



ISO 9001 & 14001 CORPORATION

COVER – I

TECHNICAL BID DOCUMENTS / DETAILED TENDER CALL NOTICE FOR THE WORK

Name of the Work: ***CONSTRUCTION OF 11 KV UG LINE TOWARDS SHIFTING OF EXISTING 11 KV OH LINE FROM PREMISES OF M/S NESTLE AT MUNDAAMBA INDUSTRIAL ESTATE, KHORDHA.***

Estimated Cost Put To Tender:

**₹ 57,44,156/-**

(Percentage Rate Based Tender)

**DIVISIONAL HEAD (ELECT)  
IDCO, BHUBANESWAR.**

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## Invitation for Bids

**Bid Identification No: BBSR/ELECT/e- 12 /2026-27**

1. The Divisional Head, Electrical Division - I, 8<sup>th</sup> Floor, IDCO Tower, Bhubaneswar invites **Percentage rate** bids in **double cover system** in online mode only, for the following work.

Sl. No	Name of Work	Value of work	Divisional Head with Headquarters	Bid Security	Tender fee(Including GST)	Period of Completion	Class of Bidder
1.	Construction of 11 KV UG line towards shifting of existing 11 KV OH line from premises of M/s Nestle at Mundaamba Industrial Estate, Khordha.	Rs. <b>57,44,156/-</b>	Divisional Head, Electrical Division-I, IDCO, Bhubaneswar	Rs. <b>57,500/-</b>	Rs.11,800/- (to be paid on-line)	<b>6 (Six)</b> Calendar Month	HT Electrical Contractors having valid license issued by ELBO.

2. Bid documents such as DTCN / BOQ etc. can be seen / downloaded from [www.tendersodisha.gov.in](http://www.tendersodisha.gov.in) during the period from 17.00 Hours of dt.19.06.2026 to 17.00 Hours of dt.30.06.2026.
3. Online bids shall be received till 17.00 Hours of dt. 30.06.2026.
4. Bidders are required to furnish "Tender fee & Bid security" in on-line mode only within the bid submission period. Non submission of the same shall lead to blacklisting of the agency / contractor.
5. The technical bids will be opened at 11.00 Hours of dt. 01.07.2026 in the office of the Divisional Head, Electrical, 8<sup>th</sup> Floor, IDCO Tower, Bhubaneswar.
6. The bidder must possess compatible Digital Signature Certificate (DSC) of Class – II or Class – III.
7. The authority reserves the right to reject any or all bids without assigning any reason thereof.

Sd/-  
Divisional Head (Elect)-I  
IDCO, Bhubaneswar

### **Odisha Industrial Infrastructure Development Corporation**

(A Government of Odisha Undertaking)  
8<sup>th</sup> Floor, Main Building, IDCO Tower, Janpath, Bhubaneswar - 751022, Odisha, INDIA  
dhelectrical@idco.in | [www.idco.in](http://www.idco.in)

**CHECKLIST TO BE ENSURED BY THE BIDDER**

Sl. No	Particulars	Reference to DTCN Clause No.	Whether furnished		Reference to Page no.
			Yes	No	
01.	Tender fee of <b>Rs.11,800/-</b> (To be paid online)	No.4 & 5(i)			
02.	Bid Security (EMD) of <b>Rs. 57,500.00</b> (1% of estimated cost put to tender).	No.5(i) & 20			
	E.M.D @2%in case of deploying machineries outside the State.	No.5 (i) & 20			
03	Additional Performance Security in case the bid price/rate is less than the estimated cost put to tender. <b>(to be submitted by the successful lowest (L1) bidder only within 7 days of issue of LOA )</b>	No.62			
04.	Copy of valid <b>Electrical HT license issued by ELBO with experience in similar nature of work.</b>	No.5(i) & 21			
05.	Copy of valid <b>GST Registration Certificate</b>	No.5(i) & 21 <b>(Required)</b>			
06.	Copy of PAN Card	No.5(i) & 21 <b>(Required)</b>			
07.	EPF Registration	No.5(i) & 21 <b>(Required)</b>			
08.	EPF Latest Challan WITHIN 2 MONTHS Of this Tender	No.5(i) & 21 <b>(Required)</b>			
09.	Copy of Profit & Loss Statement of last 5 FYs	No.5(i)			
10.	No Relationship Certificate in Schedule – A & Schedule – I	No.35 <b>(Required)</b>			
11.a	Works Experience: List of projects under execution that are similar in nature to the work.	Schedule – B <b>(Not Required)</b>			
11.b	Works Experience: <b>List of projects completed that are similar in nature to the work. (with all details as per Schedule –D format)</b>	Schedule –D <b>(Required)</b>			
12. <b>(A)</b>	Information regarding current litigation, debaring / expelling of the tender or abandonment of the work by the tenderer (Schedule-E)	No.49 <b>(Required)</b>			
<b>(B)</b>	Affidavit (Schedule-F) <b>(to be uploaded)</b>	No.49 <b>(Required)</b>			
13.	Assessed Available Bid Capacity.	No. 112 (h) <b>(Deleted)</b>			
14.	<del>Manufacturer's Authorization Form (MAF) as per Annexure B.</del>	<b>Annexure B</b>			
15.	Similar nature of work.	No. 112 (g)			
16.	Qualification of Key personnel engaged. (Schedule (G)	No. 64			
17.	Work Programme.	<b>(Required)</b>			
18.	e-mail ID &	<b>(Required)</b>			
19.	Contact no	<b>(Required)</b>			
<p><b>NB: Documents as per the requirement of the DTCN &amp; Technical Specification should be uploaded even though those are not mentioned in the above check list.</b></p> <p><b>2. Unless “Not Required” is mentioned, all as per the above check list should be uploaded. Any lapse on the part of the bidder is to be considered as sufficient ground for rejection of the bid.</b></p>					

## CONTRACT DATA

### A. GENERAL INFORMATIONS

SI No	Item	Details
1	Name of the Work	<b>Construction of 11 KV UG line towards shifting of existing 11 KV OH line from premises of M/s Nestle at Mundaamba Industrial Estate, Khordha.</b>
2	Employer	Divisional Head (Elect), IDCO
3	Employer's Representative.	Divisional Head, Electrical Division - I, IDCO, Bhubaneswar
4	<u>Estimated Cost (In.)</u> Total	<b>Rs. 57,44,156/-</b>

### B. BID INFORMATION

5	Intended completion period/Time period assigned for Completion	6 (Six) Calendar Month.	
6	Last Date & time of submission of Bid	<b>17.00 Hours of dt: 30.06.2026.</b>	
7	Tender fee		
	i	Amount	<b>Rs.11,800/-</b>
	<b>OPWD</b>	Instructions to be followed for <b>online</b> payment available in the e-Procurement portal during the processing of tender by the bidder.	
8	Bid Security		
	i	Amount	<b>Rs.57,500.00</b> (1% of Estimated cost put to tender)
	ii		Instructions to be followed for <b>online</b> payment available in the e-Procurement portal during the processing of tender by the bidder.
	iii	Type of instrument	<b>As specified in Bid document.</b>
9	Additional Performance Security		
	i	Amount	No.62 (of DTCN)
	ii	In favour of	Divisional Head, Electrical Division - I, IDCO, Bhubaneswar
	iii	Type of instrument	As specified in Bid document ( <b>Clause 62 of DTCN</b> )
10	The Financial years of last Seven years	2019-2020 upto 2025-2026	
11	Bid validity period	<b>180 days</b>	
12	Currency of Contract	Indian Rupees	
13	Language of Contract	English	

# Instruction to Bidders (ITB)

## e-procurement.

### 1. NOTICE INVITING BID AND OBTAINING BID DOCUMENTS:

- 1.1.** The authority belonging to the major discipline is competent to invite tender of composite bids. He will also nominate the **Divisional Head, Electrical Division - I, IDCO** who will deal with all matters relating to the bids in the invitation of bids.
- 1.2.** For composite tender, estimated cost of each component should be clearly indicated in addition to combined estimated cost put to tender. The eligibility of bidders will correspond to the combined estimated cost of different components put to tender.
- 1.3.** The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules /amendments issued there under from time to time. If he fails to do so, it will be considered a breach of the contract and the **Divisional Head, Electrical Division - I, IDCO** may at his discretion without prejudice to any other right or remedy available under law, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the said Act by him.
- 1.4.** The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices quoted in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.
- 1.5.** The successful bidder shall complete the works by the intended completion date specified in the Contract data.
- 1.6.** Throughout these bidding documents, the terms "bid and tender" EMD and Bid Security and their derivatives (bidder / tenderer, bidding / tendering, etc.) are synonymous.
- 1.7.** In case the tender for composite work includes in addition to main work / building work all other ancillary works such as sanitary and water supply installations, drainage installation, electrical work, horticulture work, roads and paths and gate works in dams and canals etc. , the bidder apart from being a registered civil Contractor of appropriate class must associate himself with agencies of appropriate class those who is eligible to tender for sanitary and water supply drainage, electrical and horticulture works in the composite tender. Intending purchasers are not required to produce any documents viz. copy of Registration, Valid **GST Registration Certificate** etc. at the time of purchase of tender documents but will be required for verification purpose at later stage. Furnishing copy of such documents is mandatory along with the tender documents otherwise his/her bid shall be declared as non-responsive and thus liable for rejection. **The L1 Bidder is required to attend the officer inviting the bid for verification of original documents within five days of opening the Price bid.**
- 1.8.** PARTICIPATING IN THE BID IN THE E-PROCUREMENT PORTAL: The Contractor/ Bidder intending to participate in the bid is required to register in the Portal with some information about the firm/Contractor. This is a onetime activity for registering in Portal. During registration, the contractor has to attach a Digital Signature Certificate (DSC) to his / her unique user ID. The DSC used must be of appropriate class (Class II or Class III) issued from a registered Certifying Authority such as n-Code, Sify, TCS, MTNL e-Mudra etc.

**1.8.1.** To log on to the portal the Contractor/Bidder is required to type his/her *username* and password. The system will again ask to select the DSC and confirm it with the password of DSC. For each login, a user's DSC will be validated against its date of validity and also against the Certificate Revocation List (CRL) of respective CAs stored in system database. The system checks the unique ID, password and DSC combination and authenticates the login process for use of portal.

**1.8.2.** The tender documents uploaded by the Tender Inviting Officer in the website [www.tendersodisha.gov.in](http://www.tendersodisha.gov.in) will appear in the section of "Upcoming Tender" before the due date of tender sale. Once the due date has arrived, the tender will move to "Active Tender" Section of the homepage. Only a small notification will be published in the newspaper specifying the work details along with mention of the specific website for details. The publication of the tender will be for specific period of time till the last date of submission of bids as mentioned in the 'Invitation for Bid' after which the same will be removed from the list of Active tenders. Any bidder can view or down load the bid documents from the web site.

**1.8.3.** All bidders are to furnish EMD & Tender Fee in online mode (Instruction to be followed for online payment available in the e-procurement portal during the process of tender by the bidder). There will be no exemption to any bidder. If the EMD is furnished by any other mode other than the prescribed mode, the tender of such party is liable to be rejected.

