.2	POWER (KVA)	:
		MAINS INSTALLED	:
		UTILISED	:
		STANDBY POWER SOURCE	:
	10.3	MANUFACTURING FACILITIES (ATTACH LIST OF EQUIPMENTS AS APPLICABLE)	:
		10.3.1 MATERIAL HANDLING	:
		10.3.2 MACHINING	:
		10.3.3 FABRICATION	:

		10.3.4 HEAT TREATMENT	:
		10.3.5 BALANCING FACILITY	:
		10.3.6 SURFACE TREATMENT PRIOR TO PAINTING/ COATING, POLISHING, PICKLING, PASSIVATION, PAINTING, ETC.	:
	10.4	SUPERVISORY STAFF	:
	10.5	ADEQUACY OF SKILLED LABOURS (MACHINISTS, WELDERS, ETC.)	:
	10.6	NO. OF SHIFTS	:
	10.7	TYPE OF MATERIAL HANDLED (SUCH AS CS, SS, ETC.)	
	10.8	WORKMANSHIP	:
	10.9	MATERIAL IN STOCK AND VALUE	:
	10.10	TRANSPORT FACILITIES	:
	10.11	CARE IN HANDLING	:
11.0	INSPECTION / QC / QA / TESTING		
	11.1	NUMBER OF PERSONNEL (INDICATE NO.OF YEARS OF EXPERIENCE)	:
	11.2	INDEPENDENCE FROM PRODUCTION	:
	11.3	AVAILABILITY OF PROCEDURAL WRITE UP/QUALITY PLAN	:
	11.4	INCOMING MATERIAL CONTROL AND DOCUMENTATION	:
	11.5	RELIABILITY/REPUTATION OF SUPPLY SOURCES	:
	11.6	STAGE INSPECTION AND DOCUMENTATION	:
	11.7	SUB-ASSEMBLY & DOCUMENTATION	:
	11.8	FINAL INSPECTION AND DOCUMENTATION	:
	11.9	PREPARATION OF FINAL DOCUMENTATION PACKAGE	:
	11.10	TYPE TEST FACILITIES	:
	11.11	ACCEPTANCE TEST FACILITIES	:

	11.12	CALIBRATION OF INSTRUMENTS AND GAUGES (WITH TRACEABILITY TO NATIONAL STANDARDS) (ATTACH LIST)	:
	11.13	STATUTORY APPROVALS LIKE BIS, IBR, ETC.(AS APPLICABLE)	:
	11.14	SUB-VENDOR APPROVAL SYSTEM AND QUALITY CONTROL	:
	11.15	DETAILS OF TESTS CARRIED OUT AT INDEPENDENT RECOGNISED LABORATORIES	:
		i) FURNISH LIST OF TESTS CARRIED OUT AND THE NAME OF THE LABORATORY WHERE THE TESTS WERE CONDUCTED	:
		ii) CHECK AVAILABILITY OF CERTIFICATES AND REVIEW THESE WHEREVER POSSIBLE	:
12.0	EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)		:
13.0	SALES, SERVICE AND SITE ORGANISATIONAL DETAILS		:
14.0	CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)		:
15.0	POWER SITUATION		:
16.0	LABOUR SITUATION		:
17.0	APPLICABILITY OF SC/ST RELAXATION (Y/N) IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED		
Part C Supporting Documents			

18.0	**DOCUMENTS TO BE ENCLOSED:** 1. Factory License 2. ISO Certificate 3. Registration of Central Excise 4. Income Tax Clearance. 5. PF Registration 6. ESI Registration 7. Insurance for Workman Compensation Act No. 8. Electrical Contract LIC No. 9. PAN No. 10. GST Registration 11. MSME Certification 12. WC Tax Registration 13. Organogram of Co. having organogram of Design, safety, quality, production and other teams. 14. Details of subscription of BIS, IEC, IEE, ASTM or other. 15. Details of the team in Design, Quality, Safety, Production. 16. List of manufacturing equipment as per Part C. 17. List of calibrated equipment as per Part C. 18. List of clients and order executed in past two years. 19. Complaint escalation matrix. 20. Performance Certificates of same product from Minimum two utilities. 21. e-Payment Form as per enclosed Annexure-G	

*** Classification of BA s under SC/ST shall be governed under following guidelines:**

- **Proprietorship/ Single Ownership Firm:** Proprietor of the firm should be from SC/ST community. Governing document shall be Proprietorship Deed.
- **Partnership Firm:** Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed.
- **Private Limited Company:** Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).
- The relaxation available for BAs under SC / STs shall be as per GCC for Tender Fees, EMD, PBG and Turnover criteria.

NOTE: Certification from SC/ST Commission shall be required for deciding upon SC/ST status of a person.

Annexure-G (e-Payment detail form) must be filled by Associate along with this form.

ANNEXURE-I

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date: …….

Tender Enquiry No.: ……..

To,

Chief (Contracts & MM)

TPNODL,
Balasore

Sir,

WHEREAS M/s. *[name of OEM]*, who are official manufacturers of …… having factories at *[address of OEM]* do hereby authorize M/s *[name of bidder]* to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us

……and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the Special Conditions of Contract or as mentioned elsewhere in the Tender Document, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

We hereby confirm that in case, the channel partner fails to provide the necessary services as per the Tender Document referred above, M/s *[name of OEM]* shall provide standard warranty on the materials supplied against the contract. The warranty period and inclusion / exclusion of parts in the warranty shall remain same as defined in the contract issued to their channel partner against this tender enquiry.

Yours Sincerely,

For ……..

Authorized Signatory

Annexure-J

TATA CODE OF CONDUCT (TCoC)

Introducing Tata Code of Conduct (TCoC) in GCC, the following clause is proposed for inclusion as per suggestions from Chief Ethics Counsellor -

"TCoC is the overarching policy framework that applies to all TATA Group companies including TPNODL. TCoC provides for stakeholder-wise approach in each of the seven chapters.

The chapter "Our Value Chain Partners" states the policy as follows:

1. We shall select our suppliers and service providers fairly and transparently.
2. We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
3. Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
4. We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
5. We respect our obligations on the use of third party intellectual property and data.

In case any Ethical Concern is faced during the course of your business dealings BA can write to Chief- Contracts & MM and CEO.

TPNODL is committed to follow Core Values and Core Principles mentioned in TCoC, cited below, in carrying out various activities as well as in discharge of bi-lateral and multi-lateral obligations involving other entities/organizations:

Core Values:

All six core values are already mentioned in GCC.

Core Principles:

1. **Zero tolerance to bribery or corruption** in any form.
2. Committed to **good corporate citizenship**
3. Contribute to the **economic development of the communities** of the countries & regions we operate in.
4. No compromise on **Safety**
5. Our conduct shall be **fair & transparent**
6. Respect the **human rights & dignity** of our stakeholders
7. **No unfair discrimination** of any kind
8. Statements made to stakeholders shall be **truthful** & made in **good faith**
9. Not engage in any restrictive or **unfair trade practice**
10. Provide avenues for our stakeholders to **raise concerns in good faith**
11. Environment **free from fear** of retribution to deal with concerns that are raised
12. Expect the leaders to be **role model**

13. **Comply with the laws** of the countries in which we operate

Gift Policy:

Principles for acceptance of gifts/benefits –

A gift or benefit may be accepted only if it complies with all of the following principles:

- ✓ it does not influence,
- ✓ does not have the potential to influence, an employee in such a way as to compromise or appear to compromise integrity and impartiality
- ✓ does not create a conflict of interest or perception of conflict of interest;

Principles for non-acceptance of gifts/benefits -

The gift or benefit may not be accepted or given if any of the following principles apply:

- ✓ causes the recipient or donor **to act in partial manner** in the course of duty
- ✓ apprehension of the recipient becoming **obligated to the donor**
- ✓ it is **not offered openly**
- ✓ if is an **offer of money** or something readily convertible to money (e.g. Shares)

Violation –

1. Not abiding with this policy would constitute violation of "Our Employees" Stakeholder group Clause "Gifts and Hospitality" of the Tata Code of Conduct (TCoC) 2015. Prompt action will be taken against violations.
2. Any deviation from this policy must be supported by appropriate rationale and must be duly approved by CEO who is also the Principal Ethics Officer. In any case, in dealing with such deviations, the spirit of the TCoC should in no case be compromised.

2. If it is determined that an employee / associate has violated this policy, appropriate action including termination of the employee's / associate's employment or association with TPNODL may be decided upon.

CONTENTS

1. SCOPE

This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site, performance of **LT 1.1 kV cable** complete with all accessories for trouble free and efficient operations.

Inclusive sizes:

Four Core Cables	Two Core Cables	Single Core Cable
4C X 300 sq.mm. 4C X 150 sq.mm. 4C X 95 sq.mm. 4C X 50 sq.mm. 4C X 25 sq.mm. 4C X 16 sq.mm.	2C X 50 sq. mm. 2C X 25 sq. mm. 2C X 16 sq. mm. 2C X 10 sq. mm.	1C X 630 sq. mm. 1C X 300 sq. mm. 1C X 185 sq. mm. 1C X 95 sq. mm. 1C X 25 sq. mm. 1C X 4 sq. mm. 1C X 2.5 sq. mm.

2. APPLICABLE STANDARDS

LT 1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

Standards	Title
IS-7098 (Part-I):1988	Specifications for Cross Linked Polyethylene PVC Sheathed Cables: Part 1-For Working Voltages up to and including 1100 Volts
IS-8130:1984	Conductor for insulated electric cables & flexible cords.
IS-5831:1984	PVC insulation and sheath of electric cables.
IEC-60228/3-2004	Conductor of insulated cables
IS 10810	Methods of tests for Cables
IEC-60502-1	Specification for power cables with extruded solid insulation with a rated voltage rating between 1 kV and 3 kV
IS-3975:1999	Low carbon galvanized steel wires, formed wires & tapes for armouring of cables
IS 10418: 1982	Specification for Drums of Electric cables
IS 3961 Part 6:2016	Recommended Current Ratings for Cables – XLPE insulated PVC sheathed cables
IS 4826	Hot-dipped galvanized coatings on round steel wires
IS 1554 (Part-1): 1988	PVC insulated (heavy duty) electric cables
IEC 332-1	Test on electric cables on fire conditions
IS 10462-1	Fictitious calculation method for determination of dimensions of protective coverings of cables
ICEA T-31-610	Test method for conducting longitudinal water penetration resistance tests on blocked conductors
ASTM 2863	Oxygen Index Test
IEC 60754	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content

		In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.
3.	**CLIMATIC CONDITIONS OF THE INSTALLATION**	CLIMATIC CONDITIONS The service conditions shall be as follows: i. Maximum Ambient Temperature 50°c ii. Maximum daily average ambient temperature 40°c iii. Minimum Ambient Temperature 2°c iv. Maximum humidity 99.7% v. Minimum humidity 15% vi. Average Annual Rainfall 1800mm vii. Average wind speed prevailing in the area 200kmph viii. Average Thunderstorms prevailing in the area 70 days per annum ix. Average Dust storms prevailing in the area 20 days per annum x. Average number of rainy days per annum 160 xi. Maximum Altitude above sea level 1200m xii. Rainy months June to October The atmosphere across coastal divisions of TPNODL is very saline, laden with salt, acid and dust suspended during dry months and subjected to fog in cold months.
4.	**GENERAL TECHNICAL REQUIREMENT**	

S. No.	Parameter	Requirement
1	Voltage level	1.1 kV (Earthed System)
2	Nominal System voltage	415 V
3	Supply frequency	50 Hz
4	Variation in supply frequency	± 5%
5	Types of Cables	4 core (3 phase + 100% neutral), 2 core (1 phase + 100% neutral), 1 core (1 phase)
6		

Cable components	4 CORE CABLE	2 CORE CABLE	1 CORE CABLE
Conductor	Less than 150 sq.mm.		Stranded Aluminium
	150 sq.mm. and above		Watertight Stranded Aluminum
Insulation	XLPE		
Core identification strip	As per Clause No. 5.C of ENG-LV-010		NA
Inner sheath	Extruded PVC ST-2 type		NA
Armour	Annealed low carbon heavily coated galvanized steel round wires		NA
Outer sheath	PVC FRLSH ST-2 type		

5.0	**GENERAL CONSTRUCTION**	The cross linked polyethylene insulated (XLPE) 1.1 kV cable (Sioplas/ self-cured) shall be manufactured and tested strictly in accordance with the Indian Standard IS 7098 (Part – 1)/

relevant IEC/International standards and their latest amendments.
All material used in the manufacturing of cables shall be virgin and shall be selected as the best available for the intended use. The rating factors for variation in ground and air temperature, depth of laying, thermal resistivity of soil and for different laying configuration of cables shall be provided by the bidder.

(A) Conductor

<table>
<tr><th>S.No.</th><th>Parameter</th><th>Requirement</th></tr>
<tr><td>1</td><td>Material</td><td>Plain Aluminium, grade H2/H4 as per IS 8130</td></tr>
<tr><td>2</td><td>Class</td><td>Class II</td></tr>
<tr><td>3</td><td>Shape</td><td>
<table>
<tr><th>No. of Cores</th><th>Size of cable</th><th>Shape</th></tr>
<tr><td rowspan="2">Single Core Cable</td><td>2.5 sq.mm.
4 sq.mm.</td><td>Stranded Non-Compacted Circular</td></tr>
<tr><td>16 sq.mm. and above</td><td>Stranded Compacted Circular</td></tr>
<tr><td rowspan="2">Two Core Cable</td><td>10 sq.mm.</td><td>Stranded Non-Compacted Circular</td></tr>
<tr><td>16 sq.mm. and above</td><td>Stranded Compacted Shaped</td></tr>
<tr><td>Four Core Cable</td><td>16 sq.mm. and above</td><td>Stranded Compacted Shaped</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>No. of strands & electrical parameters</td><td>
<table>
<tr><th>Nominal size of conductor mm^2</th><th>Min. number of strands</th><th>Max. DC resistance @ 20 deg C (Ohm/km)</th><th>Conductor Short circuit current rating for 1 second (kA)</th></tr>
<tr><td>2.5</td><td>3</td><td>12.1</td><td>0.235</td></tr>
<tr><td>4</td><td>3</td><td>7.41</td><td>0.376</td></tr>
<tr><td>10</td><td>7</td><td>3.08</td><td>0.94</td></tr>
<tr><td>16</td><td>6</td><td>1.91</td><td>1.50</td></tr>
<tr><td>25</td><td>6</td><td>1.20</td><td>2.35</td></tr>
<tr><td>50</td><td>6</td><td>0.641</td><td>4.70</td></tr>
<tr><td>95</td><td>15</td><td>0.320</td><td>8.93</td></tr>
<tr><td>150</td><td>15</td><td>0.206</td><td>14.2</td></tr>
<tr><td>185</td><td>30</td><td>0.164</td><td>17.39</td></tr>
<tr><td>300</td><td>30</td><td>0.10</td><td>28.20</td></tr>
<tr><td>630</td><td>53</td><td>0.0469</td><td>59.22</td></tr>
</table>
</td></tr>
<tr><td>6</td><td>Longitudinal water sealing of conductor (for 150 sq.mm. and above only)</td><td>a) Non-conductive water swellable yarn/tape/ combination of both shall be provided in between interstices of the conductor.
b) Water swellable tape and yarn shall be compatible to withstand conductor continuous temperature of 90 deg C and short circuit temperature of 250 deg C without any decay.
c) It shall not affect the electrical conductivity of the conductor.</td></tr>
</table>

7	Cleanliness and uniformity	a) Before stranding, the cross-section of the Aluminium conductor shall be circular, and shall have uniform smooth surface, free from sharp edges and free from any defects. b) Stranded Conductor shall be free from oil traces & aluminum dust. Conductor (after stranding) shall be super cleaned. c) Traces of aluminum dust on conductor shall not be acceptable.
8	Raw material supplier	Conductor raw material shall be procured from reputed suppliers viz., BALCO/ HINDALCO/ NALCO/ Vedanta only.
9	Diameter of conductor (for single core cable only)	To be specified by bidder
10	Weight of conductor/km (approx.)	