**1.8.4.** If the software application has the provision of payment of Tender Fee through payment gateways of authorized bankers by directly debiting the account of the bidders, bidders will be required to avail online payment

**1.9.** The bidder intending to participate in the bid online shall furnish costs of bid in online mode (Instruction to be followed for online payment available in the e-procurement portal during the process of tender by the bidder)

**1.10. DELETED**

**1.11.** In the case of any failure, malfunction, or breakdown of the electronic system used during the e-procurement process, the tender inviting officer shall not accept any responsibility for failures or breakdowns other than in those systems strictly within their own control.

**1.12.** Any third party/company/person under a service contract for operation of e-procurement system in the State or his/their subsidiaries or their parent companies shall be ineligible to participate in the procurement processes that are undertaken through the e-procurement system irrespective of who operates the system.

## **2. ELIGIBLE BIDDERS:**

**2.1.** This Bid is open to all **Electrical HT license issued by ELBO with experience in similar nature of work** for execution of works. The Bidders are required to enclose the proof of registration from the registering authority along with the Bid subject only to the registration in the portal using his/her DSC for online bids. **The work experience, available technical personnel is to be furnished as per clause 112 of DTCN (enclosed).**

**Contractors not registered with Govt. of Odisha can participate in the e-procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the state Govt./IDCO before award of the work as per prevalent registration norms of the state.**

- 2.2.** All bidders *shall* provide a statement that the bidder is neither associated, nor has been associated, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by IDCO to provide consulting services for the preparation or supervision of the works, and any of its affiliates shall not be eligible to bid.
- 2.3.** If the bidder has a relative employed as an Officer in the rank of **Assistant Engineer/Under Secretary and above in the Government of Odisha in the concerned Department**, he shall inform the same in **Schedule-I** of the bid document mentioning the exact details in a covering letter along with the tender, failing which his bid will not be considered. Also if the fact of relationship subsequently comes to light, his contract will be rescinded. The bid security or the performance security will be forfeited and he shall be liable to make good any loss or damage resulting from such cancellation. In case the bidder has no relationship with any of the officers mentioned above he shall have to furnish with his bid an undertaking to that effect.
- 2.4.** He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the concerned Department. Any breach of this condition by the contractor would render him liable for penal action for suppression of facts.
- 2.5.** **No Engineer of gazetted rank or other gazetted officer employed in Engineering or Administrative duties in an Engineering Department of Govt. of Odisha/IDCO is allowed to work for contractor for a period of two years after his retirement from IDCO service, without prior permission of Govt. of Odisha/IDCO in writing. Such a contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of Govt. of Odisha/IDCO as aforesaid before submission of the tender for engagement in the contractor's service.**

### **3. QUALIFICATION CRITERIA:**

- 3.1.** For submission of Bids through the E-Procurement Portal, the bidder shall up-load the scanned copy/copies of documents listed under clause 3.2 in prescribed format wherever warranted in support of eligibility criteria and qualification information. **The L-1 bidder shall have to produce the original documents in support of the scanned copies and statements uploaded in the portal within 5 days of opening of price bid.** The Bids from Joint ventures are not acceptable.
- 3.2.** The bid shall include following information and documents.
- (a) Copy of valid contractor's registration certificate, PAN card, **GST Registration Certificate** should accompany the technical bid.
  - (b) Copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory.
  - (c) DELETED
  - (d) DELETED.
  - (e) DELETED.
  - (f) DELETED.
  - (G) DELETED.
  - (h) Electrical HT license issued by ELBO.**
  - (i) DELETED.
  - (j) Details of works executed during the last seven years.

(k) Copy of EPF Registration & Copy of latest Challan.

(L) **GST Registration Certificate**

**3.3. DELETED**

**3.4.** *The Bidders are subject to be disqualified if they have:*

- a. Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- b. Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- c. Participated in the previous bidding for the same work and had quoted unreasonable prices and could not furnish rational justification to the Engineer-in-Charge.
- d. Indulged in unlawful & corrupt means in obtaining bids.
- e. Been black listed/their registrations by the competent authority.

**4. ONE BID PER BIDDER:**

**4.1.** Each bidder shall submit only one bid for one package. A bid is said to be responsive if accompanied by **Tender Fee** and appropriate bid security. The system shall consider only the last bid submitted through the E-Procurement portal.

**5. COST OF BIDDING:**

**5.1.** The bidder shall bear all costs associated with the preparation and submission of his bid, and the Engineer-in-Charge will in no case be responsible and liable for those costs.

**5.2.** All the rates and prices in the bid shall cover all charges including labour cess but excluding GST.

**5.3.** The rate of royalties and taxes prevailing on the date of measurement shall be considered while making deductions in the bills.

**5.4.** The successful bidder shall make his own arrangement for all materials unless otherwise specified in the conditions of contract.

**6. SITE VISIT:**

**6.1.** Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A Bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The Bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of work.

**6.2. DELETED.**

**6.3.** The Officer inviting the bid **Engineer-in-Charge** will clarify queries on the Contract Data on requisition by the intending Bidder. The bidder may ask question in the e-procurement portal using his DSC; provided the questions are raised before the date mentioned in the home page under critical dates.

## **B. BIDDING DOCUMENTS**

### **7. GENERAL INSTRUCTIONS:**

**7.1.** The description of the work is as mentioned under Invitation for Bid.

**7.2.** The bids uploaded by the Tender Inviting Officer may consist of general arrangements drawings or typical sections of the project. Bidder may download these drawings and take out the print for detail study. Any other drawings and documents pertaining to the works available with the officer inviting the Bid as well as in the office of the **Divisional Head Electrical** as mentioned in the contract data will be open for inspection during working hours on all working days by the bidders. The bidder is required to download all the documents including the drawings for preparation of his bid. It is not necessary on the part of the Bidder to upload the drawings other Bid documents (after signing) while uploading his bid. He is required to upload documents related to his qualification information and Bill of Quantities duly filled in. It is assumed that while participating in the bid, the bidder has referred to all the drawings and documents uploaded by the Officer Inviting the Bids. Seeking any revision of rates or backing out of the bid claiming for not having referred to any or all documents provided in the Bid document by the Officer Inviting the Bids will be construed as plea to disrupt the bidding process and in such cases the bid security shall be forfeited.

**7.3.** The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, and technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk.

### **8. CLARIFICATION OF BIDDING DOCUMENTS:**

**8.1.** Bid documents consisting of drawings, plans, specifications, the schedule of quantities of the various items of work to be done and the set of terms & conditions of contract to be complied with by the contractor who intends to bid and other necessary Documents can be seen in the office of the officer inviting the Bid during office hours every day except on Sundays & Public Holidays till last date of sale of tender paper.

**8.2.** **No paper copy of the bid shall be sold.**

**8.3.** The Contract Data to bid shall be filled and completed in the office of Officer inviting bid before issue of bid documents. If the documents are issued to the intending bidder without having been so filled in & completed, he shall request the officer inviting the bid to have this done before he completes and delivers his bid.

**8.4.** **The bidder can seek clarification on the bids which he received earlier than 07 days prior to the deadline for submission of bids. The Employer's response will be forwarded through the e-mail- ID of the enquirer.**

### **9. AMENDMENT OF BIDDING DOCUMENTS:**

**9.1.** Before the deadline for submission of bids, the officer inviting the Bid may modify the bidding documents by issuing addenda.

**9.2.** Any **addendum** thus issued shall be part of the bidding documents and shall be notified in the website **[www.tendersodisha.gov.in/www.idco.in/notice board](http://www.tendersodisha.gov.in/www.idco.in/notice board)**.

**9.3.** To give **prospective** bidders reasonable time in which to take an addendum into account in preparing their bids, the Officer inviting the Bid may, at his discretion, extend as necessary the dead line for submission of bids.

## **C. PREPARATION OF BIDS**

### **10. LANGUAGE OF THE BID:**

**10.1.** All documents relating to the Bid shall be in the English / Hindi / Oriya language. Bids submitted in any other language shall be summarily rejected.

### **11. DOCUMENTS COMPRISING THE BID:**

**11.1.** Following documents will be deemed to be part of the bid even if not submitted with the bid.

- (i) Invitation for Bids (IFB)
- (ii) Instructions to bidders (ITB)
- (iii) Conditions of Contract
- (iv) Contract Data
- (v) Specifications
- (vi) **DELETED**

**11.2.** All the volumes/documents shall be provided in the portal by the Officer inviting the bid. The bidder shall carefully go through the document and prepare the required documents and up load the scanned documents in Portable Document Format to the portal in the designated locations of Technical Bid. He will fill up the percentage rate in the BOQ down loaded for the work in designated Cell and up-load the same in designated locations of Financial Bid. Submission of document shall be effected by using DSC of appropriate class.

A. **“Tender Fee” & “Bid Security”** shall comprise

- (i) Tender Fee **(Online)**
- (ii) Bid Security **(Online)**

B. **“Technical Bid”** shall comprise.

- (i) Declaration under the Official Secret Act, 1923
- (ii) Qualification Information and supporting documents,
- (iii) Certificates, undertakings, affidavits,

C. **“Financial Bid”** shall comprise.

- i) Priced Bill of Quantities

### **12. PROPOSAL BY THE BIDDER:**

**12.1.** In the **E-Procurement Portal**, an intelligent Bill of Quantity in Microsoft Excel format shall be made available to the bidder.

**12.2.** Deleted

**12.3.** In case of **percentage rate** tender, the bidder will only fill in the designated cell and activate “less” or “excess” to indicate how much his price offer is excess or less **(Up to two decimal Place)** than the estimated amount.

**12.4.** The **bidder** shall bid for the whole works as described in the Bill of Quantities.

**12.5.** Bidders shall submit offers that fully comply with the requirements of the bidding documents, Including the Conditions of Contract basic technical design as indicated in the drawing and specification. **Conditional offer or alternative offers will not be considered** in the process of bid evaluation.

**12.6.** All charges and other levies including Building and other Construction Workers Welfare Cess @ 1% payable by the contractor under the contract, or for any other charges shall be included in the rates, prices submitted by the bidder **excluding GST**. Purchase tax, turnover tax or any other tax on material in respect of this contract shall be payable by the Contractor and **IDCO/Government** will not entertain any claim whatsoever in respect of the same.

**Tax to be deducted at Source (TDS)**

**Income tax, cess will be deducted from the bills of the contractor as per prevailing rule of the Govt. and Amended from time to time.**

**12.7.** In the case of any bid where unit rate of any item/items appear unrealistic, such bid will be considered as unbalanced and in case the bidder is unable to provide satisfactory explanation such a tender is liable to be disqualified and rejected.

**12.8.** DELETED.

**12.9.** DELETED.

**12.10.** DELETED.

**12.11.** DELETED.

**12.12.** DELETED

**12.13.** The contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of Quantities, all of which shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant & services or of contingencies for which there is a **Provisional** Sum) and all matters and things necessary for the proper execution and completion of the work and the remedying of any defects therein.