Nominal size of conductor mm^2	Min. weight of conductor (kg/km/core)
2.5	6.5
4	10.4
10	26
16	42
25	65
50	130
95	247
150	390
185	482
300	780
630	1640

(B) Insulation

S.No.	Parameter	Requirement
1	Material and extrusion process	XLPE insulation shall be applied through extrusion process.
2	Curing process	Curing shall be done by Sioplas/ self-curing method.
3	Min. thickness of Insulation	As per Table no. 3 of IS 7098 part 1. Tolerance on thickness shall be as per Clause no. 9.3 of IS 7098 part 1
4	Raw material supplier	(i) XLPE compound shall be super cleaned and procured from reputed raw material suppliers viz., Dow, Borealis, Hanwa Kalpana, KLJ only. (ii) XLPE compound from cable manufacturer may be considered only after evaluation of the compound manufacturing process.
5	Thermal stability	The insulation properties shall be stable under thermal conditions arising out of continuous operation at conductor temperature of 90 deg. C rising momentarily to 250 deg. C under short circuit conditions.

6	Insulation fitting to the conductor	(i) Insulation shall fit tightly to the conductor and shall be applied concentrically about the conductor in thickness consistent with the voltage classification. (ii) The insulation shall be so applied that it shall be possible to remove it without damaging the conductor.
7	Weight of core	To be specified by bidder

(C) Core Identification

4C Cable	(i) Insulation colour: Black for all cores (ii) Core colour: embedded & extruded bright coloured line of XLPE for phases: 'red' for R phase, 'blue' for B phase, 'yellow' for Y phase, shall not be exceeding depth of 50% of insulation thickness. Width to be specified by bidder. (iii) For neutral, as core is already black, extruded line is not required.
2C Cable	(i) Insulation colour: Black (ii) Core colour: embedded & extruded red coloured bright line of XLPE for phase shall not be exceeding depth of 50% of insulation thickness. Width to be specified by bidder.
1C Cable	For single core cable, XLPE insulation shall be black in colour.

Laying up of Cores (For multi-core cable only)

Laying up	(i) Cores shall be laid up together as per table-4 of Clause 11.2 of IS 7098, Part-1. (ii) Where necessary, the interstices shall be filled with non-hygroscopic material.

(D) Inner Sheath (For multi-core cable only)

S.No.	Parameter	Requirement
1	Material	Black coloured Polyvinyl chloride (PVC) type ST-2 compound.
2	Thickness	(i) The sheath shall have adequate thickness, mechanical strength and elasticity, as per IS 5831. (ii) Min. thickness of inner sheath shall be as per Table no.5 of IS 7098 part 1. (ii) For 2 Core: Inner sheath shall be applied by pressure extrusion method. For 4 Core: Inner sheath shall be applied by normal extrusion process.
3	Raw material supplier	**PVC compound shall be procured from reputed raw material suppliers viz.,** Shakun, KKalpana, KLJ, DCM ShriRam.

		PVC compound from cable manufacturer may be considered only after evaluation of the compound manufacturing process.

(E) Armour (For multi-core cable only)

S.No.	Parameter	Requirement
1	Material	Annealed (soft) low carbon hot dipped heavily coated galvanized round steel wires.
2	Compliance to Standard	It shall comply with the requirements of IS 3975 along with latest amendments. Hot dipped galvanizing layer shall be uniform on low carbon annealed steel wires. Zinc coating shall be heavily coated as per IS 4826:1979. Diameter of GI wires shall be as per Table no.6 of IS 7098 part 1.
4	Approx. Armour Short circuit rating of armour for 1 sec (kA)	Area of Conductor / Short circuit rating of Armour for 1 sec (kA) 10 / 1.88 16 / 2.54 25 / 3.17 50 / 4.22 95 / 6.97 150 / 10.98 300 / 19.26
5	Jointing in the armour wires	Not acceptable in any armour wire
6	Laying of armour	The armor wires shall be applied as closely as practicable. Shall not be less than 90% of total circumference.
7	Binding	Rubberized cotton binding tape shall be applied to bind the armor wires such that it shall not affect the electrical properties of the armor wires and the overall cable.
8	Weight of armor Kg/km	To be furnished by Bidder
9	Raw material supplier	Armour steel shall be procured from reputed raw material suppliers viz., TATA Steel, Jindal Steel, SAIL, Bansal (BWIL) only.

(F) Outer Sheath

S.No.	Parameter	Requirement
1	Material	Polyvinyl chloride (PVC) ST-2 **FRLSH** type compound (as per IS 5831) with **'lead napthenate'** additive.
2	Configuration	Polyvinyl chloride (PVC) ST-2 **FRLSH** type compound with **'lead napthenate'** additive as 'termite & rodent repellent' shall be applied by extrusion process. The outer sheath shall have adequate thickness, mechanical strength and elasticity, as per IS 5831. Thickness of outer sheath shall be as per Table no. 8 of IS 7098 part 1.
3	Colour	Blue, colour code: 103 as per IS 5:2007.
4	Surface uniformity	(i) The outer sheath shall be ultraviolet protected for operation in direct sunlight.

				(ii) Surface of outer sheath shall be free from cavity/ nicks/ other visible defects.
		5	Raw material supplier	**PVC compound shall be procured from reputed raw material suppliers viz.,** Shakun, Kalpana, KLJ, DCM ShriRam. PVC compound from cable manufacturer may be considered only after compound manufacturing process evaluation.
		6	Weight of outer sheath kg/km	To be provided by bidder
		7	Weight of complete cable Kg/km	To be provided by bidder
		8	Overall diameter of cable	To be provided by bidder

(G) Other requirements

S.No.	Parameter	Requirement
1	End seal	Adhesive coated polyolefin heat shrinkable end caps shall be provided on both ends of cable.

6.0 NAME PLATE AND MARKING ON DRUM AND CABLE OUTER SHEATH

Wooden drums shall be free from sharp edges and visual defect.
Cable length on one drum shall be:
(a) 4 Core Cable – 95 sq.mm. to 300 sq.mm. – 500 meters with + 5% tolerance
(b) 4 Core Cable – 16 sq.mm. to 50 sq.mm. – 1000 meters with + 5% tolerance
(c) 2 Core & 1 Core Cables – 1000 meters with + 5% tolerance

i. Following details shall be provided on flanges of **drum**:
- a) Manufacturer's name
- b) Type of Cable
- c) Size of Cable
- d) Voltage Grade
- e) Length of the cable on the drum
- f) Direction of the rotation of the drum
- g) Gross mass
- h) Country of manufacture
- i) Year and month of manufacture
- j) Purchase Order no.
- k) Drum No.

ii. Following details shall be **embossed** on the **outer PVC sheath.**

Embossing shall be clearly visible. **At interval of every 1 meter, following details to be embossed:**

- a) Sequential meter marking ***(shall be marked through printing)***
- b) Property of TPNODL
- c) Manufacturer name
- d) Month & Year of Manufacture

e) Voltage grade
f) Size of the cable
g) Purchase Order no.
h) Cable code

7.0 TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC.
All acceptance tests shall be witnessed by TPNODL's authorized representative.
All the components shall be type tested as per the relevant standards.
Following tests shall be necessarily conducted on the 1.1 kV Cable in additions to others specified in IS/IEC standards.

**In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.*

(A) Type Tests

S.No.	Test	Specific value		Test method	
		Clause No.	Reference Standard	Clause No.	Reference Standard
Tests on Conductor					
1	Conductor resistance test	Table 2	IS 8130	10	IS 10810 part 5
2	Conductor water penetration test (For conductor size - 150 sq.mm. and above)	ICEA T-31-610	ICEA T-31-610	4	ICEA T-31-610
3	Tensile strength (for non-compacted conductor)	6.2.1	IS 8130	8	IS 10810 part 2
4	Wrapping test (for non-compacted conductor)	6.2.2	IS 8130	8	IS 10810 part 3
Tests on Insulation					
5	Tensile strength & Elongation at break (before ageing)	Table 1	IS 7098 part 1	8	IS 10810 part 7
6	Ageing in air oven	Table 1	IS 7098 part 1	8	IS 10810 part 11
7	Tensile strength & Elongation at break (after ageing)	Table 1	IS 7098 part 1	8	IS 10810 part 7
8	Tests for thickness of insulation	Table 3	IS 7098 part 1	8	IS 10810 part 6
9	Hot set test	Table 1	IS 7098 part 1	8	IS 10810 part 30
10	Shrinkage test	Table 1	IS 7098 part 1	8	IS 10810 part 12
11	Gravimetric test (Water absorption)	Table 1	IS 7098 part 1	8	IS 10810 part 33

12	Volume resistivity/ Insulation Resistance	Table 1	IS 7098 part 1	8	IS 10810 part 43
Tests on Inner Sheath					
13	PVC thickness	Table 5	IS 7098 part 1	8	IS 10810 part 6
Tests on Outer Sheath (PVC)					
14	Flammability test for outer sheath	Clause No. 16.3	IS 7098 Part 1	As per IEC 332 part 1	
15	Tensile strength and Elongation at break (before ageing)	Table 2	IS 5831	8	IS 10810 part 7
16	Tensile strength and Elongation at break (after ageing)	Table 2	IS 5831	8	IS 10810 part 7
17	Variation due to ageing	Table 2	IS 5831	8	IS 10810 part 7
18	Loss of mass test	Table 2	IS 5831	8	IS 10810 part 10
19	Shrinkage test	Table 2	IS 5831	8	IS 10810 part 12
20	Hot deformation test	Table 2	IS 5831	8	IS 10810 part 15
21	Heat shock test	Table 2	IS 5831	8	IS 10810 part 14
22	Thermal stability test	Table 2	IS 5831	Appendix B	IS 5831:1984
23	Oxygen index	As per ASTM 2863			
24	Temperature index	ASTM 2863			
25	Acid gas generation	IEC 60754			
26	Smoke density	ASTM 2843			
Tests on Armour for multi-core Cable					
27	Tensile test	8	IS 3975	6	IS 1608
28	Torsion test	8	IS 3975	7	IS 1717
29	Wrapping test	8	IS 3975	5	IS 1755
30	Resistance test	8	IS 3975	8	IS 10810 Part 42
31	Mass of zinc coating	Table 1	IS 4826	6	IS 6745
32	Uniformity of zinc coating	9	IS 3975	4	IS 2633
33	Adhesion test	9	IS 3975	9.3	IS 3975
Tests on complete cable					
34	High voltage test	7.2 kV for 5 minutes As per Clause no. 16.2	IS 7098 part 1	8	IS 10810 Part 45

(B) Routine Tests

Test	Clause No.	Reference Standard
Conductor resistance test	15.3	IS 7098 part 1
High voltage test with power frequency	15.3	IS 7098 part 1

(C) Acceptance Tests:

All acceptance tests mentioned below shall be witnessed by TPNODL's representative during inspection stage.

S.No.	Test name	Specific value		Test method	
		Clause No.	Reference Standard	Clause No.	Reference Standard
(I) Test on Conductor					
1	Conductor resistance test	Clause No. 5(A.4)	ENG-LV-010	10	IS 10810 part 5
2	Test for non-conductivity of water swellable tape/yarn of conductor (For conductor size : 150 sq.mm. and above)	Clause No. 5(A.6)	ENG-LV-010	Through multimeter	
3	Visual inspection for conductor cleanliness	Clause No. 5(A.7)	ENG-LV-010	Check for presence of any Aluminium dust	
4	Tensile test (non-compacted conductor only)	Clause No.3.1	IS 8130	8	IS 10810 part 2
5	Wrapping test (non-compacted conductor only)	Clause No.6.2.2	IS 8130	8	IS 10810 part 3
6	Conductor water penetration test	ICEA T-31-610			
(II) Test on Insulation					
7	Tensile strength & Elongation at break (before ageing)	Table 1	IS 7098 part 1	8	IS 10810 part 7
8	Insulation thickness	Table 3	IS 7098 part 1	8	IS 10810 part 6
9	Depth of embedded, extruded colour line (for mutli-core cable only)	Max depth 50% of insulation thickness	ENG-LV-010	Through profile projector/ magnifying optical scale	
10	Brightness of embedded, extruded colour line (for mutli-core cable only)	Clause No. 5.C	ENG-LV-010	Visual check from a distance of 1 meter	
11	Hot set test	Table 1	IS 7098 part 1	8	IS 10810 part 30
12	Surface smoothness of insulation	Clause No. 5(B.7)	ENG-LV-010	To be checked by inspector	
(V) Test on Inner sheath					
13	PVC thickness	Table 5	IS 7098 part 1	8	IS 10810 part 6

14	Colour of inner sheath	Clause No. 5 (D.1)	ENG-LV-010	To be checked by inspector		
(VI) Test on Armour (for multicore cables only)						
15	Tensile test	8	IS 3975	IS 1608		
16	Mass of zinc coating	Table 1 Heavily coated soft wire	IS 4826	IS 6745		
17	Uniformity of zinc coating	9	IS 3975	IS 2633		
18	Adhesion test	9	IS 3975	IS 3975		
19	Diameter	Table 6	IS 7098 part 1	Value to be measured by inspector		
20	No. of wires & Coverage %	Clause No. 5(E.6)	ENG-LV-010	Value to be measured by inspector		
(VII) Test on PVC Outer Sheath						
21	Thickness		IS 7098 part 1		IS 10810 Part 6	
22	Tensile strength and Elongation at break (before ageing)	Table 2	IS 5831	8	IS 10810 part 7	
23	Colour of outer sheath	Clause No. 5 (F.3)	ENG-LV-010	To be checked by inspector		
24	Surface uniformity of outer sheath (on full drum)/ shall be free from any damage- void, nick, cavity.	Clause No. 5 (F.4)	ENG-LV-010	Through rewinding of drum (As per TPNODL specification)		
25	Anti-termite and rodent property test in PVC outer sheath	Chemical test	As per manufacturer Process/ Method	To be checked by inspector		
26	Flammability test	IS 10810 part 61				
27	Oxygen index	IS 10810 part 58				
28	Temperature Index test	IS 10810 part 64				
29	Acid gas generation	IS 10810 part 59				
30	Smoke density	IS 10810 part 63				
(VIII) Tests for complete cable						
31	High voltage test	7.2 kV for 5 minutes As per Clause no. 16.2.1	IS 7098 part 1	8	IS 10810 part 45	
(IX) Additional tests						
32	Raw material consumption	Clause No. A.8, B.4, D.3, E.9, F.5	Document verification as proof to be submitted			
		Invoice to be shown from procurement to consumption				
33	Sequential marking check	Clause no. 6.ii	ENG-LV-010	To be checked by inspector		
34	Cable drum length verification	Clause no. 6	ENG-LV-010	To be checked by inspector		

		35	Packaging of cable on cable drum	By recyclable PVC sheet- As per Clause no.12	ENG-LV-010	To be checked by inspector
		36	End caps	Clause No. G	ENG-LV-010	To be checked by inspector
		37	Weight of conductor Kg/km	To be checked by inspector		
		38	Weight of core Kg/km	To be checked by inspector		
		39	Weight of armour Kg/km	To be checked by inspector		
		40	Weight of complete cable Kg/km	To be checked by inspector		
		41	Overall approx. diameter of complete cable	To be checked by inspector		
8.0	**TYPE TEST CERTIFICATES**	Bidder shall furnish the type test report of **1.1 kV** cable for the tests as mentioned in Clause no. 7 of this specification and as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test report shall be submitted for the type, size and rating of the cable mentioned in the bid/ OR for any size higher (than required) of similar type and similar voltage grade. Conductor Water penetration test as per ICEA T 31-610 shall be conducted at CPRI/ERDA/NABL. **Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of opening of bid**. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPNODL. In case the type test certificates are dated beyond 5 years and up to 10 years, though the basic component design of cable is same, then acceptance for *'no change in design'* shall be submitted by bidder on their organization's letter head. TPNODL will have the rights to accept/reject these type test reports.				

9.0	**PRE-DISPATCH INSPECTION**	Inspection shall be carried out by duly authorized representative of TPNODL. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection may be made at any stage of manufacturing at the discretion of TPNODL and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Inspection by TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specification. **Dispatch of material:** Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL. Following documents shall be sent along with the supplied material: a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Delivery Challan
10.0	**INSPECTION AFTER RECEIPT AT STORES**	The equipment received at TPNODL, Balasore, Odisha store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.
11.0	**GUARANTEE**	**Requirement:** Bidder shall confirm for guarantee towards design, material, workmanship & quality of process / manufacturing for integrated product delivered under the contract. In the event any defect is found by TPNODL, up to a period of at least 60 months from the date of commissioning or 72 months from the date of last supplies made under the contract whichever is later, bidder shall be liable to undertake to replace/rectify such defects at their own costs, within mutually agreed time frame, and to the entire satisfaction of TPNODL, failing which TPNODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPNODL's own charges (@ 20% of expenses incurred), from the Bidder or from 'Security cum Performance Deposit' as the case may be. **Free replacement:** Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by TPNODL.

12.0	**PACKAGING**	a) **Standard length of Cable:** The cable shall be supplied in continuous **standard length** as per Clause no.6 of this specification. b) **Filling condition:** Drum shall not be overfilled. c) **Cable drum:** The cable shall be wound on non-returnable drums without any extra cost to TPNODL as per IS 10418 and its latest amendments. d) **Sealing of cable ends:** The ends of the cable shall be sealed by means of heat shrinkable polyolefin end caps. e) **Requirements for Cable drums**: Cable drums shall be so constructed as to have required mechanical strength so that the drum flanges and other components do not break during transport, in actual use or in storage. The flanges and the outside surface of the barrel shall be free from protruding materials/projections/ unevenness/ sharp edges that can damage the cable or hands of the operator during rotation of drums. Material preservation shall be applied to the entire drum. f) Bottom end of cable should be clamped on drum by jute or nylon rope. g) **Rail/ Road transportation:** The bidder shall ensure that the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit. The drums shall withstand normal handling and transport. **h) Packaging shall be as per climate change perspective.** **Cable wound on cable drum shall be covered by recyclable PVC sheet for dust proof.** ***TPNODL encourages to use environment friendly packaging.***
13.0	**TENDER SAMPLE**	NA
14.	**QUALITY CONTROL**	The bidder shall submit **'Quality Assurance Plan'** followed by him in respect of bought out items, items manufactured by him, Raw materials in process, Final inspection Packaging & Marking. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPNODL reserves the sole rights for the type test of random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the bid, the complete Lot shall be rejected. TPNODL's nominated representative shall have free access to the bidder's works to carry out inspections.
15.	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine and acceptance tests as per relevant International / Indian standards.
16.	**MANUFACTURING ACTIVITIES**	The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of cable as per RC line items for getting approval before mass manufacturing. Bidder shall start manufacturing of mass quantity only after getting CAT-A approved drawings and technical compliances or as per intimation from TPNODL.
17.	**SPARES, ACCESSORIES AND TOOLS**	Not applicable

18.	DRAWINGS AND DOCUMENTS	Following documents shall be submitted along with the bid for approval after award of RC/PO: a) Completely filled–in clause wise compliance of this specification b) Type test Certificates for each specified test c) Cross sectional drawing of the cable d) Rating factors for variation in ground and air temperature, depth of laying, thermal resistivity of soil and different laying configuration of cables. Following documents shall be submitted after award of contract for approval before manufacturing: a) Completely filled–in clause wise compliance of this specification b) Cross sectional drawing of the cable All the Documents and Drawings shall be in English Language.
19.	GUARANTEED TECHNICAL PARTICULARS	Bidder to submit clause wise compliance.
20.	SCHEDULE OF DEVIATIONS	**(TO BE ENCLOSED WITH TECHNICAL BID)** All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the TPNODL's specification.

S.No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company Signature :

Designation

ANNEXURE – 1
INSPECTION TEST PLAN

S.No.	Test name	Specific value		Test method	
		Clause No.	Reference Standard	Clause No.	Reference Standard
(I) Test on Conductor					
1	Conductor resistance test	Clause No. 5(A.4)	ENG-LV-010	10	IS 10810 part 5
2	Test for non-conductivity of water swellable tape/yarn of conductor	Clause No. 5(A.6)	ENG-LV-010	Through multimeter	

	(For conductor size : 150 sq.mm. and above)				
3	Visual inspection for conductor cleanliness	Clause No. 5(A.7)	ENG-LV-010	Check for presence of any Aluminium dust	
4	Tensile test (non-compacted conductor only)	Clause No.3.1	IS 8130	8	IS 10810 part 2
5	Wrapping test (non-compacted conductor only)	Clause No.6.2.2	IS 8130	8	IS 10810 part 3
6	Conductor water penetration test	ICEA T-31-610			
(II) Test on Insulation					
7	Tensile strength & Elongation at break (before ageing)	Table 1	IS 7098 part 1	8	IS 10810 part 7
8	Insulation thickness	Table 3	IS 7098 part 1	8	IS 10810 part 6
9	Depth of embedded, extruded colour line (for mutli-core cable only)	Max depth 50% of insulation thickness	ENG-LV-010	Through profile projector/ magnifying optical scale	
10	Brightness of embedded, extruded colour line (for mutli-core cable only)	Clause No. 5.C	ENG-LV-010	Visual check from a distance of 1 meter	
11	Hot set test	Table 1	IS 7098 part 1	8	IS 10810 part 30
12	Surface smoothness of insulation	Clause No. 5(B.7)	ENG-LV-010	To be checked by inspector	
(V) Test on Inner sheath					
13	PVC thickness	Table 5	IS 7098 part 1	8	IS 10810 part 6
14	Colour of inner sheath	Clause No. 5 (D.1)	ENG-LV-010	To be checked by inspector	
(VI) Test on Armour (for multicore cables only)					
15	Tensile test	8	IS 3975	IS 1608	
16	Mass of zinc coating	Table 1 Heavily coated soft wire	IS 4826	IS 6745	
17	Uniformity of zinc coating	9	IS 3975	IS 2633	
18	Adhesion test	9	IS 3975	IS 3975	
19	Diameter	Table 6	IS 7098 part 1	Value to be measured by inspector	
20	No. of wires & Coverage %	Clause No. 5(E.6)	ENG-LV-010	Value to be measured by inspector	
(VII) Test on PVC Outer Sheath					

21	Thickness		IS 7098 part 1		IS 10810 Part 6
22	Tensile strength and Elongation at break (before ageing)	Table 2	IS 5831	8	IS 10810 part 7
23	Colour of outer sheath	Clause No. 5 (F.3)	ENG-LV-010	To be checked by inspector	
24	Surface uniformity of outer sheath (on full drum)/ shall be free from any damage- void, nick, cavity.	Clause No. 5 (F.4)	ENG-LV-010	Through rewinding of drum (As per TPNODL specification)	
25	Anti-termite and rodent property test in PVC outer sheath	Chemical test	As per manufacturer Process/ Method	To be checked by inspector	
26	Flammability test	IS 10810 part 61			
27	Oxygen index	IS 10810 part 58			
28	Temperature Index test	IS 10810 part 64			
29	Acid gas generation	IS 10810 part 59			
30	Smoke density	IS 10810 part 63			
(VIII) Tests for complete cable					
31	High voltage test	7.2 kV for 5 minutes As per Clause no. 16.2.1	IS 7098 part 1	8	IS 10810 part 45
(IX) Additional tests					
32	Raw material Invoice & consumption verification	Clause No. A.8, B.4, D.3, E.9, F.5	Document verification as proof to be submitted		
		Invoice to be shown from procurement to consumption			
33	Sequential marking check	Clause no. 6.ii	ENG-LV-010	To be checked by inspector	
34	Cable drum length verification	Clause no. 6	ENG-LV-010	To be checked by inspector	
35	Packaging of cable on cable drum	By recyclable PVC sheet- As per Clause no.12	ENG-LV-010	To be checked by inspector	
36	End caps	Clause No. G	ENG-LV-010	To be checked by inspector	
37	Weight of conductor Kg/km	To be checked by inspector			
38	Weight of core Kg/km	To be checked by inspector			
39	Weight of armour Kg/km	To be checked by inspector			
40	Weight of complete cable Kg/km	To be checked by inspector			
41	Overall approx. diameter of complete cable	To be checked by inspector			

CONTENTS

1.0	**SCOPE**	This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store and performance of Control Cables for trouble free and efficient operation.
2.0	**APPLICABLE STANDARDS**	Cable covered under this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International standards / IEC and shall conform to the regulations of the local authorities.

IS-1554 (Part-I)	PVC insulated (heavy duty) electric cables
IS-8130:1984	Conductor for insulated electric cables & flexible cords
IS-5831:1984	PVC insulation and sheath of electric cables
IEC-60228/3-2004	Conductor of insulated cables
IEC 60332-1:1993	Flame retardant, characteristics of electrical cables.
IS-3975:1979	Mild steel wires strips and tapes for armoring cables.
IS:3961-(Part-2)	Recommended current ratings for cables
IS 10418: 1982	Drums for Electric Cables

3.0 **CLIMATIC CONDITIONS OF THE INSTALLATION**

1. Maximum Ambient Temperature	50°c
2. Maximum daily average ambient temperature	40°c
3. Minimum Ambient Temperature	2°c
4. Maximum humidity	99.7%
5. Minimum humidity	15%
6. Average Annual Rainfall	1800mm
7. Average wind speed prevailing in the area	200kmph
8. Average Thunderstorms prevailing in the area	70 days per annum
9. Average Dust storms prevailing in the area	20 days per annum
10. Average number of rainy days per annum	160
11. Maximum Altitude above sea level	1200m
12. Rainy months	June to October

The atmosphere across coastal divisions of TPNODL is very saline, laden with salt, acid and dust suspended during dry months and subjected to fog in cold months.