**12.14.** The **contractor shall** conform in all respects, by giving all notices and paying all fees, with the provisions of:

- i) Any national or State Statue, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the works and remedying of any defects therein, and
- ii) The rules and regulations of all public bodies and companies whose property rights are affected or may be affected in any way by the works.

**12.15.** **FOR COMPOSITE BIDS: DELETED.**

**13. CURRENCIES OF BID AND PAYMENT:**

**13.1.** The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees. All payments shall be made in Indian Rupees.

**14. VALIDITY:**

**14.1.** Bids shall remain valid for a period not less than **180 days** or the period mentioned in the Contract Data, after the deadline date for submission of bid as specified in the notice inviting the Bids. A Bid valid **for a shorter period shall be rejected by the Divisional Head / Engineer-in-charge** as non-responsive.

**14.2.** In exceptional circumstances, prior to expiry of the original time limit, the Officer inviting the Bid may request the bidders to extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable or by e-mail.

**14.3. DELETED.**

**15. BID SECURITY:**

**15.1.** The Bidder shall furnish, as part of his Bid, a Bid security for the amount mentioned under Contract Data in online mode as instructed for online payment available in the e-Procurement portal during the processing of tender

The successful **lowest bidder** will produce the original of all scanned documents for verification within 5 days of opening of the tender (Price Bid). In the eventuality of failure on the part of the lowest successful bidder to produce the original documents, he will be debarred in future from participating in tender for three years and will be blacklisted by the competent authority. In such a situation, successful L-2 bidder will be required to produce his original documents for consideration of his/her tender at the negotiated rate equal to L-1 bidder.

**15.1.1. DELETED**

**15.1.2. DELETED**

**15.1.3. DELETED**

**15.1.4. DELETED**

**15.2.** The Bid shall be declared non-responsive and shall be rejected if submitted without an acceptable Bid Security and not secured as indicated in Sub-Clauses 15.1.

**15.3.** Combined bid security for more than one work is not acceptable.

**15.4. All the participating bidders are to be furnish Tender Fee, EMD through online mode. There will not be any exemption to any bidders.**

**15.5. DELETED**

**15.6.** The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security and Additional Performance security if any

**15.7.** The Bid Security may be forfeited

**15.7.1.** If the bidder withdraws the bid after opening of the bid but within the period of validity.

**15.7.2.** If the Bidder seeks any revision of rates or backs out of the bid claiming for not having referred to any or all documents provided in the Bid by the Officer Inviting the Bids.

**15.7.3. DELETED.**

**15.7.4.** In the case of a successful bidder, if the bidder fails within the specified time limit to

**15.7.4.1.** Sign the Agreement; or

**15.7.4.2.** Furnish the required Performance Security including additional performance security if any.

**16. FORMAT AND SIGNING OF BID:**

**16.1.** The bidder can download the tender of his choice and save it in his system and undertake the necessary preparatory work off-line and upload the completed tender at his convenience within the final date and time of submission. The bidder shall only submit single copy of the required documents and Price Bid in the portal. In the Financial bid, the bidder cannot leave any figure blank. He has to

only write the figures, the words will be self-generated. The Bidders are advised to up-load the completed Bid document well ahead of the last date & time of receipt to avoid any last moment problem of power failures etc.

**16.2.** The Bidder shall go through the Bid carefully and list the documents those are asked for submission. He shall prepare all documents including **Tender Fee**, Bid Security, Declaration form, price bid etc. and store in the system.

**16.3.** The bidder shall log on to the portal with his DSC and move to the desired tender for up-loading the documents in appropriate place one by one simultaneously checking the documents. Once the Bidder makes sure that all the documents have been up-loaded in appropriate place, he clicks the submit button to submit the bid to the portal.

**16.3.1.** Tender cannot be pre-opened and cannot be submitted after due date and time. Therefore, only after satisfying that all the documents have been uploaded, the Bidder should activate submit button.

**16.3.2.** In the e-procurement process, each process is time stamped. The system can identify each individual who has entered into the portal for any bid and the time of entering into the portal.

**16.3.3.** The Bidder should ensure clarity of the document up-loaded by him to the portal, especially the scanned documents by taking out sample printing. Non-submission of legible documents may render the bid non-responsive. However, the Officer inviting the Bids if so desires, **can ask for legible copies for clarification within a stipulated period of 7 days**, provided such document in no way alters the Bidder's price bid. **If the Bidder fails to submit such documents with in the stipulated date, his bid shall be evaluated on its own merit.**

#### **D. SUBMISSION OF BIDS**

##### **17. SECURITY OF BID SUBMISSION:**

**17.1.** All bid data uploaded by the Bidder to the portal will be encrypted by the DSC of the opener(s). The system shall require all the mandatory forms and fields filled up by the contractor during the process of submission of the bid/tender.

**17.2.** The Bid shall be received in encrypted format by the system which can only be decrypted / opened by the authorized openers only on or after the due date and time.

##### **18. DEADLINE FOR SUBMISSION OF THE BIDS :**

**18.1.** The online bidding will remain active till the last date and time of the bid submission. Once the date and time (Server date and time) is over, the bidder will not be able to submit the bid. The date & time of bid submission shall remain unaltered even if the specified date for the submission of bids declared a holiday for the Officer inviting the Bid.

**18.2.** The officer inviting the bid may extend the deadline for submission of bids by issuing an amendment in accordance with Sub-Clause 9.3, in which case all rights and obligations of the officer inviting the bid and the bidders previously subject to the original deadline will then be subject to the new deadline.

##### **19. LATE BIDS :**

**19.1.** The system shall reject submission of any bid through portal after closure of the receipt time. For all purpose the server time displayed in the e-procurement portal shall be the time to be followed by the bidder and concerned officers.

##### **20. MODIFICATION AND WITHDRAWAL OF BIDS :**

**20.1.** In the E-Procurement Portal, it is allowed to modify the bid any number of times before the final date and time of submission. The bidder shall have to log on to the system and resubmit the documents as

asked for by the system including the price bid. In doing so, the bids already submitted by the bidder will be removed automatically from the system and the latest bid only will be admitted. But the bidder should avoid modification of bid at the last moment to avoid system failure or malfunction of internet or traffic jam or power failure. If the bidder fails to submit his modified bids within the designated time of receipt, the bid already in the system shall be taken for evaluation.

**20.2.** In the E-Procurement Portal, with-drawl of bid is allowed. But in such case he has to write a letter with appropriate reasons for his withdrawal addressed to the Officer inviting the bid and up load the scanned document to portal in the respective bid before the closure of receipt of the bid. The system shall not allow any withdrawal after expiry of the closure time of the bid.

## E. OPENING AND EVALUATION

### 21. OPENING OF THE BID:

**21.1.** Bid opening dates are specified during tender creation or can be extended vide corrigendum. These dates are available in IFB, tender document as well as the home page of portal. Bid opening can be done by the authorized users which are defined during the tender publication / approval stage. The bids are encrypted using there public keys and can be decrypted only on or after the Bid Opening due date. The bid openers private key will be required to open the bids and all the openers have to log on to the portal during that time.

**21.1.1.** The bidders who participated in the on line bidding can witness opening of the bid from any system logging on to the portal with the DSC away from opening place. Contractors are not required to be present during the bid opening at the opening location if they so desire.

**21.1.2.** Each activity is date and time stamped with **user** details. For time stamping, server time is taken as the reference.

**21.2.** In the event of the specified date of bid opening being declared a holiday for the Officer inviting the Bid/Engineer-in-Charge, the bids will be opened at the appointed time on the **next working day**.

**21.3.** In case bids are invited for more than one package, the order for opening of the "Bid" shall be that in which they appear in the "Invitation for Bid".

**21.4. DELETED.**

**21.4.1.** Combined bid security for more than one work is not acceptable. If the bid security furnished does not conform to the amount and validity period as specified in clause 15 and has not been furnished in the form specified in Clause 15, the bid will be declared non-responsive and rejected.

**21.5.** The Bid openers; who have been pre-defined shall log on to the portal with their respective DSC. Unless all the Officers who have been declared as Opening officers, log on the portal with their DSC the Tender cannot be opened.

**21.5.1. DELETED.**

**21.5.2.** Subject to confirmation of the bid security by the issuing institutions, the bids accompanied with appropriate **Tender Fee** and valid bid security will be taken up for evaluation with respect to the qualification Information and other information furnished in Part - I pursuant to Clause 3.

**21.5.3.** **After receipt of confirmation of the bid security**, the bidder will be asked in writing to clarify his technical bid, if necessary.

**21.5.4.** The bidders will respond in **not more than 7 days** of issue of the clarification letter, which will also indicate the date, time and venue of opening of the Financial Bid.

**21.5.5.** Immediately on receipt of these clarifications, the Evaluating Officers; predefined in the system for the bid, will finalize the list of responsive bidders. They will log on to the site with their DSC and record their comments on the Technical evaluation page in the system. The Officer Inviting the Bid if also the accepting authority, shall log on to the system with his digital signature and check the technical evaluation. He can either accept or pass on to the evaluating officers for re-evaluation. Upon acceptance of technical evaluation by the Accepting authority in the system, the system shall automatically generate letter to all the responsive bidders and the system shall forward the letter to all the responsive bidder that their technical bid has been evaluated responsive with respect to the data/information furnished by him and the letter shall also intimate him the date & time of opening of financial bid. The system shall also inform the non-responsive bidders in their email ID that their bid has been found non-responsive.

**21.6.** The Technical evaluation of all the bids will be taken up as per the information furnished by the Bidders. **If any of the information/ statements/documents/certificates furnished by the bidder is found to be false/fabricated/bogus, his EMD/Bid Security shall stand forfeited and his registration in the portal shall be blocked and the bidder is liable to be blacklisted.**

**21.7.** After **technical** evaluation of the bidders and selection of the qualified bidders, the financial bids of the technically qualified bidders shall be opened on the due date of opening. Members of the bid opening committee log on to the system in sequence and open the financial bids for the technically qualified bidders. The opening of financial bid by the opening officer using their DSC shall decrypt the financial bids.

**21.7.1.** Opening of price bid and evaluation of lowest bidder is subject to satisfaction of other qualification information asked for in the bid pursuant to Clause-3.

**21.7.2.** The Officer inviting Bid shall ensure that all the Bidders are individually intimated about the date, time & venue of opening of the financial bid along with the responsiveness of the Technical Bid.

**21.7.3.** The Financial Bid will be opened on the notified date & time in the presence of bidders or their authorized representative who wish to be present.

**21.7.4.** At the time of opening of "Financial Bid", the names of the bidders whose bids were found responsive in accordance with Sub-Clause 24.1 will be announced. The bids of only those bidders will be opened. The remaining bids will be rejected.

**21.7.5.** The responsive bidders' names, the bid prices, the item wise rates the total amount of each item, any discounts and withdrawals, and such other details as the officer inviting the tender may consider appropriate, will be announced by him or his authorized representatives at the opening.

**21.7.6.** Special conditions and/or rebate/discount offer if any uploaded to the system shall be declared and recorded first.