4.0 GENERAL TECHNICAL REQUIREMENTS

Sl.No.	DESRIPTION	UNITS	REQUIREMENT			
1	Reference Standard		IS:1554,Part-1/1988 in General			
2	Voltage grade		1.1 KV			
3	Type of cable		Control Cable			
A	**Size of cable**	sq.mm	**1C*2.5**	**2C*2.5**	**2C*6**	**4C*2.5**
1	**Conductor**					
a.	Conductor Material		Plain Annealed Copper			
b.	No. of cores	Nos.	1	2	2	4
c.	Size of conductor	sq.mm.	2.5	2.5	6	2.5
d.	Shape of conductor		Stranded circular			
e.	No. & diameter of each wire in conductor		Minimum size shall be corresponding to meet the requirement of conductor resistance as per relevant clause of IS:8130-1984			
2	**Insulation**					
a.	Material		PVC insulation conforming to type C as per IS: 5831-1984 applied by extrusion process			
b.	Nominal thickness	mm	0.9	0.9	0.9	0.9
c.	Core identification		NA	Red & Black	Red & Black	Red,Yellow,Blue & Black
3	**Inner sheath**					
a.	Material		Not applicable	Not applicable	PVC conforming to type ST-2 as per IS:5831-1984	
b.	Minimum thickness (at any pointof measurement)	mm			0.3	0.3
4	**Armour**					
a.	Material		Not applicable	Not applicable	Galvanized Steel round wire confirming to IS:3975-1999	
b.	Nominal Diameter	mm			1.4	1.4
c.	Type				Wire	Wire
5	**Outer Sheath**					
a.	Material		FRLS PVC Type ST-2, extruded type as per IS:5831-1984 (With FRLS Properties)			

b.	Color		Blue				
c.	Minimum thickness (at any point of measurement)	mm	1.80	1.24	1.24	1.24	
6	**Diameter**						
a.	Approx. overall diameter	mm	7.5	15.0	19.0	17.0	
b.	Tolerance of diameter	mm	±3	±3	±3	±3	
7	Short circuit capacity for one second	kA	0.2875	0.2875	0.69	0.2875	
8	Approx. Weight of cable	Kg/km	90	500	750	600	
9	Standard length of cable drum with tolerance	m	500±5% / 1000±5%				
10	Allowable conductor temperature at continuous current	ºC	70	70	70	70	
11	Allowable conductor temperature during short circuit	ºC	160	160	160	160	
12	Max. DC resistance at 20ºC - Main	Ohm/km	7.41	7.41	3.08	7.41	
13	Max. AC resistance at max. Operating temp.	Ohm/km	8.89	8.89	3.7	8.89	
14	Guaranteed value of min oxygen index at 27ºC	%	29	29	29	29	
15	Guaranteed value of min. temp. index at 21 oxygen index	ºC	250	250	250	250	
16	Smoke Density Rating		Max. average 60 SDR				

S No	DESCRIPTION	UNITS	REQUIREMENT				
B	**Size of cable**	sq.mm	**4C*4**	**6C*2.5**	**7C*2.5**	**10C*2.5**	**12C*2.5**
1	**Conductor**						
a.	Conductor Material		Plain Annealed Copper				
b.	No. of cores	Nos.	4	6	7	10	12
c.	Size of conductor	sq.mm.	4	2.5	2.5	2.5	2.5
d.	Shape of conductor		Stranded circular				
e.	No. & diameter of each wire in conductor		Minimum size shall be corresponding to meet the requirement of conductor resistance as per relevant clause of IS:8130-1984				
2	**Insulation**						
a.	Material		PVC insulation conforming to type C as per IS: 5831-1984 applied by extrusion process				
b.	Nominal thickness	mm	0.9	0.9	0.9	0.9	0.9
c.	Core Identification		Red,Yellow,Blue & Black	All cores white with core numbers printed in black ink as per clause 10.3 of IS:1554(Part-I)/1988			
3	**Inner sheath**						
a.	Material		PVC conforming to type ST-2 as per IS:5831-1984				
b.	Minimum thickness (at any point of measurement)	mm	0.3	0.3	0.3	0.3	0.3
4	**Armour**						
a.	Material		Galvanized Steel round wire confirming to IS:3975-1999				
b.	Nominal Diameter	mm	1.4	1.4	1.4	1.6	1.6
c.	Type		Wire	Wire	Wire	Wire	Wire
5	**Outer Sheath**						
a.	Material		FRLS PVC Type ST-2, extruded type as per IS:5831-1984 (With FRLS Properties)				
b.	Color		Blue				
c.	Minimum thickness (at any point of measurement)	mm	1.24	1.24	1.24	1.4	1.4
6	**Diameter**						
a.	Approx. overall diameter	mm	18	18	20	22	25
b.	Tolerance of diameter	mm	±3	±3	±3	±3	±3
7	Short circuit	kA	0.46	0.2875	0.2875	0.2875	0.2875

	capacity for one second						
8	Approx. Weight of cable	Kg/km	800	750	750	1100	1200
9	Standard length of cable drum with tolerance	m	500±5% / 1000±5%				
10	Allowable conductor temperature at continuous current	ºC	70	70	70	70	70
11	Allowable conductor temperature during short circuit	ºC	160	160	160	160	160
12	Max. DC resistance at 20ºC - Main	Ohm/km	4.61	7.41	7.41	7.41	7.41
13	Max. AC resistance at max. Operating temp.	Ohm/km	5.53	8.89	8.89	8.89	8.89
14	Guaranteed value of min oxygen index at 27ºC	%	29	29	29	29	29
15	Guaranteed value of min. temp. index at 21 oxygen index	ºC	250	250	250	250	250
16	Smoke Density Rating		Max. average 60 SDR				

S No	DESCRIPTION	UNITS	REQUIREMENT				
C	**Size of cable**	sq.mm	**14C*2.5**	**19C*2.5**	**6C*4**	**4C*10**	**4C*16**
1	**Conductor**						
a.	Conductor Material		Plain Annealed copper			EC H4 Grade Aluminum	
b.	No. of cores	Nos.	14	19	6	4	4
c.	Size of conductor	sq.mm.	2.5	2.5	4	10	16
d.	Shape of conductor		Stranded circular				
e.	No. & diameter of each wire in		Minimum size shall be corresponding to meet the requirement of conductor resistance as per relevant				

	conductor		clause of IS:8130-1984					
2	**Insulation**							
a.	Material		PVC insulation conforming to type C as per IS: 5831-1984 applied by extrusion process					
b.	Nominal thickness	mm	0.9	0.9	1.0	0.9	0.9	
c.	Core identification		All cores white with core numbers printed in black ink as per clause 10.3 of IS:1554(Part-I)/1988		Red, Yellow, Blue, Black, Grey & Green		Red, Yellow Blue & Black	
3	**Inner sheath**							
a.	Material		PVC conforming to type ST-2 as per IS:5831-1984					
b.	Minimum thickness (at any point of measurement)	mm	0.3	0.3	0.3	0.3	0.3	
4	**Armour**							
a.	Material		Galvanized Steel round wire confirming to IS:3975-1999					
b.	Nominal Diameter	mm	1.6	1.6	1.6	1.6	1.6	
c.	Type		Wire	Wire	Wire	Wire	Wire	
5	**Outer Sheath**							
a.	Material		FRLS PVC Type of ST 2, extruded type as per IS:5831-1984 (With FRLS Properties)					
b.	Color		Blue					
c.	Minimum thickness (at any point of measurement)	mm	1.4	1.4	1.4	1.4	1.4	
6	**Diameter**							
a.	Approx. overall diameter	mm	27	28	22	22	23	
b.	Tolerance of diameter	mm	±3	±3	±3	±3	±3	
7	Short circuit capacity for one second	kA	0.2875	0.2875	0.46	0.76	1.216	
8	Approx. Weight of cable	Kg/km	1350	1487	1060	900	1100	
9	Standard length of cable drum with tolerance	m	500±5% / 1000±5%					
10	Allowable conductor temperature at	ºC	70	70	70	70	70	

			continuous current						
		11	Allowable conductor temperature during short circuit	ºC	160	160	160	160	160
		12	Max. DC resistance at 20ºC – Main	Ohm/km	7.41	7.41	4.61	3.08	1.91
		13	Max. AC resistance at max. Operating temp.	Ohm/km	8.89	8.89	5.53	3.7	2.29
		14	Guaranteed value of min oxygen index at 27ºC	%	29	29	29	29	29
		15	Guaranteed value of min. temp. index at 21 oxygen index	ºC	250	250	250	250	250
		16	Smoke Density Rating		Max. average 60 SDR				

5.0	**GENERAL CONSTRUCTION**	5.1. The PVC Insulated Cable shall be manufactured and tested strictly in accordance with the Indian Standard IS 1554 (Part – I):1988 and its latest amendments. 5.2. All material used in the manufacturing of cables shall be new and shall be selected as the best available for the intended use and shall withstand the requirement of following tests: i) Tensile test & Wrapping test (for aluminium) ii) Annealing test (for copper) 5.3. **For all cables excluding 4CX10 sq.mm. and 4CX16 sq.mm. Cable:** 1.1 kV stranded copper conductor, PVC Insulated type-C, extruded PVC inner sheath, galvanized round wire armoured, extruded outer sheathed FRLS type cable conforming to IS:1554(Part-I) with latest amendment. Overall outer sheath in blue color. 5.4 **4CX10 sq.mm. and 4CX16 sq.mm. Cable:** 1.1 kV stranded aluminium H4 grade conductor, PVC insulated type-C, extruded inner sheath, galvanized round wire armoured, extruded PVC outer sheathed FRLS cable conforming to IS:1554(Part-I) with latest amendment. Overall outer sheath in blue color.

5.1	**AROURING**	The armouring shall be with galvanized steel wires for multi core cables. The galvanized steel wires shall comply with the requirements of IS: 3975 with latest amendments.
5.2	**OUTER SHEATH**	The Outer Sheath shall be of polyvinyl chloride (PVC) compound confirming to the requirements of Type ST1 of IS: 5831 with FRLS properties with latest amendments. The outer sheath shall be applied by extrusion process. The thickness of the outer sheath shall be as per IS: 1554(Part – I). No tolerance on the negative side shall be acceptable.
5.3	**CORE IDENTIFICATION**	Individual core of multi-core cable shall be colour-coded and/or numbered for proper identification in accordance with relevant IS/manufacturer's standard.
5.4	**REELS/DRUMS**	Cables shall be supplied in the wooden drums in specified length. Wooden drums shall be strong, weatherproof and non-returnable. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
6.0	**MARKING**	**Drum:** Wooden drums shall be of good quality. It shall be free from any damages & sharp edges of nails/ hardware inside the drums. A protective covering of polymeric sheet shall be applied inside the drum before winding the cable on the drum. The **drum** shall carry the following information **stenciled** on both sides of the drum: a) Manufacturer's name b) Type of Cable c) Voltage Grade d) Number of cores e) Nominal Cross sectional Area f) Length of the cable on the drum g) Number of lengths on the drum (If more than one) h) Direction of the rotation of the drum i) Gross mass j) ISI Certification mark The following details shall be **embossed** on the **outer sheath** of the cable at regular intervals every meter. a) Manufacturer's name b) Voltage grade c) Number of cores, size, type d) FRLSH e) Property of TPNODL, ODISHA f) IS Reference g) ISI Mark h) PO Number i) Material code j) Year of manufacturing k) Sequential length marking shall be provided on the outer sheath of the cable by printing.
7.0	**TESTS**	All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 1.1 kV control cables in addition to others specified in IS/IEC standards.
7.1	**TYPE TEST**	A. Tests on Conductor - Conductor Resistance test B. Test for round steel wires/armouring wires

		C. Test for thickness of insulation and sheath(outer and inner) D. Physical tests for insulation & outer sheath i) Tensile strength and elongation at break ii) Ageing in air oven iii) Hot deformation iv) Shrinkage test v) Loss of mass in air oven vi) Heat shock test vii) Thermal stability E. Insulation Resistance test F. High voltage test (water immersion test) – AC & DC G. High voltage test at room temperature H. Flammability test
7.2	**ROUTINE TEST**	a) Conductor Resistance test b) High Voltage test at room temperature
7.3	**ACCEPTANCE TEST**	a) Tensile Test (for aluminium) b) Annealing test (for copper) c) Wrapping Test (for aluminium) d) Conductor Resistance Test e) Test for thickness of insulation and sheath f) Tensile strength and elongation at break test for insulation and sheath g) High Voltage test at room temperature h) Insulation resistance test
8.0	**TYPE TEST CERTIFICATES**	The bidder shall furnish the type test certificates of the 1.1 kV Control cable for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA / NABL Accredited Labs as per the relevant standards. Type test shall have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPNODL.
9.0	**PRE-DESPATCH INSPECTION**	The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of TPNODL and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL. Following documents shall be sent along with material a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan h) Other Documents (as applicable).
10.	**INSPECTION AFTER RECEIPT**	The material received at TPNODL store shall be inspected for acceptance andshall be liable for rejection, if found different from the reports of the pre-dispatch inspection

	AT STORES	and one copy of the report shall be sent to Project Engineering department.
11.0	**GUARANTEE**	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by TPNODL, up to a period of at least 24 months from the date of commissioning or 36 months from the date of last supplies made under the contract whichever is later, (the time scale of 24/36months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of TPNODL, failing which TPNODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPNODL's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of FOUR years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by TPNODL.
12.0	**PACKING**	The cable shall be wound on strong weatherproof and non-returnable wooden drums packed in coil lengths of 500 meters/1000 meters in line with the requirement of IS 10418 – 1982 and its latest amendments. The ends of the cable shall be sealed by means of non-hygroscopic sealing material. Bidder shall ensure that cable covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit
13.0	**TENDER SAMPLE**	Bidder shall have to submit the sample of material (1 meter length) with the offer (in case of first supply to TPNODL).
14.0	**QUALITY CONTROL**	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPNODL reserves the sole rights for the type test of random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the bid, the complete Lot shall be rejected. TPNODL's engineer or its nominated representative shall have free access to the bidder's works to carry out inspections.
15.0	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.
16.0	**MANUFACTURING ACTIVITIES**	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.
17.0	**SPARES, ACCESSORIES AND TOOLS**	Not required
18.0	**DRAWINGS AND DOCUMENTS**	Following documents shall be prepared based on TPNODL specifications and statutory requirements with complete BOM and shall be submitted with the bid: a) Completely filled-in Technical Parameters b) General description of the equipment and all components including brochures c) Type test Certificates d) Experience List. e) Cross sectional diagram of the cable. Drawings/Documents to be submitted after the award of the contract:

S No	Description	For Approval	For Review / Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Installation Instructions		√	√
4	Cross sectional diagram of the cable	√		√
5	Instruction for use		√	√
6	Transport/shipping dimension drawing		√	√
7	QA & QC Plan	√	√	√
8	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.
After receipt of the order, the successful bidder will be required to furnish two copies of all relevant drawings/Documents for TPNODL approval.

Instruction Manuals: Bidder shall furnish manual (in English Language) covering erection and maintenance instructions and all relevant information pertaining to the cables in case supplying for the first time.

19.0 GUARANTEED TECHNICAL PARTICULARS

S No	DESRIPTION	UNITS	Requirement			
1	Reference Standard IS:1554,Part-1/1988 in General		To be furnished by bidder			
2	Voltage grade					
3	Type of cable					
A	**Size of cable**	sq.mm	**1C*2.5**	**2C*2.5**	**2C*6**	**4C*2.5**
1	**Conductor**		To be furnished by bidder			
a.	Conductor Material					
b.	No. of cores	Nos.				
c.	Size of conductor	sq.mm.				
d.	Shape of conductor					
e.	No. & diameter of each wire in					

Initiator	Sanjukta Mohanty	HOD (Engineering)	Sandip Pal

			conductor		
		2	**Insulation**		
		a.	Material		To be furnished by bidder
		b.	Nominal thickness	mm	
		c.	Core Identification		
		3	**Inner sheath**		
		a.	Material		
		b.	Minimum thickness (at any point of measurement)	mm	
		4	**Armour**		
		a.	Material		
		b.	Nominal Diameter	mm	
		c.	Type		
		5	**Outer Sheath**		
		a.	Material		
		b.	Color		
		c.	Minimum thickness (at any point of measurement)	mm	
		6	**Diameter**		
		a.	Approx. overall diameter	mm	
		b.	Tolerance of diameter	mm	
		7	Short circuit capacity for one second	kA	
		8	Approx. Weight of cable	Kg/km	
		9	Standard length of cable drum with tolerance	m	
		10	Allowable conductor temperature at continuous current	ºC	

11	Allowable conductor temperature during short circuit	ºC	To be furnished by bidder
12	Max. DC resistance at 20ºC - Main	Ohm/km	
13	Max. AC resistance at max. Operating temp.	Ohm/km	
14	Guaranteed value of min oxygen index at 27ºC	%	
15	Guaranteed value of min. temp. index at 21 oxygen index	ºC	
16	Smoke Density Rating		

S No	DESCRIPTION	UNITS	REQUIREMENT				
B	**Size of cable**	sq.mm	**4C*4**	**6C*2.5**	**7C*2.5**	**10C*2.5**	**12C*2.5**
1	**Conductor**		To be furnished by bidder				
a.	Conductor Material						
b.	No. of cores	Nos.					
c.	Size of conductor	sq.mm.					
d.	Shape of conductor						
e.	No. & diameter of each wire in conductor						
2	**Insulation**						
a.	Material						
b.	Nominal thickness	mm					
c.	Core identification						
3	**Inner sheath**						
a.	Material						
b.	Minimum thickness (at	mm					

			any point of measurement)		
		4	**Armour**		
		a.	Material		
		b.	Nominal Diameter	mm	
		c.	Type		
		5	**Outer Sheath**		
		a.	Material		To be furnished by bidder
		b.	Color		
		c.	Minimum thickness (at any point of measurement)	mm	
		6	**Diameter**		
		a.	Approx. overall diameter	Mm	
		b.	Tolerance of diameter	Mm	
		7	Short circuit capacity for one second	kA	
		8	Approx. Weight of cable	Kg/km	
		9	Standard length of cable drum with tolerance	M	
		10	Allowable conductor temperature at continuous current	ºC	
		11	Allowable conductor temperature during short circuit	ºC	
		12	Max. DC resistance at 20ºC - Main	Ohm/km	
		13	Max. AC resistance at max. Operating temp.	Ohm/km	
		14	Guaranteed value of min oxygen index at 27ºC	%	To be furnished by bidder
		15	Guaranteed	ºC	

	value of min. temp. index at 21 oxygen index		
16	Smoke Density Rating		

S No	DESCRIPTION	UNITS	REQUIREMENT				
C	Size of cable	sq.mm	14C*2.5	19C*2.5	6C*4	4C*10	4C*16
1	**Conductor**		To be furnished by bidder				
a.	Conductor Material						
b.	No. of cores	Nos.					
c.	Size of conductor	sq.mm.					
d.	Shape of conductor						
e.	No. & diameter of each wire in conductor						
2	**Insulation**						
a.	Material						
b.	Nominal thickness	mm					
c.	Core identification						
3	**Inner sheath**						
a.	Material						
b.	Minimum thickness (at any point of measurement)	mm					
4	**Armour**						
a.	Material						
b.	Nominal Diameter	mm					
c.	Type						
5	**Outer Sheath**						
a.	Material						
b.	Color						
c.	Minimum thickness (at any point of measurement)	mm					
6	**Diameter**						
a.	Approx. overall diameter	mm					

		b.	Tolerance of diameter	mm	To be furnished by bidder
		7	Short circuit capacity for one second	kA	
		8	Approx. Weight of cable	Kg/km	
		9	Standard length of cable drum with tolerance	m	
		10	Allowable conductor temperature at continuous current	ºC	
		11	Allowable conductor temperature during short circuit	ºC	
		12	Max. DC resistance at 20ºC - Main	Ohm/km	
		13	Max. AC resistance at max. Operating temp.	Ohm/km	
		14	Guaranteed value of min oxygen index at 27ºC	%	
		15	Guaranteed value of min. temp. index at 21 oxygen index	ºC	
		16	Smoke Density Rating		

20.0 SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications.

S.No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company

Signature :

Designation

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 1CX95 sqmm XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

LT 1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %

- Average Annual Rainfall 1800 mm
- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

STANDARD DATA SHEET FOR SINGLE CORE LT CABLES : XLPE INSULATED, PVC INNER AND OUTER SHEATH, UN ARMOURED, AL CABLE		
SLNo.	**Description**	**STANDARD-A**
1	No of cores	1
2	Cable Cross Section	95 sqmm
3	Cable Type	A2XY
4	Applicable Standard	IS:7098/I/2011
5	Voltage Grade	1.1 KV
6	Voltage variation	+10% to -15%
7	Frequency variation	±6%
8	Maximum rated conductor temperature	90 °C
9	Maximum allowable conductor temperature during short circuit	160 °C
10	Maximum rated conductor temperature during overload	130 °C
11	Air Temperature in Deg C	40
12	Ground Temperature in Deg C	30
13	Depth Of laying (in mm)	750 mm (min)
14	Thermal Resistivity of Soil (Cm/W)	150 Deg C cm/W
15	**CONTINUOUS CURRENT CAPACITY**	
15.1	Current Rating of Air	264 Amps
15.2	Current Rating of Ground	243 Amps
15.3	Current Rating of Duct	199 Amps
16	**CONDUCTOR**	
16.1	Material	For Aluminium : H2/H4 Grade Aluminum Class 2 AS PER IS:8130-2013 Latest

16.2	Conductor Shape	STRANDED COMPACTED CIRCULAR
16.3	Nom Area of Cond.	95 sqmm
16.4	Min No. of Wires In Cond.	15
16.5	Maximum allowable conductor temperature during short circuit	160 deg C
17	**INNER SHEATH**	
17.1	Material, type and thickness	NA
18	**ARMOUR**	
18.1	Material	NA
18.2	Nominal Dia/dimension of armour in mm	NA
18.3	Fault current carrying capacity for 1 sec	NA
19	**OUTER SHEATH**	
19.1	Material, type and thickness	PVC TYPE ST2 AS PER IS:5831/84- 1.88 mm
19.2	Outer sheath Colour	BLACK
20	Approx Overall Dia of Cable	18 mm
21	Approx overall weight of cable (Kg/km)	450 KG/KM
22	Safe Pulling Force N/Sqmm	30
23	Short Circuit capacity of cond /sec	8.93 K Amps/Sec
24	Max.DC resistance at 20 deg C	0.32 Ohms/KM
25	AC resistance at 90 deg C	0.411
26	Approx. reactance Ohm/KM	0.085/KM
27	Approx. Capacitance per KM	0.79
28	Embossing on XPLE cable	Embossing on phase insulation of the cable: manufacturer name 1100 V, size of cable, ISI, month & year of manufacturing, Property of TPNODL, PO number & date
29	Marking on Drum	The cable shall carry the following information either stenciled on the drum or contained in a label attached to it: a)Reference to the Standards. b)Manufacturer's name· c) Type of cable. d) Voltage grade. e) Number of cores. f) Nominal cross-section area of the conductor. g) Length of the cable on the drum. h) Length of the cable per m. i) Marking of PO j) Direction of rotation· of the drum. k) Gross mass. I) Country of manufacture. m) Year of manufacture. n) ISI Certification mark. o) Property of TPNODL
30	Drum Length	500 m
31	Drum Material	Wooden
Testing shall be strictly follow IS 7098/1 and IS 8130		

Note	Flamability test shall be as per IEC 332-1	

5. GENERAL CONSTRUCTION

CONDUCTOR: Aluminium conductor shall be H4 grade, stranded in construction with flexibilityclass 2, complying with the requirements as specified in IS-8130-1984 with latest amendments**.**
The conductor shall be clean & reasonably uniform in size and shape and its surface shall be free from sharp edges.

INSULATION: The Conductor shall be provided with XLPE insulation applied by extrusion. The smallest of measured valuesof thickness of insulation shall not fall below the nominal value (ti) by more than 0.1 mm+ 0.1(ti).
The insulation shall be so applied that it fits closely on the conductor (or barrier, if any) and it shall bepossible to remove it without damaging the conductor.
OUTER SHEATH: The outer sheath shall be black & applied by extrusion. It shall be applied Over the insulation in case of unarmoured single core cable. Material of outer sheath should be PVC Type ST2 as per IS:5831-1984.

SEALING OF END CAP: The ends of the cable shall be sealed with heat shrinkable caps.

CABLE DRUM: Cables shall be furnished in the specified reels or coil lengths of 500 meters. Drums shall be of non-returnable wooden drums as per IS 10418:1982 and the drums should be free from defects such as cracks, knots, warps, and split. The ends of the cables shall be suitably sealed by means of non-hygroscopic sealing. The tolerance on the Drum length shall be +/- 3%.

6. NAME PLATE & MARKING

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.

- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 1Cx955 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 1Cx95 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Test:

- Resistance Test on Conductor
- Test for thickness of insulation and sheath
- Physical test for insulation.
    - Tensile strength and elongation at break.
    - Ageing in air oven.
    - Shrinkage test
    - Hot set test.
    - Water absorption (Gravimetric)
- Physical tests for outer sheath
    - Tensile strength and elongation at break
    - Ageing in air oven
    - Shrinkage test

- Hot deformation
- Loss of mass in air oven
- Heat shock test
- Thermal stability

- Insulation resistance (Volume resistivity) Test
- High voltage test
- Flammability test

ACCEPTANCE TEST:

- Resistance Test on Conductor
- Test for thickness of insulation and sheath
- Tensile strength and elongation at break test for insulation & outer sheath.
- Hot set test for insulation.
- Insulation resistance (Volume resistivity) Test
- High voltage test

ROUTINE TEST:

- Resistance Test on Conductor
- High voltage test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found

unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus

the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.MINIMUN TESTING FACILITY

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTUREING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 1CX95 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company: Signature:

Date:

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 4CX300 sqmm armoired XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %
- Average Annual Rainfall 1800 mm

- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

Sl/No	TECHNICAL PARTICULARS	Unit	DESIRED VALUE
Size of cable		sq.mm	**4C*300**
1	**Conductor**		
a.	**Type**		Aluminium
b.	**Grade**		H4
c.	No. of cores	Nos.	4
d.	Maximum dc resistance of conductor at 20°C	ohm/km	0.1
e.	Short circuit capacity for one second	kA	28.3
	A.C. resistance at operating temperature of 90 deg C	Ohm/Km	0.13
f.	Continuous current rating at 40degC	A	501
g.	Minimum number of wires in the conductor	Nos.	30
h.	Shape of conductor		Stranded compact circular
2	**Insulation**		
a.	Nominal thickness	Mm	1.8
b.	Minimum thickness (at any point of measurement))	Mm	1.55

3	**Inner sheath**		
a.	Type		For TPNODL-Extruded PVC FRLSH (Flame retardant cables with reduced halogen evolution and smoke)
b.	Minimum thickness (at any point ofmeasurement)	Mm	0.5
4	**Armour**		
a.	Type of armour		GS Round Wire
b.	Nominal Diameter	Mm	2.5
c.	Tolerance	Mm	±0.080
d.	Type of Zinc coating		Medium
e.	Mass of Zinc coating	g/m²	120
f.	Number of dips		2 dip for 1minute and 1 dip for ½ min
5	**Outer Sheath**		
a.	Minimum thickness (at any point of measurement)	Mm	2.2
6	Marking On Drum and Cable Outer Sheath		Following details shall be provided on flanges of drum: a) Manufacturer's name b) Type of Cable c) Size of Cable d) Voltage Grade e) Length of the cable on the drum f) Direction of the rotation of the drum g) Gross mass h) Country of manufacture i) Year and month of manufacture j) Purchase Order no. k)DRUM NO. l) ISI Marking m) Property of TPNODL

7	Embossing on cable		**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) TPNODL c) Manufacturer name d) Month & Year of Manufacture e) Voltage grade f) Size of the cable g) Purchase Order no. h) Cable code i) ISI Marking

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 6%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		4
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
8	Type of Cable		Aluminium conductor, XLPE insulated, Extruded PVC inner sheath, Galvanized Steel Round wire armoured and PVC FRLSH outer sheathed cable
9	Core		Four
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.

11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		Extruded PVC Compound Type ST2 as per IS:5831-1984
13	Armour		Galvanized steel round wire as per IS:3975-1999
14	Outer sheath		Extruded FRLSH PVC Compound Type ST2 as per IS:5831-1984
15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
    - for 4C cables - sector shaped
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.
- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with

latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).

- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be so applied that it shall be possible to remove it without Damaging the conductor.

CORE IDENTIFICATION:

- For 4C cable colored strips or colored insulation shall be applied on the core foridentification of cores in 4C cable. Red, Yellow, and Blue strips shall be used to identify different phase conductors and black strips shall be used to identify neutral conductors.
    - Bright Red line shall represent - R ph
    - Bright Yellow line shall represent - Y ph
    - Bright Blue line shall represent - B ph
    - For neutral core identification non-contact type laser printing or ink jet printing to be provided with 'N' printed on it at every span of 1 ft.
    - For 150 sq. mm. and above, the colored line shall be (3 mm width X 0.5 mmdepth from insulation surface) extruded/embedded on the insulation surface.
    - Below 150 sq. mm, the colored line shall be (2 mm width X 0.3 mm depth from insulation surface) extruded/embedded on the insulation surface.

LYING UP OF CORES:

- In multi-core cables, the cores shall be laid up together witha suitable lay, the outermost layer shall have to be right-hand lay and the successive layer shall be laid with opposite lay. Where necessary, the interstices shall be filled with non-hygroscopic material to make the laid-up cores circular. The layup plan of multi-cores shall be as per IS 7098 (Part-I):1988.