**21.7.7.** The Financial bid of the bidders shall be opened one by one by the designated officers. **The system shall auto-generate the Comparative Statement.**

**21.7.8.** The Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.

## **22. PROCESS TO BE CONFIDENTIAL:**

**22.1.** 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 until the award to the successful bidder has been

announced. Any effort by a bidder to influence the officer inviting the bid, processing of bids or award decisions may result in the rejection of his bid.

**23. CLARIFICATION OF BIDS:**

**23.1.** To assist in the examination, evaluation, and comparison of bids, the officer inviting the bid may, at his discretion, ask any bidder for clarification of his rates including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable or by e-mail, but no change in the bid price or substance of the bid shall be sought, offered.

**23.2.** Subject to sub-clause 23.1, no bidder shall contact the officer inviting the bid on any matter relating to his bid from the time of the opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the officer inviting the bid, it should do so in writing.

**24. EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS:**

**24.1.** During the detailed evaluation of "Technical Bids", the officer inviting the bid will determine whether each bid:-

**24.1.1. DELETED.**

**24.1.2.** Has submitted legible documents for evaluation.

**24.1.3.** Meets the eligibility criteria defined in *Clause 3* and;

**24.1.4.** Is substantially responsive to the requirements of the bidding documents.

**24.2.** During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications and drawings.

**24.3.** A substantially responsive "Financial Bids" is one, which conforms to all the terms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one

**24.3.1.** Which affects in any substantial way the scope, quality, or performance of the works.

**24.3.2.** Which limits in any substantial way, inconsistent with the bidding documents, the right of the officer inviting the bid or the bidder's obligations under the contract or

**24.3.3.** Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

**24.4.** If a "Financial Bid" is not substantially responsive, it will be rejected by the officer inviting the bid, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

**24.5.** On opening of the price bid the system shall arrange the financial bids in order of their value (L1 first, followed by L2, L3 ....) for subsequent evaluation. The evaluation status (Sheet) will be visible to all the participating bidders after opening on their respective logins. Each activity is recorded in the system with date and time stamping.

**25. EVALUATION OF BIDS: DELETED**

**25.1.** If the officer **inviting** the Bid in his opinion judges that the price quoted by the lowest qualified bidder is high or a special condition imposed by the bidder is to be withdrawn, the bidder shall be invited for negotiation by the officer inviting the Bid or by an officer authorised by him in writing. **Negotiations** of financial bid with **only the lowest bidder** shall be carried out, if necessary. Negotiation of bid will be carried out by manual way.

**25.2. DELETED.**

**25.3. DELETED**

**25.4. DELETED.**

**25.5. DELETED.**

## **F. AWARD OF CONTRACT**

### **26. AWARD CRITERIA:**

**26.1.** The officer inviting the bid will award the contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated price.

**26.2.** On acceptance of the tender, the Contractor shall name in writing his accredited representative(s) who would be responsible for taking instructions from the Engineer-in-Charge.

**26.3.** Competent Authority of Orissa Industrial Infrastructure Development Corporation (IDCO) reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

**26.4.** The successful bidder registered under other State Government / MES / Railways / CPWD/IDCO vendors in equivalent rank has to register under state PWD before signing of the agreement.

### **27. OPTIONS IF THE BIDDER BACKS OUT FROM BIDDING PROCESS :**

**27.1.** In case the 1st lowest Bidder or even the next lowest Bidder withdraw in series one by one, thereby facilitating a particular Bidder for award, then they shall be penalized with adequate disincentives with forfeiture of EMD/Bid Security unless adequate justification for such back out is furnished. Appropriate action for blacklisting the bidder shall also be taken apart from dis-incentivising the bidder.

**27.2.** The bidding process shall be deemed to be complete till the date of issue of letter of acceptance. If the bidder fails to sign the agreement within the stipulated period mentioned under clause 29.2, his bid security shall stand forfeited.

### **28. RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS :**

**28.1.** The competent authority of IDCO does not bind him to accept the lowest or any other tender and reserves to him the authority to reject any or all the tenders received without assigning any reason.

**28.2.** All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.

### **29. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT:**

**29.1.** In the E-Procurement Portal, the system shall generate the template of award letter and the Officer Inviting the Bid shall mention the amount of Performance Security and additional security required to be furnished in the letter and intimate the bidders in his e-mail ID. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.

**29.2.** The bidder shall within 7 days of issue of letter of acceptance, furnish the Performance security & additional Performance security (if any) in the prescribed form & the work programme & shall sign the agreement in prescribed format, failing which the Engineer-in-Charge shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the Bid Security absolutely. The agreement will incorporate all agreements between the officer inviting the bid and the successful bidder.

If L1 bidder does not turn up for agreement after finalization of the tender, then he shall be debarred from participation in bidding for three years and action will be taken to blacklist the contractor. In that case, the L2 bidder, if fulfils, other required criteria would be called for drawing agreement for execution of work subject to the condition that L2 bidder negotiates at par with the rate quoted by the

L1 bidder otherwise the tender will be cancelled. In case a contractor is black listed, it will be widely published and intimated to all departments of Government and also to Govt. of India agencies working in the state.

(Amendment to Para-3.5.14 Note-I of OPWD Code Vol.-I by inclusion).

**29.2.1.** Following documents shall form part of the agreement.

**29.2.1.1.** The notice inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence & documents leading thereto & required amount of performance security including additional performance security as per sub clause 29.2 hereof.

**29.2.1.2.** Standard Bid **Document P.W.D. Form P-1**

**29.3.** The letter to proceed with the work shall be issued by Engineer-in-charge only after signing of the agreement. The notification of award will constitute the formation of the contract subject only to the furnishing of performance security and additional performance security in accordance with the provisions of the agreement.

**29.4.** On acceptance of the composite bids by the competent authority the letter of award will be issued by the **Engineer-in-Charge/Divisional Head** on **behalf of IDCO**.

**29.5.** Upon signing of the agreement by the successful bidder, **the Engineer-in-Charge** will promptly notify the other bidders that their bids have been unsuccessful.

### **30. CORRUPT OR FRAUDULENT PRACTICES:**

**30.1.** The Engineer-in-Charge will reject a proposal for award if he determines that the bidder recommended for award has been engaged in corrupt or fraudulent practices in competing for the contract in question. He will report to the Officer Inviting Bid / next higher authority.

**30.2.** Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.

## DETAILED TENDER CALL NOTICE

1. Sealed **Percentage rate** bids are invited in **double cover system** from the Class of eligible registered contractors for **“Construction of 11 KV UG line towards shifting of existing 11 KV OH line from premises of M/s Nestle at Mundaamba Industrial Estate, Khordha.”** at an estimated cost of **Rs.57,44,156.00/- (Rupees Fifty Seven Lakhs Forty Four Thousand One Hundred Fifty Six Only)** Contractors not registered with Govt. of Odisha can participate in the e-procurement after necessary enrolment in the portal but have to subsequently register themselves with the appropriate registering authority of the state Govt. before award of the work as per prevalent registration norms of the state.
  - a) This tender is of composite nature and complete in all respect.
  - b) This detailed Tender Call Notice along with the clauses mentioned herein shall form a part of the contract and agreement.
2. The Bid documents are available on official website of Government: <https://www.tendersodisha.gov.in> from **17.00 Hours of dt: 19.06.2026 to 17.00 Hours of dt: 30.06.2026**. The last date and time of submission of Bid is as per contract data.
3. The Technical Bid documents (**Cover-I**) will be opened by the assigned officer in the office of the officer inviting the bid at **11.00 Hours dt: 01.07.2026** in the presence of the bidders or their authorized representatives who wish to attend. After evaluation of the documents contained in Cover-I, the Cover-II containing price bid/s of the technically responsive bidder/s will be opened. The date, time and place of opening the price bid will be intimated to the eligible qualified bidders through system generated E-mails.
4. The Cost of Bid document (Tender fee) of **Rs.11,800/-** will be submitted **online** only as per the Instructions available in the e-Procurement Portal during the processing of tender by the bidder.
5. The bid is to be submitted in two covers.
  - i) **Cover-I** is to contain **Registration Certificate, PAN, valid GST Registration Certificate, EPF Registration, EPF latest challan**, affidavit, and all other documents required as per the relevant clauses of this DTCN.
  - ii) **Cover-II** is to contain the **PRICE BID** duly filled in by the bidder.
6. Furnishing scanned legible copy of Original Registration certificate, **valid GST Registration Certificate, PAN card EPF Registration, EPF latest Challan**, along with the Technical Bid is mandatory otherwise his/ her bid shall be declared as non-responsive and thus liable for rejection.
7.
  - (i) Deleted.
  - (ii) Deleted.
  - (iii) Deleted.
8. A copy of electrical license should also be enclosed with the tender papers, the original of which need to be furnished during verification.
9. (i) DELETED

The contract will be drawn & signed by Divisional Head, Electrical Division - I.

  - (ii) The work will be supervised measured & check measured by the Divisional Head, IDCO, Electrical Division - I. Interim & Final payment will be released by the Officer of IDCO executing the agreement.

10. If an individual makes the application, the individual should sign (with DSC) above his full type written name and current address.
11. If the application is made by proprietary firm, it shall be signed (with DSC) by the proprietor & furnish full type written name and the full name of his firm with its current address in a forwarding letter.
12. If the application is made by a firm in partnership, it shall be signed (with DSC) by a partner holding power of attorney for the firm in which case a certified copy of the power of attorney shall accompany the application. A certified copy of the partnership deed and current address of all partners of the firm shall also accompany the application.
13. If the application is made by a limited company or a corporation, it shall be signed (with DSC) by a duly authorized person holding power of attorney for signing the application in which case a certified copy of the power of attorney shall accompany the application. Such limited company or corporation will be required to furnish satisfactory evidence of its existence along with the technical bid.
14. The tender should be strictly in accordance with the provisions as mentioned in the tender schedule. Any change in the wordings will not be accepted.
15. The work is to be completed in all respects within **6 (Six) Calendar Month** from the date of issue of work order. **Before acceptance of tender, the successful bidder will be required to submit a work programme and milestone basing on the financial achievement so as to complete the work within the stipulated time and in case of failure on the part of the agency to achieve the milestone liquidated damage will be imposed**  
  
(Amendment to Para-3.5.18 Note-VIII of OPWD Code Vol.-I).
16. All tenders received will remain valid for a period of **180 days** from the last date prescribed for receipt of tenders and validity of tenders can also be extended if agreed by the tenderers and the Department.
17. The tenderer shall carefully study the tentative drawings and specifications applicable to the contract and all the documents, which will form a part of the agreement to be entered in to, by the accepted tenderer and detailed specifications for Odisha, and other relevant specifications and drawings, which are available. Complaint at a future date that the tenderers have not seen plans and specifications cannot be entertained.
18. The drawings furnished with the tender are tentative and subject to revision or modification as tendered during the execution as per actual necessity and detail test conducted. But the tendered rates quoted by the tenderer will hold good in case of such modification of drawings during the time of execution and shall in no way invalidate the contract and no extra monetary compensation will be entertained. The work shall however be executed as per final approved drawing to be issued by the Engineer-in-Charge as and when required.
19. By admission of a tender for the work, a tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the work, about the quality and availability of the required quantity of material including the wheat/ rice referred to above, medical aid, labour and food stuff etc., and that rates quoted by him in the tender will be adequate to complete the work according to the specifications attached there to and that he had taken in to account all conditions and difficulties that may be encountered during its progress and to have quoted rates including labour and materials with taxes,

octroi, other duties, lead, lifts, loading and unloading, freight for all materials and all other charges necessary for the completion of the work, to the entire satisfaction of the **Engineer-in Charge** of the work and his authorized subordinates. After acceptance of the contract rate Government will not pay any extra charges for any reason in case the contractor claims later on to have misjudged as regard availability of materials, labour and other factors.