INNER SHEATH:

- Material – The inner sheath material shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of type ST 2 compound of IS:5831:1984 with latest amendments.
- Laying up – The laid-up cores shall be provided with an inner sheath applied by the pressurized Extrusion process. It shall be ensured that it is as circular as possible. The inner sheath shall be so applied that it fits closely on the laid-up coresand it shall be possible to

remove it without damage to the underlying insulation of the cores. When one or more layers of proofed plastic tape are applied over the laid up cores as a binder, the thickness of such tapes shall not be construed as part of the extruded inner sheath.

- Thickness – The thickness of the inner sheath shall be as per IS-7098 (Part-I):1988.

ARMOURING:

- Material – The armoring shall be of galvanized round steel wires complying with the requirements of IS: 3975:1999 along with the latest amendments. The resistance measured for galvanized wires/strips when corrected to 20°C, shall comply with appropriate values mentioned in IS: 7098 (Part - I):1988. The round steel wires taken from the cable shall meet the following:
  - Tensile strength, not less than 250 N/mm^2 and not more than 580 N/mm^2
  - Elongation at the break of round steel wires shall not be less than 6%
  - Round steel wire shall meet the requirement of the torsion test. The gauge length between vices and minimum no. of turns without break shall be asper IS 3975:1999.
  - The zinc coating shall not show any cracks and shall not flake off on rubbing by the bare finger when the round steel wire is subjected to a winding test.
  - The uniformity of round steel wire shall comply to the requirement of IS 3975:1999.
  - The mass of zinc coating of round steel wire shall not be less than 95 %that of mentioned in IS 3975:1999.
  - The resistivity of round steel wire shall meet the requirement of IS 3975:1999.
- Laying up – The armoring shall be applied over the inner sheath in multi-core cables. Thearmor wires shall be applied as closely as practicable (less than the diameterof a single wire in between the interstices). The direction of lay of the armor shall be left hand.
- Thickness – The dimensions of armour round wires shall be as per IS-7098(PartI):1988**.**
- Joints – The joints in armour wire shall be made by brazing or welding and the surface Irregularities shall be removed. A joint in any wire shall be at least 300 mmfrom the nearest joint in any other armour wire in the completed cable.

OUTER SHEATH

- Material – The outer sheath shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of Type ST-2 of IS – 5831:1984 with latest amendments. Surface should be smooth. The sheath shall be ultraviolet protected for operation in direct sunlight. It shall be

free from voids/bubbles/ bulges & mechanical scratches and damages. Surface should be smooth.

- Laying up – The outer sheath shall be applied by an extrusion process, It shall be tightly applied:
  - Over the armoring in case of armored cables.
- Thickness – The thickness of the outer sheath shall be as per IS: 7098 (Part - I):1988. Colour The outer sheath shall be blue in color

6. NAME PLATE & MARKING

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components

shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 4Cx300 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 4Cx300 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. A complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

1. Tests on Conductor
   - Tensile test
   - Wrapping test
   - Resistance test
2. Test for armouring wires as per IS 3975:1999
   - Dimensional check
   - Tensile strength
   - Elongation at break
   - Torsion test (for round wires)
   - Winding test (for round wires)
   - Uniformity of zinc coating
   - Mass of zinc coating
   - Resistivity
3. Test for thickness for insulation and sheath
4. Physical tests for insulation
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Hot set test
   - Shrinkage test
   - Water absorption/gravimetric
5. Physical tests for outer sheath
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Loss of mass in air oven
   - Shrinkage test
   - Hot deformation
   - Heat shock
   - Thermal stability

6. Insulation resistance (Volume resistivity) test
   - High voltage test
   - Flammability test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, a Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.
fea
Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.MINIMUN TESTING FACILITY

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTURING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 4CX300 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension Drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm thepurchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those feadetailed above.

Seal of the Company: Signature:

Date:

Initiator	Udit Sankar Das.	HOD (Operation)	Sandip Pal.

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 1CX35 sqmm unarmored XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

LT 1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %
- Average Annual Rainfall 1800 mm

- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

Sl/No	TECHNICAL PARTICULARS	Unit	DESIRED VALUE
Size of cable		sq.mm	**1C*35**
1	**Conductor**		
a.	**Type**		Aluminum
b.	**Grade**		H4
c.	No. of cores	Nos.	1
d.	Maximum dc resistance of conductor at 20°C	ohm/km	0.868
e.	Short circuit capacity for one second	kA	3.31
f.	Continuous current rating at 40degC	A	118
g.	Minimum number of wires in the conductor	Nos.	6
h.	Shape of conductor		Stranded Sector Shaped
2	**Insulation**		
a.	Nominal thickness	mm	0.9
b.	Minimum thickness (at any point of measurement))	mm	0.75
3	**Inner sheath**		

a.	Type		NA
b.	Minimum thickness (at any point ofmeasurement)	mm	NA
4	**Armour**		
a.	Type of armour		NA
b.	Nominal Diameter	mm	NA
c.	Tolerance	mm	NA
d.	Type of Zinc coating		NA
e.	Mass of Zinc coating	g/m²	NA
f.	Number of dips		NA
5	**Outer Sheath**		
a.	Minimum thickness (at any point of measurement)	mm	1.4
6	Marking On Drum and Cable Outer Sheath		Following details shall be provided on flanges of drum: a) Manufacturer's name b) Type of Cable c) Size of Cable d) Voltage Grade e) Length of the cable on the drum f) Direction of the rotation of the drum g) Gross mass h) Country of manufacture i) Year and month of manufacture j) Purchase Order no. k)DRUM NO. l) ISI Marking m) Property of TPNODL
7	Embossing on cable		**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) TPNODL c) Manufacturer name d) Month & Year of Manufacture e) Voltage grade

			f) Size of the cable g) Purchase Order no. h) Cable code i) ISI Marking

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 6%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		1
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
8	Type of Cable		Aluminium conductor, XLPE insulated, Extruded PVC inner sheath, Galvanized Steel Round wire armoured and PVC FRLSH outer sheathed cable
9	Core		One
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.
11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		Extruded PVC Compound Type ST2 as per IS:5831-1984
13	Armour		Galvanized steel round wire as per IS:3975-1999

14	Outer sheath		Extruded FRLSH PVC Compound Type ST2 as per IS:5831-1984
15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
  - for 1C - compacted circularas per IS 8130:1984
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.
- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).
- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be

so applied that it shall be possible to remove it without Damaging the conductor.

CORE IDENTIFICATION:

- For single-core cable, natural XLPE Colour with blue PVC outer sheath.

LYING UP OF CORES:

- In twin, three, and multi-core cables, the cores shall be laid up together witha suitable lay, the outermost layer shall have to be right-hand lay and the successive layer shall be laid with opposite lay. Where necessary, the interstices shall be filled with non-hygroscopic material to make the laid-up cores circular. The layup plan of multi-cores shall be as per IS 7098 (Part-I):1988.

OUTER SHEATH

- Material – The outer sheath shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of Type ST-2 of IS – 5831:1984 with latest amendments. Surface should be smooth. The sheath shall be ultraviolet protected for operation in direct sunlight. It shall be free from voids/bubbles/ bulges & mechanical scratches and damages. Surface should be smooth.
- Laying up – The outer sheath shall be applied by an extrusion process, It shall be tightly applied:
  - Over the insulation in case of unarmoured single core cables.
- Thickness – The thickness of the outer sheath shall be as per IS: 7098 (Part - I):1988. Colour The outer sheath shall be blue in color

6. **NAME PLATE & MARKING**

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.

- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 1Cx35 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 1Cx35 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

1. Tests on Conductor
   - Tensile test
   - Wrapping test
   - Resistance test
2. Test for armouring wires as per IS 3975:1999
   - Dimensional check
   - Tensile strength
   - Elongation at break
   - Torsion test (for round wires)

- Winding test (for round wires)
- Uniformity of zinc coating
- Mass of zinc coating
- Resistivity

3. Test for thickness for insulation and sheath
4. Physical tests for insulation
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Hot set test
   - Shrinkage test
   - Water absorption/gravimetric
5. Physical tests for outer sheath
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Loss of mass in air oven
   - Shrinkage test
   - Hot deformation
   - Heat shock
   - Thermal stability
6. Insulation resistance (Volume resistivity) test
   - High voltage test
   - Flammability test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within

mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.MINIMUN TESTING FACILITY

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTUREING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 1CX95 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company: Signature:

Date:

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 4CX150 sqmm armoired XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

LT 1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %
- Average Annual Rainfall 1800 mm

- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

Sl/No	TECHNICAL PARTICULARS	Unit	DESIRED VALUE
Size of cable		sq.mm	**4C*150**
1	**Conductor**		
a.	**Type**		Aluminium
b.	**Grade**		H4
c.	No. of cores	Nos.	4
d.	Maximum dc resistance of conductor at 20°C	ohm/km	0.206
e.	Short circuit capacity for one second	kA	14.17
f.	Continuous current rating at 40degC	A	305
g.	Minimum number of wires in the conductor	Nos.	15
h.	Shape of conductor		Stranded Sector Shaped
2	**Insulation**		
a.	Nominal thickness	mm	1.4
b.	Minimum thickness (at any point of measurement))	mm	1.2
3	**Inner sheath**		

a.	Type		For TPNODL-Extruded PVC FRLSH (Flame retardant cables with reduced halogen evolution and smoke)
b.	Minimum thickness (at any point ofmeasurement)	mm	0.5
4	**Armour**		
a.	Type of armour		GS Round Wire
b.	Nominal Diameter	mm	2.5
c.	Tolerance	mm	±0.065
d.	Type of Zinc coating		Medium
e.	Mass of Zinc coating	g/m²	110
f.	Number of dips		1 dip for 1minute and 1 dip for ½ min
5	**Outer Sheath**		
a.	Minimum thickness (at any point of measurement)	mm	2.04
6	Marking On Drum and Cable Outer Sheath		Following details shall be provided on flanges of drum: a) Manufacturer's name b) Type of Cable c) Size of Cable d) Voltage Grade e) Length of the cable on the drum f) Direction of the rotation of the drum g) Gross mass h) Country of manufacture i) Year and month of manufacture j) Purchase Order no. k)DRUM NO. l) ISI Marking m) Property of TPNODL
7	Embossing on cable		**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) TPNODL c) Manufacturer name d) Month & Year of Manufacture e) Voltage grade

			f) Size of the cable g) Purchase Order no. h) Cable code i) ISI Marking

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 6%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		4
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
8	Type of Cable		Aluminium conductor, XLPE insulated, Extruded PVC inner sheath, Galvanized Steel Round wire armoured and PVC FRLSH outer sheathed cable
9	Core		One
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.
11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		Extruded PVC Compound Type ST2 as per IS:5831-1984
13	Armour		Galvanized steel round wire as per IS:3975-1999
14	Outer sheath		Extruded FRLSH PVC Compound Type ST2 as per IS:5831-1984

15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
  - for 4C cables - sector shaped
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.
- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).
- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be so applied that it shall be possible to remove it without Damaging the conductor.

CORE IDENTIFICATION:

- For 4C cable colored strips or colored insulation shall be applied on the core foridentification of cores in 4C cable. Red, Yellow, and Blue strips shall be used to identify different phase conductors and black strips shall be used to identify neutral conductors.
  - Bright Red line shall represent - R ph
  - Bright Yellow line shall represent - Y ph
  - Bright Blue line shall represent - B ph
  - For neutral core identification non-contact type laser printing or ink jet printing to be provided with 'N' printed on it at every span of 1 ft.
  - For 150 sq. mm. and above, the colored line shall be (3 mm width X 0.5 mmdepth from insulation surface) extruded/embedded on the insulation surface.
  - Below 150 sq. mm, the colored line shall be (2 mm width X 0.3 mm depth from insulation surface) extruded/embedded on the insulation surface.

LYING UP OF CORES:

- In multi-core cables, the cores shall be laid up together witha suitable lay, the outermost layer shall have to be right-hand lay and the successive layer shall be laid with opposite lay. Where necessary, the interstices shall be filled with non-hygroscopic material to make the laid-up cores circular. The layup plan of multi-cores shall be as per IS 7098 (Part-I):1988.

INNER SHEATH:

- Material – The inner sheath material shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of type ST 2 compound of IS:5831:1984 with latest amendments.
- Laying up – The laid-up cores shall be provided with an inner sheath applied by the pressurized Extrusion process. It shall be ensured that it is as circular as possible. The inner sheath shall be so applied that it fits closely on the laid-up coresand it shall be possible to remove it without damage to the underlying insulation of the cores. When one or more layers of proofed plastic tape are applied over the laid up cores as a binder, the thickness of such tapes shall not be construed as part of the extruded inner sheath.
- Thickness – The thickness of the inner sheath shall be as per IS-7098 (Part-I):1988.

ARMOURING:

- Material – The armouring shall be of galvanized round steel wires complying with the requirements of IS: 3975:1999 along with the latest amendments. The resistance measured for galvanized wires/strips when corrected to 20°C, shall comply with appropriate values mentioned in IS: 7098 (Part - I):1988. The round steel wires taken from the cable shall meet the following:
  - Tensile strength not less than 250 N/mm^2 and not more than 580 N/mm^2
  - Elongation at the break of round steel wires shall not be less than 6%
  - Round steel wire shall meet the requirement of the torsion test. The gauge length between vices and minimum no. of turns without break shall be asper IS 3975:1999.
  - The zinc coating shall not show any cracks and shall not flake off on rubbing by the bare finger when the round steel wire is subjected to a winding test.
  - The uniformity of round steel wire shall comply to the requirement of IS 3975:1999.
  - The mass of zinc coating of round steel wire shall not be less than 95 %that of mentioned in IS 3975:1999.
  - The resistivity of round steel wire shall meet the requirement of IS 3975:1999.
- Laying up – The armoring shall be applied over the inner sheath in multi-core cables. Thearmor wires shall be applied as closely as practicable (less than the diameterof a single wire in between the interstices). The direction of lay of the armor shall be left hand.
- Thickness – The dimensions of armour round wires shall be as per IS-7098(PartI):1988**.**
- Joints – The joints in armour wire shall be made by brazing or welding and the surface Irregularities shall be removed. A joint in any wire shall be at least 300 mmfrom the nearest joint in any other armour wire in the completed cable.