For the purpose of estimate, the approved quarry lead is to be provided judiciously. Engineers in charge would be responsible for ensuring the quality of the materials supplied. The contractors would, however, be responsible for procurement of material from authorized sources and voluntarily disclose the source of procurement for the purpose of billing. Besides, the bidder would be required to submit the details of quarry for procurement while submitting the bids.

(Amendment to Para-3.4.16 (a) (vii) of OPWD Code Vol.-I by substitution).

**20.** EMD of Rs.57,500/- has to Paid online during bid submission. Bidders desirous to hire machinery or equipment from outside the state or owned but deployed outside the state are required to furnish additional one percent (1%) EMD / Bid Security.

**21.** The tender should be accompanied with the *Scanned copies of the valid Registration certificate, valid GST Registration Certificate and PAN card, EPF Registration, EPF latest Challan* which are mandatory, otherwise his/her bid shall be declared as non-responsive and thus liable for rejection.

**22.** The tender containing extraneous conditions not covered by the tender notice are liable for rejection and quotations should be strictly in accordance with the items mentioned in the Tender Call Notices. Any change in the wording will not be accepted.

**23.** The department reserves the right of authority to reject any or all tenders received without assigning any reason whatsoever.

**24.** The earnest money of the L-1 bidder will be retained and will be dealt with as per terms and condition of O.P.W.D. Code. The retention of E.M.D. with the Department will carry no interest.

**25.** Divisional Head will notify the bidder / tenderer whose bid has been accepted of the award prior to expiration of the validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the conditions of Contract called the "Letter of Acceptance") will state the sum that the Engineer-in-charge will pay the contractor in consideration of the execution, completion and maintenance of the Works by the contractor as prescribed by the contract (Hereinafter and in the contract called the "Contract Price").

The Notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security (Initial Security Deposit) of the agreement in form of Deposit receipt of Schedule Bank / Kissan Vikash Patra / Post Office Savings Bank Account/National Savings Certificate / Post Office Time Deposit Account duly pledged in favour of the "**Divisional Head ,Electrical Division - I, IDCO, Bhubaneswar**" & payable at **Bhubaneswar** and in no other form, which including the amount already deposited as bid security (earnest money) shall be 2% of the value of the tendered amount (excluding 1% deposited towards hiring of equipments / machineries from outside the state if any) and sign the agreement in the P.W.D. form No. P-1 (Schedule XLV No. 61) for the fulfilment of the contract in the office of the **Divisional Head, IDCO, Electrical Division - I** and payable at **Bhubaneswar** or as directed. The security deposit together with the earnest money and the amount withheld according to

the provision of P-1 agreement shall be retained as security for the due fulfilment of this contract and additional performance security in accordance with the provisions of the agreement.

The agreement will incorporate all agreements between **Divisional Head, IDCO, and Electrical Division - I inviting the bid** / Engineer-in Charge and the successful bidder within 15 days following the notification of award along with the Letter of Acceptance. The successful bidder will sign the agreement and deliver it to the Engineer-in Charge. Following documents shall form part of the agreement.

- a) The notice-inviting bid, all the documents including additional conditions, specifications and drawings, if any, forming the bid as issued at the time of invitation of bid and acceptance thereof together with any correspondence leading thereto & required amount of performance security including additional performance security.
- b) Standard **P.W.D. Form P-1 with latest amendments**. Failure to enter in to the required agreement and to make the security deposit as above shall entail forfeiture of the Bid Security (earnest money) .No contract (tender) shall be finally accepted until the required amount of initial security money is deposited. The security will be refunded after **12 (Twelve) months** of completion of the work and payment of the final bill and will not carry any interest. As concurred by Law Department & Finance Department In their U.O.R. No 848, dt.21.05.97 J.O.R.No.202 W.F.D. dtd.06.03.98 respectively the E.M.D. will be forfeited in case, where tenderers back out from the offer before acceptance of tender by the competent authority.

**26.** The contractor should be liable to fully indemnify the Department for payment of compensation under workmen compensation act. VIII of 1923 on account of the workmen employed by the contractor and full amount of compensation paid will be recovered from the contractor.

**27.** Tenderers are required to liable by fair wages clause as introduced by Govt. of Odisha, Works Department letter No.VII (R&B) 5225, dt.26.2.55 and No.II, M-56/61-28842 (5), dt.27.9.61.

**28.** The contractor shall bear cost of various incidentals, sundries and contingencies necessitated by work in full within the following or similar category.

- a) Rent, royalties, cess and other charges of materials, **excluding prevailing GST** from time to time. Ferry tolls, conveyance charges and other cost on account of land buildings including temporary building required by the tenderer for collection of materials, storage, housing of staff or other purpose of the work are to be borne by the contractor at his own cost. No rent will be payable to Govt. for temporary occupation of land owned by govt. at the site of the work for bonafide use of the land for work and all such construction of temporary nature by the contractor shall be done after obtaining written permission from the Engineer-in-Charge of Civil portion of the work and all such construction shall have to be demolished and debris removed and ground made good and cleared after completion of the work at no extra cost.
- b) Royalty will be recovered from each bill as notified by Govt. from time to time unless K Forms are enclosed. Refund of royalty at later date after passing of the bills cannot be entertained as the recovery of royalty is being credited to revenue.
- c) Labour camps or huts necessary to a suitable scale including conservancy and sanitary arrangements therein to the satisfaction of the local labour laws and health authorities shall have to be provided by the Contractor.

- d) Arrangement of suitable water supply including pipe water supply where available for the staff and labour as well as for the execution of the work is sole responsibility of the Contractor and no extra cost for carriage of water will be entertained. e) All fees and dues levied by Municipal, Canal or Water Supply Authorities are to be borne by the Contractor.
- f) Suitable safety equipments and dresses, gloves, life belts etc. for the labour engaged in risky operations are to be supplied by the contractor at his own cost.
- g) Suitable fencing barriers, signals including paraffin and electric signals where necessary at work and approaches in order in project the public and employees from accident has to be provided by the Contractor at his own cost.
- h) Compensation including cost of any legal suit for injury to persons or property arising out of execution of the work and also any sum, which may become payable due to operation of the workmen compensation act, shall have to be borne by the contractor.
- i) The contractor has to arrange adequate lighting arrangements for the work wherever necessary at his own cost.

**29.** No payment will be made for layout, benchmark, level pillars, profiles and benching and levelling the ground required, which has to be carried out by the contractor at his own cost. The rates to be quoted should be for finished items of work inclusive of carriage of all materials and all incidental items of work.

**30.** After the work is finished all surplus materials should be removed from the site of work, preliminary work such as vats, mixing platforms, etc. should be dismantled and all materials removed from the site and premises left neat and his should be inclusive in the rates. No extra payment will be made to the Contractor in this account.

**31.** It should be understood clearly that no claim what-so-ever will be entertained to extra items of works quantity of any item besides estimate amount unless written order is obtained from the competent authority and rate settled before the extra items of work or extra quantity of any items of work is taken up.

**32.** The tenderers shall have to abide by the C.P.W.D. safety code rules introduced by the Govt. of India, Ministry of Works and Housing & Supply in their standing order No.44150, dt.25.11.57.

**33.** No part of the contract shall be sublet without written permission of the officer inviting the bid or transfer to be made by the power of attorney authorizing others to receive payment on contractor's behalf.

**34.** Bid documents consisting of plans, specifications, the schedule of quantities and the set of terms and conditions of contract and other necessary documents can be seen in all the offices issuing the documents and office of the under signed during office hours every day except on Sundays and Public Holidays till **last date of sale and receipt of tender papers**. Interested bidders may obtain further information at the same address. But it must be clearly understood that tenders must be received in order and according to instructions in complete shape. Incomplete tender is liable for rejection.

**35. No Relation certificate.**

The contractor shall furnish a certificate along with the tender to the effect that he is not related to any officer in the rank of a **Deputy Manager** & above in IDCO. If the fact subsequently proved to be false, the contract is liable to be rescinded. The earnest money & the total security will be forfeited & he shall

be liable to make good to damages the loss or damages resulting for such cancellations. The proforma for no relationship certificate is contained in a separate sheet vide **Schedule-A**.

**36. DELETED (36.(a) to (e) )**

**37. DELETED**

**38. DELETED**

**39. DELETED**

**40. DELETED**

**41. DELETED**

**42.** The tenderers shall make all arrangements for proper storage of materials but no cost for raising shed for store and pay of security guard etc. will be borne by the Department. The department is not responsible for any theft or loss of materials at site. It is contractor's risk. Under any such plea, if the tenderer stops the work he shall have to pay the full penalty as per clauses of the contract.

**43. DELETED**

**44.** The contractor should at his own cost arrange necessary tools and plants required for efficient execution of work and the rates quoted should be inclusive of transportation, hire and running charges of such plant and cost of consumables.

**45.** The contractor shall properly co-ordinate with the execution of P.H. and Electrical works and take care of the safety of workers.

**46. DELETED**

**47.** No claim whatsoever will be entertained for supply of machineries. No extension of time will be granted to the contractor under this ground under any circumstances

**48.** The tenderer should furnish along with their tender a list of works executed during the last Seven years duly certified by the concerned **Engineer-in-charge/Divisional Head** indicating the satisfactory completion for ..... works as per the proforma enclosed in a separate sheet of **Schedule-D**.

**49.** The tenderer or any of its constituent partners of whose contract for any work has been rescinded or who has abandoned any work in the last five years prior to the date of Bid shall be debarred from qualification. The tenderer is to furnish an affidavit at the time of submission of tender paper about the authentication of tender documents. An affidavit to this effect is to be furnished in **Schedule-F** and information in **Schedule-E**

**50.** It should be clearly understood that :

a) **DELETED.**

b) **DELETED.**

c) **DELETED.**

d) **DELETED.**

**51. DELETED.**

**52.** The contractor shall employ one or more Engineering Graduate or Diploma holders as apprentice at his cost if the work as shown in the tender exceeds Rs.2,50,000.00. The apprentices will be selected by the **Divisional Head (Elect)**. The period of employment will commence within one month after the date of work order and would last till the date, when 90% of the work is completed. The fair wage to be paid to the apprentices should not be less than the emolument of personnel of equivalent qualification employed under Government. The number of apprentices to be employed should be fixed by the

**Divisional Head (Elect)** in the manner so that the total expenditure does not exceed one percent of the tendered cost of the work.

**53. DELETED.**

**54. DELETED.**

**55.** For submission of a tender for the work, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the work about the quality and availability of the required quantity of materials, Medical aid, labour and Flood stuff etc. and that the rates quoted by him in the tender will be adequate to complete the work according to the specifications attached thereto and that he had taken in to account all conditions and difficulties that may be encountered during its progress and to have quoted labour rates and materials with taxes, Octroi and other duties lead, lifts, loading and unloading freight for materials and all other charges necessary for the completion of the work to the entire satisfaction of the Engineer-in-charge of the work and his authorized subordinates. After acceptance of the contract rates Government will not pay any extra charges for any reason in case the contractor finds later on to have misjudged the conditions as regards the availability of materials, labour and other factors. The contractor will be responsible for any misuse, loss or damages due to any reasons whatsoever of any departmental material during the execution of work. In case of loss, damage or misuse, recovery at the rate at 5 times the cost of the materials will be deducted from the bills or his other dues.

**56.** The prevailing percentage of I.T. Department of the gross amount of the bill towards income tax will be deducted from the contractor's bill.

**57. Prevailing rate of GST as applicable would be paid extra.**

**58. Prevailing rate of cess i.e. @ 1% on estimated cost put to tender as per the Building and Other Constructed Workers (RE&CS) Act. 1996 and Buildings and Other Construction Workers Welfare Cess Act. 1996 (vide resolution No.-12653, dt.15.12.2008 of Labour and Employment Department, Govt. of Odisha) will be deducted from each running bill of the contractor.**

**59.** It must be clearly understood that under no circumstances any interest is chargeable for the dues or additional dues if any payable for the work executed and final bill pending disposal due to any reason whatsoever.

**60.** No extra payment will be made for removing spreading and consolidating salvaged metals and materials.

**61.** Under section 12 of contractors labour (Regulation and Abolition) Act. 1970 the contractor who undertakes execution of work through labour should produce valid license from licensing authorities of labour Department

**62. Performance Security / Additional Performance Security:**

**62.1. Amendment to Appendix – IX, Clause – 36 of OPWD Code Vol.-II by inclusion. Modification in DTCN Clause No.28 as per Works Department, Govt. of Odisha Office Memorandum No.173 dtd.03.01.2026 and Clarification vide Office Memorandum No.632 dtd.09.01.2026**

Amendment of Codal and Contractual provisions of threshold negative bid caps of (14.99%) introduced in Appendix IX, Clause 36 of OPWD Code Volume-II is to be applicable as per the Works Department OM No.173 dtd. 03.01.2026 (Decimal up to two numbers will be taken for all practical purpose) either at the estimated cost put to tender, the tender accepting authority will finalize the tender thorough a transparent lottery system where all bidders / their authorized representatives, the concerned officer inviting the bid & senior officer representative of Finance Dept, IDCO will remain present. (Amendment to Appendix-IX, Clause-36 of OPWD Code Vol.-II) (by inclusion vide O.M.No.173 dt.03.01.2026)

**62.2. • If the rate quoted by the SC and ST Category Contractors comes to the rate quoted by the L1 bidder (decimal up to two numbers will be taken for all practical purposes) after availing 10% price preference as per Para 2 of Works Department Resolution No. 27748 dated. 11.10.1977, the tender shall be finalized by the tender accepting authority through a transparent lottery system along with other categories of contractors.**

The State Govt. is pleased to fix the following rate of Additional Performance Security. Vide Office Memorandum No. 173 dtd. 03.01.2026.

SL. No.	Range of Difference between the estimated cost put to tender & Bid Amount	Additional Performance Security to be deposited by the successful bidder
(i)	<b>below 0% but not below 10%</b>	No Additional Performance Security
(ii)	<b>below 10% but not below 20%</b>	additional performance guarantee/security percentage shall be incremented by 0.1% for every percentage of bid price below 10% of the project cost put to bid starting at 11% with the additional bid performance guarantee being 0.1% and this additional performance guarantee percentage shall be applied on the bid price ;
(iii)	<b>20% or more below</b>	the additional performance guarantee percentage shall be incremented by 0.2% for every percentage of bid price below 20% of the project cost put to bid in additional to 1% of the bid price and this additional performance guarantee percentage shall be applied on the bid price.
(iv)		The additional performance guarantee percentage shall be rounded off to the next lower percentage based on whether the decimal point of the percentage of bid price is below 0.5% or next higher percentage based on whether the decimal point of the percentage of bid price is 0.5% or more.
(v)		The additional performance security shall be treated as part of the performance security.
(vi)		Justification for abnormally low bids shall be scrutinized by the Departmental Technical Committee and recommended to the competent authority of the Administrative Department for the approval of the Additional Performance Security (APS). An abnormally low bid is one in which the Bid price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the contract at the offered price. Procuring Entity may, in such cases, seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to scope, schedule, resource mobilization, allocation of risks and responsibilities, and any other requirements of the bid document. If, after evaluating the price analyses, the procuring entity determines that the Bidder has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Procuring Entity may reject the Bid/Proposal. However, it would not be advisable to fix a normative percentage below the estimated cost, which would automatically be considered as an abnormally low bid.

**If the contractor fails to complete the work, the amount so furnished as additional performance security will be forfeited in addition to the other penal clauses, if any to be imposed**

**62.3.** Divisional Head to release the APS after completion of work without waiting for approval of EOT and Deviation

- 63. Sample of all material** - The contractor shall supply sample of all materials fully before procurement for the work for testing and acceptance as may be requiring by the concerned **Engineer-in-Charge & CONCERNED DISCOMS Authorities**.
- 64.** Super class contractor shall employ under himself two Graduate Engineer and two Diploma holders belonging to the State of Odisha. Special class contractor shall employ under him one graduate Engineer and two Diploma Holders belonging to the state of Odisha. Likewise 'A' class contractor shall employ under him one Graduate Engineer or two Diploma Holders belonging to state of Odisha. The contractor shall pay to the Engineering personnel monthly emoluments, which shall not be less than the emoluments of the personnel of equivalent qualification employed under the State Govt. of Odisha. **The Divisional Head (Elect)** may however assist the contractor with names of such unemployed Graduate engineers and Diploma Holders if such help is sought for by the contractor. The names of such Engineering personnel appointed by the Contractors should be intimated to the tender receiving authority along with the tender as to who would be supervising the work. Each bill of the Super Class, Special Class or 'A' Class Contractor shall be accompanied by an employment Roll of the Engineering personnel together with a Certificate of the Graduate Engineer or Diploma Holder so employed by the contractor to the effect that the work executed as per the bill has been supervised by him. (Vide Works Department No. Codes M-22/91-15384 dated 9.7.91). The required certificate is to be furnished in the tender documents vide **Schedule-G**.
- 65.** An engineering personnel of the executing agency should be present at work site at the time of visit of High level Inspecting officers in the rank of **Chief General Manager** and above.
- 66. DELETED.**
- 67. DELETED.**
- 68.** The tenderer shall have to abide by the C.P.W.D. safety code rules introduced by the Government of India, Ministry of work Housing and Supply in their standing order No-44150 dtd.25.11.57.
- 69.** The Contractor will have to submit to the **Divisional Head (Electrical)** monthly return of labour both skilled and unskilled employed by him on the work.
- 70. DELETED.**
- 71. DELETED.**
- 72.** The Tenderer should furnish along with their tender **1.Schedule-A, 2.Schedule-D, 3.Schedule-E, 4.Schedule-F, 5.Schedule-G, 6.Schedule-H & 7.Schedule-I with other documents as specified in Technical Specification below** in the prescribed proforma (s) enclosed herewith in appropriate place of bid document.
- 73. DELETED.**
- 74. DELETED**
- 75.** The contractor has to arrange the samples of materials required for execution to be got tested and approved by the Department before taking up the work and during course of execution required from time to time. All such samples will be tested at any of the Departmental Control and Research Laboratories, at the cost of the Contractor with no extra cost to the Department.
- 76.** If there is any damage to the work due to natural calamities like flood or cyclone or any other cause during the course of execution of work or up to 6 months after completion of work or if any, imperfection becomes apparent to the work within 6 months from the date of final certificate of

completion of work the contractor shall make good of all such damages at his own cost with no extra cost to the Department. No claims, whatsoever, in this regard will be entertained.

**77. DELETED.**

**78.** Under Section 1 of contract labour Regulation and Abolition Act 1970 the contractor who undertakes execution of work through labour should produce valid license from the licensing authority of labour Department.

**79. DELETED.**

**80. Deleted**

**81.** That for the purpose of jurisdiction in the event of disputes if any of the contract would be deemed to have been entered in to within the State of Odisha and it is agreed that neither party to the contract will be competent to bring a suit in regard to the matter by this contract at any place outside the State of Odisha.

**82. SPECIAL CONDITIONS (PART OF THE CONTRACT)**

- (I) All materials before they are being used in the items of works as per this Schedule of quantities and also the finished items of work where tests are applicable shall have to be tested through the Engineer-in-charge of the respective wing at appropriate Laboratories according to the relevant I.S. specifications of the materials and the said items of works and the cost of all such tests shall have to be borne by the Contractor and the rates of the items of works should be inclusive of cost of such tests.
- (II) The tests have to be planned & carried out such that the progress of work is not hampered
- (III) The tests are mandatory as per the prescribed frequencies and I.S. specifications. However, these are not exhaustive and the Engineer-in-charge has the right to prescribe other required test if any as will be considered from time to time.

**83.** In case of ambiguity between clauses of this D.T.C.N. and the P-1 contract form, the relevant Clauses of the P-1 contract form shall prevail over the D.T.C.N. The clauses not covered under P-1 contract form shall be governed by the clauses of the D.T.C.N.

**84. DELETED.**

**85.** Schedule of quantities is accompanied in Cover-II (Price Bid). It shall be definitely understood that the IDCO does not accept any responsibility for the correctness or completeness of this schedule and that this schedule is liable for alternation or omissions, deductions or alternations set forth in the conditions of the contract and such omissions, deductions, additions or alternations shall no way invalidate the contract and no extra monetary compensation, will be entertained.

**86.** In case of any complaint by the labour working about the non-payment or less payment of his wages as per latest minimum Wages Act, the **Engineer-in-Charge** will have the right to investigate and if the contractor is found to be in default, he may recover such amount due from the contractor and pay such amount to the labour directly under intimation to the local labour office of the Govt. The contractor shall not employ child labour. The decision of the **Engineer-in-Charge** is final and binding on the contractor.

**87. DELETED.**

88. The bidder will be responsible for the loss or damage of any departmental materials during transit and in the execution of the work due to reasons what-so-ever and the cost of such materials will be recovered from the bills at stock issue rates or market rates whichever is higher.
89. If the contractor removes Government/ IDCO materials supplied to him from the site of work with a view to dispose of the same dishonestly, he shall be in addition to any other liability civil or criminal arising out of his contract be liable to pay a penalty equivalent to five times of the price of the materials according to the stock issue rate or market rate whichever is higher. The penalty so imposed shall be recovered at any time from any sum that may then or at any time thereafter become due to the contractor or from his security deposit or from the proceeds of sale thereof.
90. The selected contractor may take delivery of Departmental /IDCO Supply according to his need for the work issued by the Engineering- in-charge subject to the availability of the materials. The tenderer shall make all arrangement for proper storages of materials but no cost for raising shed for storage, pay of security guard etc. will be borne by the IDCO. The IDCO is not responsible for considering the theft of materials at site. It is the contractor's risk. Under any such plea if the tenderer stops the work, he shall have to pay the full penalty as per clause of agreement.
91. The IDCO will have the right to supply at any time in the interest of work any IDCO materials to be used in the work and the contractor shall use such materials without any controversy or dispute on that account. The rate of issue of such materials will be at the stock issue rates inclusive of storage charges or rates fixed by the IDCO or current market rate whichever is higher.
92. DELETED.
93. DELETED.
94. DELETED.
95. DELETED.
96. The contractor is required to pay royalty to Govt. as fixed from time of time and produce such documents in support of their payment to the concerned Divisional Head with their bills, falling which the amount towards royalties of different materials as utilised by them in the work will be recovered from their bills and deposited in the revenue of concerned department.
97. DELETED.
98. DELETED.
99. From the commencement of the works to the completion of the same, they are to be under the contractors charge. The contractor is to be held responsible to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and they hold the Govt. of Odisha/IDCO harmless for any claims for injuries to person or structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or any one in his employment during the execution of the work. Also no claim shall be entertained for loss due to earthquake, flood, cyclone, epidemic, riot or any other calamity whether natural or incidental damages so caused will have to be made good by the contractor at his own cost.
100. DELETED.
101. Where it will be found necessary by the IDCO the Engineer-in-Charge of the work shall issue an order book to the contractor to be kept at the site of the work with pages serially numbered. Orders regarding the work whenever necessary are to be entered in this book by the IDCO. Officer-in-Charge with their dated signatures and duly noted by the contractor or his authorized agents with their dated

signature. Orders entered in this book and noted by the contractor's agent shall be considered to have been duly given to the contractor for following the instructions of the IDCO. The order Book shall be the property of the IDCO and shall not be removed from the site of work without written permission of the **Divisional Head** and to be submitted to the Engineer-in charge every month.

**102.** The contractor should attach the certificate in token of payment deposit with the registration authority as per recent circular of the Government/IDCO relating to his registration.

**103.** In case of any discrepancy in printing or omissions of statutory specifications or any other part or portion of the approved document during download of the bid document, the decision of the officer inviting the bid will be binding on the bidder.

**104.** The rates quoted by the contractor shall cover the latest approved rates of Labours, Materials, P.O.L. and Royalties. Arrangement of borrow areas i.e. Land, Approach Road to the building site etc. are the responsibility of the contractor.

**105. DELETED.**

**106.** The contractor shall make requisition of claim book from the date of commencement of the work from the IDCO and shall maintain in proper IDCO form with pages serially numbered in order to record items of works are not covered by his contract and claimable as extra. Claims shall be entered regularly in this book under the dated signature of the contractor or his duly authorized agents at the end of each month. A certificate should be furnished along with the claim to the effect that he has no other claim beyond this claim up-to-date. If in any month there are no claims to record, a certificate to that effect should be furnished by the contractor in the claim book. Each claim must be defined and should be given as far as possible regarding the quantities as well as the total amount claimed. The claim book must be submitted by the contractor regularly by 10th and 16th days of each month for orders of the Engineer-in-Charge or competent authority. Claims not made in this manner or the claim book not maintained from the commencement of the work is liable to be summarily rejected. The claim book is the property of the IDCO and shall be surrendered by the contractor to the Engineer-in-charge after completion of the work or before recession of the contract by the IDCO whichever is earlier for record.

**107. DELETED.**

**108.** Even qualified criteria are met, the bidders can be disqualified for the following reasons, if enquired by the Department.

- (a) Making a false statement or declaration.
- (b) Past record of poor performance.
- (c) Past record of abandoning the work half way/ recession of contract.
- (d) Past record of in-ordinate delay in completion of the work.
- (e) Past history of litigation.

**109.** In case the 1st lowest tenderer or even the next lowest tenderers withdraw in series one by one, thereby facilitating a particular tender for award, then they shall be penalized with adequate disincentives with forfeiture of EMD unless adequate justification for such back out is furnished. Appropriate action for black listing the tenderers shall also be taken apart from disincentives against the tenderer.

**110.** The following documents which are not submitted with the Bid, will be deemed to be part of the Bid:

Sl. No	Particulars
1	Notice Inviting tender
2	Instruction to the Bidders
3	Conditions of Contract.
4	Contract data
5	Specifications
6	Drawings

111. Deleted

112. ELIGIBILITY CRITERIA:

To be eligible for qualification, applicants shall furnish the followings. Non-furnishing of the following particulars shall be treated as ineligible.

- a. **DELETED.**
- b. Tender Fee: to be paid **online.**
- c. Scanned copy of valid **Registration Certificate/IDCO Vendor Registration, GST Registration Certificate, PAN card, EPF Certificate, EPF Latest Challan** along with the tender documents and the **L-I bidder has to furnish** the Original Registration certificate, **GST Registration Certificate and Pan card, EPF Certificate, EPF Latest Challan for verification** for verification within **(5) Five days** of opening of **Cover-II** of the tender before **Divisional Head (Elect), Bhubaneswar** as per **Clause No-1,5 (i) and 21 of DTCN.**
- d. License criteria as per **Clause No.8 of DTCN need to be furnished.**
- e. **DELETED.**
- f. **Joint Ventures are not accepted.**
- g. The bidder should have satisfactorily executed
  - i) **1(One) similar completed work costing 80% (Rs. 45.95 Lakh) of the total project value in last 7 financial years / current financial year.**

OR,

- ii) **02(Two) similar completed works each costing not less than 50% (28.72 Lakh) of the total project value in last 7 financial years/ current financial year.**

OR,

- ii) **03(Three) similar completed works each costing not less than 40% (22.97 Lakh) of the total project value in last 7 financial years/ current financial year**

Along with Certificates from the concerned Officer not below the rank of **Executive Engineer or Divisional Head or Equivalent** need to be furnished by the bidder as per **Schedule-D (Similar nature of works means Supply, installation, testing and commissioning of 11 KV and above OH & UG line in any Govt. or PSU or ULB or DISCOMs)** However, the bidder should meet the eligibility criteria under clause 2.1 (a) of ITB (instructions to bidders).

**Escalation Factor:** Following enhancement factors will be used for the cost of works (similar works) executed to a common base value for works completed in India, which shall be adopted for evaluation in qualifying work experience criteria evaluation.

**Year Before**

**Multiplying Factor**

One	1.10
Two	1.21
Three	1.33
Four	1.46
Five	1.61
Six	1.77
Seven	1.94

(Applicant should indicate actual figures of costs and amounts for the works executed by them without accounting for the above mentioned factors)

**h. BID CAPACITY- (DELETED)**

**i. Non-submission of required information in schedule D, E & F shall be treated as non-responsive and the bid shall be summarily rejected.**

**113. Time Control:- (Vide Works Department Office Memorandum No.24716 dtd.24.12.2005 and No.8310 dtd.17.05.2006)**

**113.1.1 Progress of work and Re-scheduling programme.**

- i) The Divisional Head** shall issue the letter of acceptance to the successful contractor. The issue of the letter of acceptance shall be treated as closure of the Bid process and commencement of the contract.
- ii)** Within 15 days of issue of the letter of acceptance, the contractor shall submit to the Divisional Head for approval a Programme showing the general methods, arrangements, and timing for all the activities in the Works along with monthly cash flow forecast.
- iii)** To ensure good progress during the execution of the work the contractors shall be bound in all cases in which the time allowed for any work exceeds one month to complete, 1/4th of the whole time allowed under the contract has elapsed, 1/2 of the whole of the work before 1/2 of the whole time allowed under the contract has elapsed, 3/4th of the whole of the work before 3/4th of the whole time allowed under the contract has elapsed.
- iv)** If at any time it should appear to the Divisional Head that the actual process of the work does not conform to the programme to which consent has been given the Contractor shall produce, at the request of the Divisional Head, a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. If the contractor does not submit an updated Programme within this period, the Divisional Head may withhold the amount of 1% of the contract value from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.
- v)** An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- vi)** The Divisional Head's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Divisional Head again at any time. A revised Programme is to show the effect of Variations and Compensation Events.
- b) Extension of the Completion Date.**
  - i)** The time allowed for execution of the works as specified in the Contract data shall be the essence of the Contract. The execution of the works shall commence from the 15th day or such time period as mentioned in letter of Award after the date on which the Divisional Head issues written orders to commence the work or from the date of handing over of the site whichever is later. If the Contractor

commits default in commencing the execution of the work as aforesaid, Government shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money & performance guarantee / Security deposit absolutely.

ii) The Contractor shall submit the Time & Progress Chart for each milestone Quarter wise indicating each month and get it approved by the IDCO. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Divisional Head and the Contractor within the limitations of time imposed in the contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per milestone given in contract data.

iii) In case of delay occurred due to any of the reasons mentioned below, the Contractor shall immediately give notice thereof in writing to the Divisional Head but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Divisional Head to proceed with the works.

(1) Force majeure, or

(2) Abnormally bad weather, or

(3) Serious loss or damage by fire, or

(4) Civil commotion, local commotion of workmen, strike or lockout affecting any of the trades employed on the work, or.

(5) Delay on the part of other contractors or tradesmen engaged by Divisional Head in executing work not forming part of the Contract.

(6) In case a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost, or

(7) Any other cause, which, in the absolute discretion of the authority mentioned, in Contract data is beyond the Contractors control.

iv) Request for reschedule and extension of time, to be eligible for consideration, shall be made by the Contractor in writing **within fourteen (14)** days of the happening of the event causing delay. The Contractor may also, if practicable, indicate in such a request the period for which extension is desired.

v) In any such case a fair and reasonable extension of time for completion of work may be given. Such extension shall be communicated to the Contractor by the Divisional Head in writing, within 3 months of the date of receipt of such request. Non-application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Divisional Head and this shall be binding on the contractor.

c) **Compensation for Delay.**

Time is the essence of the contract. If the contractor fails to maintain the required progress in terms of clause-2 of P-1 Contract or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the **Divisional Head (Elect)** on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the **Divisional Head (Elect)** (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every

completed day / month (as applicable) that the progress remains below that specified in Clause-2 of P-1 Contract or that the work remains incomplete. This will also apply to items or group of items for which a separate period of completion has been specified. Compensation @ 1.5% per month of delay of work, delay to be counted on per Day basis. Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the Tendered Value of work or to the Tendered Value of the item or group of items of work for which a separate period of completion is originally given. The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the **Divisional Head (Elect)**. In case, the contractor does not achieve a particular milestone mentioned in contract data, or the rescheduled milestone(s) in terms of Clause-2.5, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of extension of time. Withholding of this amount on failure to achieve a milestone shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However no interest whatsoever shall be payable on such withheld amount.