OUTER SHEATH

- Material – The outer sheath shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of Type ST-2 of IS – 5831:1984 with latest amendments. Surface should be smooth. The sheath shall be ultraviolet protected for operation in direct sunlight. It shall be free from voids/bubbles/ bulges & mechanical scratches and damages. Surface should be smooth.
- Laying up – The outer sheath shall be applied by an extrusion process, It shall be tightly applied:
  - Over the armouring in case of armoured cables.
- Thickness – The thickness of the outer sheath shall be as per IS: 7098 (Part - I):1988. Colour The outer sheath shall be blue in color

6. **NAME PLATE & MARKING**

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 4Cx150 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 4Cx150 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

1. Tests on Conductor
   - Tensile test
   - Wrapping test
   - Resistance test
2. Test for armouring wires as per IS 3975:1999
   - Dimensional check
   - Tensile strength
   - Elongation at break
   - Torsion test (for round wires)
   - Winding test (for round wires)
   - Uniformity of zinc coating
   - Mass of zinc coating
   - Resistivity
3. Test for thickness for insulation and sheath
4. Physical tests for insulation
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Hot set test
   - Shrinkage test
   - Water absorption/gravimetric
5. Physical tests for outer sheath
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Loss of mass in air oven
   - Shrinkage test
   - Hot deformation
   - Heat shock
   - Thermal stability
6. Insulation resistance (Volume resistivity) test
   - High voltage test
   - Flammability test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule

shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

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Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTUREING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 1CX95 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√

2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm thepurchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Date:

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 4CX185 sqmm armoired XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

LT 1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %
- Average Annual Rainfall 1800 mm

- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

Sl/No	TECHNICAL PARTICULARS	Unit	DESIRED VALUE
Size of cable		sq.mm	**4C*185**
1	**Conductor**		
a.	**Type**		Aluminium
b.	**Grade**		H4
c.	No. of cores	Nos.	4
d.	Maximum dc resistance of conductor at 20°C	ohm/km	0.164
e.	Short circuit capacity for one second	kA	17.48
f.	Continuous current rating at 40degC	A	350
g.	Minimum number of wires in the conductor	Nos.	30
h.	Shape of conductor		Stranded Sector Shaped
2	**Insulation**		
a.	Nominal thickness	mm	1.6
b.	Minimum thickness (at any point of measurement))	mm	1.54
3	**Inner sheath**		

a.	Type		For TPNODL-Extruded PVC FRLSH (Flame retardant cables with reduced halogen evolution and smoke)
b.	Minimum thickness (at any point ofmeasurement)	mm	0.5
4	**Armour**		
a.	Type of armour		GS Round Wire
b.	Nominal Diameter	mm	2.5
c.	Tolerance	mm	±0.080
d.	Type of Zinc coating		Medium
e.	Mass of Zinc coating	g/m²	120
f.	Number of dips		2 dip for 1minute and 1 dip for ½ min
5	**Outer Sheath**		
a.	Minimum thickness (at any point of measurement)	mm	2.2
6	Marking On Drum and Cable Outer Sheath		Following details shall be provided on flanges of drum: a) Manufacturer's name b) Type of Cable c) Size of Cable d) Voltage Grade e) Length of the cable on the drum f) Direction of the rotation of the drum g) Gross mass h) Country of manufacture i) Year and month of manufacture j) Purchase Order no. k)DRUM NO. l) ISI Marking m) Property of TPNODL

7	Embossing on cable		**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) TPNODL c) Manufacturer name d) Month & Year of Manufacture e) Voltage grade f) Size of the cable g) Purchase Order no. h) Cable code i) ISI Marking

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 6%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		4
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
8	Type of Cable		Aluminium conductor, XLPE insulated, Extruded PVC inner sheath, Galvanized Steel Round wire armoured and PVC FRLSH outer sheathed cable
9	Core		One
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.

11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		Extruded PVC Compound Type ST2 as per IS:5831-1984
13	Armour		Galvanized steel round wire as per IS:3975-1999
14	Outer sheath		Extruded FRLSH PVC Compound Type ST2 as per IS:5831-1984
15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
    - for 4C cables - sector shaped
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.
- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with

latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).

- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be so applied that it shall be possible to remove it without Damaging the conductor.

CORE IDENTIFICATION:

- For 4C cable colored strips or colored insulation shall be applied on the core foridentification of cores in 4C cable. Red, Yellow, and Blue strips shall be used to identify different phase conductors and black strips shall be used to identify neutral conductors.
  - Bright Red line shall represent - R ph
  - Bright Yellow line shall represent - Y ph
  - Bright Blue line shall represent - B ph
  - For neutral core identification non-contact type laser printing or ink jet printing to be provided with 'N' printed on it at every span of 1 ft.
  - For 150 sq. mm. and above, the colored line shall be (3 mm width X 0.5 mmdepth from insulation surface) extruded/embedded on the insulation surface.
  - Below 150 sq. mm, the colored line shall be (2 mm width X 0.3 mm depth from insulation surface) extruded/embedded on the insulation surface.

LYING UP OF CORES:

- In multi-core cables, the cores shall be laid up together witha suitable lay, the outermost layer shall have to be right-hand lay and the successive layer shall be laid with opposite lay. Where necessary, the interstices shall be filled with non-hygroscopic material to make the laid-up cores circular. The layup plan of multi-cores shall be as per IS 7098 (Part-I):1988.

INNER SHEATH:

- Material – The inner sheath material shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of type ST 2 compound of IS:5831:1984 with latest amendments.
- Laying up – The laid-up cores shall be provided with an inner sheath applied by the pressurized Extrusion process. It shall be ensured that it is as circular as possible. The inner sheath shall be so applied that it fits closely on the laid-up coresand it shall be possible to

remove it without damage to the underlying insulation of the cores. When one or more layers of proofed plastic tape are applied over the laid up cores as a binder, the thickness of such tapes shall not be construed as part of the extruded inner sheath.

- Thickness – The thickness of the inner sheath shall be as per IS-7098 (Part-I):1988.

ARMOURING:

- Material – The armouring shall be of galvanized round steel wires complying with the requirements of IS: 3975:1999 along with the latest amendments. The resistance measured for galvanized wires/strips when corrected to 20°C, shall comply with appropriate values mentioned in IS: 7098 (Part - I):1988. The round steel wires taken from the cable shall meet the following:
  - Tensile strength not less than 250 N/mm^2 and not more than 580 N/mm^2
  - Elongation at the break of round steel wires shall not be less than 6%
  - Round steel wire shall meet the requirement of the torsion test. The gauge length between vices and minimum no. of turns without break shall be asper IS 3975:1999.
  - The zinc coating shall not show any cracks and shall not flake off on rubbing by the bare finger when the round steel wire is subjected to a winding test.
  - The uniformity of round steel wire shall comply to the requirement of IS 3975:1999.
  - The mass of zinc coating of round steel wire shall not be less than 95 %that of mentioned in IS 3975:1999.
  - The resistivity of round steel wire shall meet the requirement of IS 3975:1999.
- Laying up – The armoring shall be applied over the inner sheath in multi-core cables. Thearmor wires shall be applied as closely as practicable (less than the diameterof a single wire in between the interstices). The direction of lay of the armor shall be left hand.
- Thickness – The dimensions of armour round wires shall be as per IS-7098(PartI):1988**.**
- Joints – The joints in armour wire shall be made by brazing or welding and the surface Irregularities shall be removed. A joint in any wire shall be at least 300 mmfrom the nearest joint in any other armour wire in the completed cable.

OUTER SHEATH

- Material – The outer sheath shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of Type ST-2 of IS – 5831:1984 with latest amendments. Surface should be smooth. The sheath shall be ultraviolet protected for operation in direct sunlight. It shall be

free from voids/bubbles/ bulges & mechanical scratches and damages. Surface should be smooth.

- Laying up – The outer sheath shall be applied by an extrusion process, It shall be tightly applied:
  - Over the armouring in case of armoured cables.
- Thickness – The thickness of the outer sheath shall be as per IS: 7098 (Part - I):1988. Colour The outer sheath shall be blue in color

6. NAME PLATE & MARKING

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components

shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 4Cx185 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 4Cx185 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

1. Tests on Conductor
   - Tensile test
   - Wrapping test
   - Resistance test
2. Test for armouring wires as per IS 3975:1999
   - Dimensional check
   - Tensile strength
   - Elongation at break
   - Torsion test (for round wires)
   - Winding test (for round wires)
   - Uniformity of zinc coating
   - Mass of zinc coating
   - Resistivity
3. Test for thickness for insulation and sheath
4. Physical tests for insulation
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Hot set test
   - Shrinkage test
   - Water absorption/gravimetric
5. Physical tests for outer sheath
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Loss of mass in air oven
   - Shrinkage test
   - Hot deformation
   - Heat shock
   - Thermal stability

6. Insulation resistance (Volume resistivity) test
   - High voltage test
   - Flammability test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.
Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.MINIMUN TESTING FACILITY

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTUREING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 4CX185 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension Drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm thepurchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Date:

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer'sworks, packing & forwarding, supply and unloading at stores/ site, and performance of 4CX240 sqmm armored XLPE cable trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

1.1 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %

- Average Annual Rainfall 1800 mm
- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

Sr. No	PARTICULARS	UNIT	4C X 240 Sq.mm
1	NAME OF THE MANUFACTURER		
2	APPLICABLE STANDARD		IS : 7098 (PART-1) 1988
3	VOLTAGE GRADE	Volts	1100
4	PERMISSIBLE VOLTAGE VARIATION	%	± 10
5	PERMISSIBLE FREQUENCY VARIATION	%	± 5
6	COMBINED VOLTAGE & FREQUENCY VARIATION	%	± 10
7	TYPE OF CABLE		A2XWY
8	NO./NOM. CROSS SECTIONAL AREA OF CONDUCTOR	Nos. X Sq.mm	4C X 240
9	CONDUCTOR MATERIAL & SHAPE		H2/H4 GRADE ALUMINIUM - STRANDED SECTOR SHAPED (AS PER IS : 8130 - 2013)
10	XLPE INSULATION (NOM./MIN. THICKNESS)	mm	1.7 / 1.43
11	CORE IDENTIFICATION		BY RED, YELLOW, BLUE & BLACK COLOURED INSULATION
12	INNER SHEATH - BLACK EXTRUDED PVC (MIN. THICKNESS)	mm	0.6
13	ARMOUR - GALVANISED STEEL ROUND WIRE (NOM. DIAMETER)	mm	2.5 ± 0.065

14	OUTER SHEATH - BLACK PVC TYPE ST-2 IS:5831-84 (MIN. THICKNESS)	mm	2.36
15	APPROX. OVERALL DIA. OF CABLE	mm	60
16	APPROX. NET WEIGHT OF CABLE	Kg/Km	6050
17	PACKING		
	a.) Std. Packing length	Mtrs	500 ± 5%
	b) Type of Drum		WOODEN DRUM
18	NON STANDARD LENGTH		NON - STANDARD LENGTH NOT LESS THAN 100 MTRS. UP TO 5% OF ORDER QTY.
19	ORDER QUANTITY TOLERANCE		±2%
20	MAX. CONDUCTOR TEMPERATURE AT RATED CURRENT	°C	90
21	MAX. CONDUCTOR TEMP. AT THE END OF SHORT CIRCUIT	°C	250
22	MAX. D.C RESISTANCE OF CONDUCTOR AT 20˚C	Ohm/Km	0.125
23	MAX. A.C RESISTANCE AT MAX. TEMP.	Ohm/Km	0.16
24	APPROX. REACTANCE AT 50 Hz	Ohm/Km	0.072
25	APPROX. CAPACITANCE	µF/Km	0.66
26	CONTINUOUS CURRENT CARRYING CAPACITY		
	a) In Air (at 40^0C)	Amps	392
	b) In Ground (at 30^0C)	Amps	327
	c) In Duct (at 30^0C)	Amps	276
27	SHORT CIRCUIT RATING OF CONDUCTOR (DURATION 1 SEC.)	KA	22.65
28	MIN. SAFE BENDING RADIUS OF CABLE	mm	12 TIMES O.D.
29	SAFE PULLING FORCE (WHEN PULLED BY PULLING EYE)	N/Sq.mm	30
30	SEQUENTIAL LENGTH MARKING		SEQUENTIAL LENGTH MARKING SHALL BE PROVIDED ON OUTER SHEATH AT EVERY METER BY HOT FOIL INDENTING/PRINTING

31	Embossing		**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) Propery of TPNODL c) Manufacturer name d) Month & Year of Manufacture **e) Voltage grade** **f) Size of the cable** **g) Purchase Order no.** **h) Cable code** **i) ISI Marking**

NOTE -

1. The particulars given above are nominal & are subject to normal manufacturing tolerances.
2. The current rating given above are based on standard conditions of installation - cable laid singly, thermal resistivity of soil 150˚C Cm/W & depth of laying 750 mm.
3. All the drums shall be packed by PP sheet over the outermost cable layer

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 10%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		4
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
	Type of Cable		Aluminium conductor, XLPE insulated, Extruded PVC

8			inner sheath, Galvanized Steel Round wire armoured and PVC FRLSH outer sheathed cable
9	Core		Four
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.
11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		Extruded PVC Compound Type ST2 as per IS:5831-1984
13	Armour		Galvanized steel round wire as per IS:3975-1999
14	Outer sheath		Extruded FRLSH PVC Compound Type ST2 as per IS:5831-1984
15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
    - for 4C cables - sector shaped
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The

insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.

- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).
- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be so applied that it shall be possible to remove it without Damaging the conductor.

CORE IDENTIFICATION:

- For 4C cable colored strips or colored insulation shall be applied on the core foridentification of cores in 4C cable. Red, Yellow, and Blue strips shall be used to identify different phase conductors and black strips shall be used to identify neutral conductors.
    - Bright Red line shall represent - R ph
    - Bright Yellow line shall represent - Y ph
    - Bright Blue line shall represent - B ph
    - For neutral core identification non-contact type laser printing or ink jet printing to be provided with 'N' printed on it at every span of 1 ft.
    - For 150 sq. mm. and above, the colored line shall be (3 mm width X 0.5 mmdepth from insulation surface) extruded/embedded on the insulation surface.
    - Below 150 sq. mm, the colored line shall be (2 mm width X 0.3 mm depth from insulation surface) extruded/embedded on the insulation surface.

LYING UP OF CORES:

- In multi-core cables, the cores shall be laid up together witha suitable lay, the outermost layer shall have to be right-hand lay and the successive layer shall be laid with opposite lay. Where necessary, the interstices shall be filled with non-hygroscopic material to make the laid-up cores circular. The layup plan of multi-cores shall be as per IS 7098 (Part-I):1988.

INNER SHEATH:

- Material – The inner sheath material shall be of polyvinyl chloride (PVC) FRLSH (Flame

retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of type ST 2 compound of IS:5831:1984 with latest amendments.