**d) Bonus for early completion**

~~For availing incentive clause in any project which is completed before the stipulated date of completion, subject to other stipulations it is mandatory on the part of the concerned **Divisional Head** to report the actual date of completion of the project as soon as possible through fax or e-mail so that the report is received within 7 days of such completion by the concerned **Divisional Head** & the Administrative Department. The incentive for timely completion should be on a graduated scale of one percent to 05 percent of the contract value. Assessment of incentives may be worked out for earlier completion of work in all respect in the following scale.~~

~~Before 30 % of contract period = 5 % of Contract Value~~

~~Before 20 to 30 % of contract period = 4 % of Contract Value~~

~~Before 10 to 20 % of contract period = 3 % of Contract Value~~

~~Before 5 to 10 % of contract period = 2 % of Contract Value~~

~~Before 5% of contract period = 1 % of Contract Value~~

~~(Amendment to Para-3.5.5 (V) of Note-III of OPWD Code Vol.-I by inclusion vide O.M. No.5288 dt.04.05.2016)~~

**e) Management Meetings**

i) Either the **Divisional Head** or the Contractor may require the other to attend a management meeting. The business of management meetings shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

ii) The **Divisional Head** shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken to be decided by the **Divisional Head** either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

**Rescission of Contract (Amendment as per letter No.10639 dt.27.05.2005 of Works Department, Odisha):-** To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Executive Engineer shall be conclusive evidence), 20% of the value of left over work will be realized from the contractor as penalty.

- 114.** Building and other Construction Workers Welfare Cess @ 1% of the estimated cost as per tender notification read with latest corrigendum if any will be proportionately deducted from the contractor's bill at the time of making payment of each bill.
- 115.** The tenderers are required to go through each clause of P.W.D. Form P-1 carefully in addition to the clauses mentioned here in before tendering.
- 116.** A Contractor may be black listed as per amendment made to Appendix XXXIV to OPWD Code Vol.-II on rules for black listing of Contractors vide letter no.3365 dt.01.03.2007 of Works Department, Odisha.
- As per said amendment a Contractor may be blacklisted
- a)** Misbehavior/threatening of Departmental & supervisory officers during execution of work/tendering process.
- b)** Involvement in any sort of tender fixing.
- c)** Constant non-achievement of milestones on insufficient and imaginary grounds and non-adherence to quality specifications despite being pointed out.
- d)** Persistent and intentional violation of important conditions of contract.
- e)** Security consideration of the State i.e. any action that jeopardizes the security of the State.
- f)** Submission of false/ fabricated / forged documents for consideration of a tender.
- 117.** The safety certificate of the E.I. work will be furnished by the agencies after getting necessary verification from the electrical inspector / equally competent authority responsible for the work prior to Energisation of the building.
- 118.** Percentage rate contract (vide Works Department letter no.8310 dt.17.05.2006) In case of percentage rate tender:-
- i) The Contractor has to mention percentage excess or less over the estimated cost (In figures as well as words) in the prescribed format appended to the tender document
- ii) DELETED
- iii) Only percentage quoted shall be considered. Percentage quoted by the Contractor should be accurately filled-in figures and words, so that there is no discrepancy.
- iv) If any discrepancy is found in the percentage quoted in words and figures, then the percentage quoted by the Contractor in words shall be taken as correct.
- v) If any discrepancy is found in the percentage quoted in percentage excess/ less and the total amount quoted by the Contractor, then percentage will be taken as correct.
- vi) The percentage quoted in the tender without mentioning excess or less and not supported with the corresponding amount will be treated as excess.
- vii) The percentage quoted in the tender without mentioning excess / less supported with corresponding amount does not tally with either to percentage excess or less then it will be treated as percentage excess.
- viii) The percentage quoted in the tender without mentioning excess / less supported with corresponding amount if tallied with the percentage then it will be treated as to which side the amount tallies.
- (1) The Contractor will write percentage excess/ less up to **two decimal points** only.
- (2) The tender shall be written legibly and free from erasures, over writings or corrections of figures. Corrections, over writings & interpolations where unavoidable should be made by making out, initialling, dating and rewriting.

- ix) In the contract P1 time is the essence. The contractor is required to maintain a certain rate of progress specify in the contract.
- x) The quantity mentioned can be increased or reduced to the extent of 10% for individual items subject to a maximum of 5% over the estimated cost. If it exceeds the limit stated above prior approval of competent authority is mandatory before making any payment.
- xi) The period of completion is fixed and cannot be altered except in case of exceptional circumstances with due approval of next higher authority.
- xii) Bills for percentage rate tenders shall be prepared at the estimated rates for individual items only and the percentage excess or less shall be added or subtracted from the gross amount of the bill.

***(Total 118 clauses)***

## ADDITIONAL TERMS & CONDITIONS FOR ELECTRICAL WORKS

### 1. **Terms of Payment:**

Subject to any deduction which the owner may be authorized to make under the contract, the contractor shall on the certificate of the engineer or his authorized representatives whose certificate will be final regarding evidence of materials at site and completion or erection etc. be entitled to payments generally as follows.

- i) 80% of the contract price shall be paid after supply of materials in good condition and installation at the site. (The engineer may seek Indemnity Bond from the contractor against safe custody of the installation / materials erected as watch & ward is the responsibility of the contractor up to handing over).
- ii) Balance 20% of the contract price shall be paid after testing and commissioning with completion of entire work, inspection and clearance by the Statutory Authority and handing over.

### 2. **Regulation of Local Authorities and Status:**

The contractor shall comply with the rules and regulations of local authorities during the performance of his field activities. He shall also comply with the Minimum Wages Act, 1948 and the payment made there under in respect of any employee of workmen employed or engaged by his sub-contractor.

The contractor shall get the Entire installation inspected and cleared by the Electrical Inspector, Government of Odisha before commissioning. Only the statutory fees/deposits relating inspection and drawing approval etc, if any, in respect of his work pursuant to this contract shall be reimbursed to the contractor on production of documentary evidence.

However, any registration, statutory inspection fees lay fully payable under the provision of any other Regulations and statutory laws or amendments thereof from time to time shall be to the account of the contractor.

Should any such inspection or registration need to be rearranged due to the fault of the contractor or his sub-contractor, the additional fees for such inspection and/ or registration shall be borne by the contractor.

### 3. **Guarantee period:**

The entire installation after satisfactory completion in all respect shall be guaranteed for trouble free performance for a minimum period of **12 months** from date of completion. Any defects noticed during this period arising out of defective materials or bad workmanship shall be rectified free of cost to the owner.

### **4. Other Conditions**

1. Before bidding, the bidder should be well aware of the site and quote accordingly and survey the site before bidding.

2. Bidder will have to strictly adhere to the approved specifications of the **concerned DISCOMs, whether mentioned or not, the agency should execute as per the norms, standard and specifications of concerned DISCOMs.**

3. The technical data sheet shall be submitted for approval from IDCO as well as concerned DISCOMs including IDCO"s approval toward Make/manufacturer/supplier, prior to placing order.

4. All Electrical equipments shall be offered for Pre Delivery Inspection before despatch. Officials from both **IDCO and DISCOMs** will inspect.

**NB:** The expenditure towards travel, boarding and lodging etc for the purpose will be borne by the successful bidder from his own cost. In case of foreign tour, it would also include cost for obtaining VISA.

5. Electricity and water supply charges as required for construction activities should be taken care of by the successful bidder.

6. If any local/site/Row problem arises at site, while executing the work, same may be resolved by the successful bidder only.

7. In case, any point arises during quality inspection of the work by DISCOMs/ IDCO representative, the bidder has to comply the same without any cost implication.

## CODES

Codes shall mean the following including the latest ascendants and / or replacement if any.

- a. Indian Boiler Act, 1923 and Rules and Regulations made their under.
- b. Indian Electricity Act, 1923 and Rules and Regulations made there under.
- c. Indian Factories Act, 1948 and Rules and Regulations made there under.
- d. The minimum wages Act.
- e. Women's Compensation Act.
- f. The Payment of Wages Act.
- g. The Fatal Accident Act.
- h. The Industrial Employment Act.
- i. The Employment provident Fund Act.
- j. Indian Explosive Act 1984 the Rules and Regulations made there under.
- k. Indian Petroleum Act 1934, and Rules and Regulations made there under.
- l. A.S.M.E. Test Codes.
- m. AIRE Test, Codes.
- n. American Society of Materials Testing Codes.
- o. Standards of the Indian Standards Institution.

1)	Low Tension Circuit Breakers:	IS 2516-1955 Part I Sec.1
2)	Switchgear Bus Bars	IS 375-1963
3)	HRC fuse links	IS 2208-1962
4)	Distribution fuse boards	IS2675-1966
5)	Enclosure for Low Voltage switchgear	IS214701962
6)	PVC Cables	IS1554-1975
7)	Tabular fluorescent lamps for Cameral lighting service	IS2418-1963
8)	Tungsten Filament Lamps for cameral service	IS415-1963
9)	Ceiling Fans	IS274-1966
10)	Flood lights	IS1947-1961
11)	Wall Glass flame-proof electric light fittings	IS2206-1962 (Part 1)
12)	Water Tight Electric Light Fittings	IS3553-1956
13)	Steel Boxes for Enclosure of Electrical Accessories	IS5133-1969
14)	Fittings for Rigid Steel conduit	IS2667-1979
15)	Rigid steel circuits for electrical wiring	IS3837-1966
16)	Accessories for Rigid Steel Conduits for Electrical Wiring	IS3837-1966
17)	Switch Socket Outlets	IS3837-1966
18)	PVC Wiring	IS694-1977
19)	Switches for domestic and similar purpose	IS3854-1966
20)	PVC wiring	IS694-1977

21)	Call Bell and Buzzers	IS2268-1966
22)	Straight through joint boxes and leads sleeves or paper insulated cables-	EID-0032-1964
23)	Earthing	IS3043-1966
24)	Electrical Wiring installations	IS732-1963
25)	Switchgear	IS3072-1965 (Part I)
26)	Lighting protection	IS2309 –1969
27)	Public Address system	IS1882-1962
28)	Low Tension switch use units	IS4064-1978
29)	Code of Practice for Automatic FIRE ALAM system	IS2189-1970
30)	Specification for Heat Sensitive Fire Detectors	IS2175-1977
31)	Guide for Safety procedure in Electric work	IS5216-1969
32)	Rubber Mats for Electric works	IS5424-1969

p. Other internationally approved standards and / or Rules and Regulations touching the subject matter of the contract.

**STANDARDS:**

Except as modified in this specification, the materials and work covered under this specification, shall confirm to IS 802(Part-II) 1977 & the amendments thereof the following of Indian Standards and equivalent International Standards whenever indicated below:

Sl. No	Bureau of Indian Standards (BIS)	Title	International & Internationally recognized standard
1.	IS:209	Specification for zinc	
2.	IS:2062/8500	Structural steel (Standard quality)	
3.	IS:432	Mild Steel & Medium tensile bars and hard drawn steel wire for complete reinforcement	
4.	IS:802	Code of practice for use of structural steel in overhead transmission line. Part-I Load and permissible stresses. Part-II: Fabrication, Galvanizing Inspection and Packing. Part-III: Testing.	
5.	IS: 1367	Technical supply conditions for threaded fasteners.	
6.	IS: 1893	Criteria of Earthquake resistant design structures.	
7.	IS: 2016	Plain washers.	
8