- Laying up – The laid-up cores shall be provided with an inner sheath applied by the pressurized Extrusion process. It shall be ensured that it is as circular as possible. The inner sheath shall be so applied that it fits closely on the laid-up coresand it shall be possible to remove it without damage to the underlying insulation of the cores. When one or more layers of proofed plastic tape are applied over the laid up cores as a binder, the thickness of such tapes shall not be construed as part of the extruded inner sheath.
- Thickness – The thickness of the inner sheath shall be as per IS-7098 (Part-I):1988.

ARMOURING:

- Material – The armoring shall be of galvanized round steel wires complying with the requirements of IS: 3975:1999 along with the latest amendments. The resistance measured for galvanized wires/strips when corrected to 20°C, shall comply with appropriate values mentioned in IS: 7098 (Part - I):1988. The round steel wires taken from the cable shall meet the following:
  - Tensile strength, not less than 250 N/mm^2 and not more than 580 N/mm^2
  - Elongation at the break of round steel wires shall not be less than 6%
  - Round steel wire shall meet the requirement of the torsion test. The gauge length between vices and minimum no. of turns without break shall be asper IS 3975:1999.
  - The zinc coating shall not show any cracks and shall not flake off on rubbing by the bare finger when the round steel wire is subjected to a winding test.
  - The uniformity of round steel wire shall comply to the requirement of IS 3975:1999.
  - The mass of zinc coating of round steel wire shall not be less than 95 %that of mentioned in IS 3975:1999.
  - The resistivity of round steel wire shall meet the requirement of IS 3975:1999.
- Laying up – The armoring shall be applied over the inner sheath in multi-core cables. Thearmor wires shall be applied as closely as practicable (less than the diameterof a single wire in between the interstices). The direction of lay of the armor shall be left hand.
- Thickness – The dimensions of armour round wires shall be as per IS-7098(PartI):1988**.**
- Joints – The joints in armour wire shall be made by brazing or welding and the surface Irregularities shall be removed. A joint in any wire shall be at least 300 mmfrom the nearest joint in any other armour wire in the completed cable.

OUTER SHEATH

- Material – The outer sheath shall be of polyvinyl chloride (PVC) FRLSH (Flame retardant cables with reduced halogen evolution and smoke) compound conforming to the requirements of Type ST-2 of IS – 5831:1984 with latest amendments. Surface should be smooth. The sheath shall be ultraviolet protected for operation in direct sunlight. It shall be free from voids/bubbles/ bulges & mechanical scratches and damages. Surface should be smooth.
- Laying up – The outer sheath shall be applied by an extrusion process, It shall be tightly applied:
  - Over the armoring in case of armored cables.
- Thickness – The thickness of the outer sheath shall be as per IS: 7098 (Part - I):1988. Colour The outer sheath shall be blue in color

SEALING OF END CAP:

- The ends of the cable shall be sealed with heat shrinkable caps.

CABLE DRUM:

- Cables shall be furnished in the specified reels or coil lengths of 500 meters. Drums shall be of non-returnable wooden drums as per IS 10418:1982 and the drums should be free from defects such as cracks, knots, warps, and split. The ends of the cables shall be suitably sealed by means of non-hygroscopic sealing. The tolerance on the Drum length shall be +/- 3%.

6. NAME PLATE & MARKING

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.

- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 4Cx300 sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 4Cx300 sqmm XLPE cable for the tests as mentioned belowand as per reference standards. A complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

1. Tests on Conductor
   - Tensile test
   - Wrapping test
   - Resistance test
2. Test for armouring wires as per IS 3975:1999
   - Dimensional check
   - Tensile strength
   - Elongation at break
   - Torsion test (for round wires)
   - Winding test (for round wires)
   - Uniformity of zinc coating
   - Mass of zinc coating
   - Resistivity
3. Test for thickness for insulation and sheath

4. Physical tests for insulation
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Hot set test
   - Shrinkage test
   - Water absorption/gravimetric
5. Physical tests for outer sheath
   - Tensile strength and elongation at break
   - Ageing in air oven
   - Loss of mass in air oven
   - Shrinkage test
   - Hot deformation
   - Heat shock
   - Thermal stability
6. Insulation resistance (Volume resistivity) test
   - High voltage test
   - Flammability test

8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, a Type test certificate shall be produced.

9. PRE DISPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of

furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

- Test reports
- MDCC issued by TPNODL
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- Other Documents (as applicable).

10.INSPECTION AFTER RECEIVE AT STORE

The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

11.GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract whichever is later, (the time scale of 48/60 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.

Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

13.TENDER SEMPLE

Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

14.QUALITY CONTROL

The bidder shall submit with the offered Quality assurance plan indicating the various stages of inspection, the tests, and checks which will be carried out on the material of construction, components during manufacture and bought out items, and fully assembled components and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.MINIMUN TESTING FACILITY

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

16.MANUFACTURING FACILITY

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 4CX240 SQMM XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension Drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions

and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those fea detailed above.

Seal of the Company:

Signature:

Date:

CONTENT

1. SCOPE

This specification covers the technical requirements of design, manufacture, test at manufacturer's works, packing & forwarding, supply and unloading at stores/ site, and performance of 55 sqmm XLPE unarmored cable for trouble-free and efficient operation. The specific requirements are covered in the enclosed technical datasheet.

2. APPLICATION STANDARD

Items covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards/ IEC/ International Standards and shall conform to the regulations of local statutory authorities.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Crosslinked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes for armouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.

3. CLIMATIC CONDITION

The material shall be suitable for following climatic conditions,

- Maximum Ambient Temperature 50 ^{o}C
- Maximum Daily Average Ambient Temperature 40 ^{o}C
- Minimum Ambient Temperature 2 ^{o}C
- Maximum Humidity 99.7 %
- Minimum Humidity 15 %

- Average Annual Rainfall 1800 mm
- Average Wind Speed prevailing in the area 200 km/hr.
- Average Thunderstorms prevailing in the area 70 days per annum
- Average dust storms prevailing in the area 20 days per annum
- Average number of rainy days per annum 160
- Maximum Altitude above sea level 1200 m
- Seismic Level 0.24g to 0.48g

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4. GENERAL TECHNICAL REQUIREMENT

TECHNICAL PARTICULARS FOR XLPE INSULATED CABLE				
Sl. No.		**Technical Parameter**	**Units**	**55 SQMM INSULATED CABLE**
1		**Type of Cable**		1CX55 SQMM XLPE INSULATED CABLE
2		**Voltage Grade**		1100V
3		**Construction**		7/3.15
5		**Type of Conductor Material**		H2/H4 EC Grade Aluminium Conductor
6		**Number of Stands**	Nos	7
7		**Maximum Resistance at 20˚C (Max)**	ohm/km	0.540
8		**Type of Insulation**		XLPE
9		**Colour of Insulation**		Black
10		**Insulation Thickness (Nominal)**	mm	1.50
11		**Hot Set Test of insulation**		
	1	Elongation Under Load (Max)	%	175
	2	Permanent set after cooling (Max)	%	15
	3	Treatment : Temperature		200° C ±3
	4	Time Under load		15 min
12		**Tensile Strength of insulation**		
	1	Tensile Strength (Min)	N/mm^2	12.50
	2	Elongation at break (Min)	%	200
13		**Shrinkage Test of insulation**		

	1	Shrinkage (Max)	%	4
	2	Treatment : Temperature		130° C ±3
	3	Time Under load		1 Hour
14		**Volume Resistivity of Insulation**		
	1	at 27° C (min)	ohm-cm	1 X 10'³
	2	at 70° C (min)	ohm-cm	1 X 10''
15		Assembly Lay Direction		RH
16		Standard Length per Drum / Coil	meter	As per Vender
17		Spark Test		Ok
18		**Weight of Cable (Approx)**	Kg /Km	197
19		Marking On Drum and Cable Outer Sheath	Following details shall be provided on flanges of drum: a) Manufacturer's name b) Type of Cable c) Size of Cable d) Voltage Grade e) Length of the cable on the drum f) Direction of the rotation of the drum g) Gross mass h) Country of manufacture i) Year and month of manufacture j) Purchase Order no. k)DRUM NO. l) ISI Marking m) Property of TPNODL	
20		Embossing on cable	**Embossing on cable** shall be clearly visible. At interval of every 1 meter, following details to be embossed: a) Sequential meter marking (shall be marked through printing) b) TPNODL c) Manufacturer name d) Month & Year of Manufacture e) Voltage grade f) Size of the cable g) Purchase Order no. h) Cable code i) ISI Marking	

5. GENERAL CONSTRUCTION

S. NO.	Description	Units	Requirement
1	Voltage grade	kV	1.1
2	System Voltage	V	415
3	Variation in supply Voltage	%	± 6%
4	Variation ins upply Frequency	Hz	50 ± 5%
5	Number of phases		1
6	System grounding		Suitable for earthed systems and unearthed Systems
7	Fault level		The cables shall be suitable for withstanding without damage; thermal and mechanical stresses due to short circuit currents for 1 Second
8	Type of Cable		Aluminium conductor, XLPE insulated,
9	Core		One
10	Conductor		Electrolytic Grade Aluminium conforming to IS 8130, and are Compact circular.
11	Insulation		High grade XLPE insulation by extrusion process as per IS: 7098 (Part-I) – 1988
12	Inner sheath		NA
13	Armour		NA
14	Outer sheath		NA
15	Standard length of cable on a drum with tolerance	M	As mentioned in Clause No.12 of this specification

CONDUCTOR:

- Material – Class 2, high electrical conductivity plain Aluminum, Stranded, GradeH2/H4.
- Shape – Before stranding, the conductor shall be circular in cross-section, uniformin Quality, solid, smooth and free from scale, sharp edges and other defects. Shape as per no. of cores:
    - for 1C - compacted circularas per IS 8130:1984
- Permissible joints – Conductors shall conform to the relevant standard for a permissible number of joints in any one of the single wires forming every complete length ofconductor, for location of joints in same layer of conductors and for method of makingsuch Joints.No joint shall be made in any conductor after it is stranded.

INSULATOR:

- Material – The insulating material shall be Cross-Linked Polyethylene (XLPE) cured by dry-curing process and applied by extrusion process as per IS-7098 (Part I):1988 and its latest amendments. The insulation properties shall bestable under thermal conditions arising out of continuous operation at a conductor temperature of 90 degrees Centigrade rising momentarily to 250 degrees Centigrade under short circuit conditions.
  The insulating material shall have excellent electrical properties with regard to resistivity dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at elevated temperatures or when immersed in water. The insulation shall be preferably fire resistant and resistant to chemicals like acids, alkalis, oils, and ozone. The quality of insulation shall be good and shall not deterioratewhen exposed to climatic conditions and shall be uniform, free from voids,Scratches, and longitudinal grooves. The surface should be smooth.
- Thickness – The average thickness of the insulation shall be as per IS 7098 (Part- I):1988 with latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-I):1988. The smallest value of the thickness of insulation shall not fall below the nominal value (ti) as specified in IS 7098 (Part 1):1988 by more than 0.1 mm+/- 0.1 (ti).
- Insulation fittings - It shall fit tightly to the conductor and shall be applied concentrically about the Conductor in thickness consistent with the voltage classification. The insulation shall be so applied that it shall be possible to remove it without damaging the conductor.

SEALING OF END CAP:

- The ends of the cable shall be sealed with heat shrinkable caps.

CABLE DRUM:

- Cables shall be furnished in the specified reels or coil lengths of 500 meters. Drums shall be of non-returnable wooden drums as per IS 10418:1982 and the drums should be free from defects such as cracks, knots, warps, and split. The ends of the cables shall be suitably sealed by means of non-hygroscopic sealing. The tolerance on the Drum length shall be +/- 3%.

6. NAME PLATE & MARKING

The cable shall carry the following information either stenciled on the drum or contained in a labelattached to it:

- Reference to the Standards.
- Manufacturer's name
- Type of cable.
- Voltage grade.
- Number of cores.
- Nominal cross-section area of the conductor.
- Length of the cable on the drum.
- Length of the cable per m.
- Marking of PO
- Direction of rotation of the drum.
- Gross mass.
- Country of manufacture.
- Year of manufacture.
- ISI Certification mark.
- Property of TPNODL

7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the TPNODL authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 35sqmm XLPE cable in additions to others specified in the IS/IEC Standards. Bidder shall furnish the type test report of 55 sqmm XLPE unarmored cable for the tests as mentioned belowand as per reference standards. Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI /

ERDA only. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of Permission.

Type Tests:

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   - Tensile test
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8. TYPE TEST CERTIFICATE

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, the same shall be carried out without any cost implication to TPNODL. TPNODL has rights for Surveillance tests of randomly selected samples from the third-party lab for quality checks of items. TPNODL shall be intimated in case revision is done by the manufacturer in product design/ dimension/ material during the execution of the contract. Subsequently, Type test certificate shall be produced.

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Following documents shall be sent along with material

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- Other Documents (as applicable).

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The material received at TPNODL, Balasore, Odisha store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering and contracts department.

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Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12.PACKING

The cable shall be wound on wooden drums and packed in line with the requirements of IS 10418-1982. The ends of the cable shall be sealed by means of non-hygroscopic sealing material.
Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

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Bidder shall submit the sample of material during the tender evaluation process with the offer (in case of first supply to TPNODL).

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The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan.

17.SPARES, ACCESSORIES & TOOLS

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of 55 sqmm XLPE cable along with the installation procedure.

18.DRAWING & DOCUMENT

Following documents shall be prepared based on TPNODL specifications and statutoryrequirements with complete BOM and shall be submitted with the bid:

- Completely filled in Technical Particulars.
- General description of the equipment and all components including brochures.
- Type test Certificates
- Experience List.

After the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detailshall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submittedafterthe final approval of the same to the purchaser

Following Drawings/Documents shall be submitted after the award of the contract

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2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of XLPE compound.		√	√
4	Cross sectional area of the cable		√	√
5	Installation Instructions		√	√
6	Instructions for use		√	√
7	Transport/shipping dimension Drawing		√	√
8	QA & QC Plan	√	√	√
9	Routine, Acceptance and Type test Certificates	√	√	√
10	Fault level calculation for armorand manual	√	√	√

All the Documents and Drawings shall be in the English Language.

Instruction Manuals: Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of the nicely boundmanual (in the English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.

19.SCHEDULE OF DEVIATION

TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm thepurchaser's specifications:

S. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Date: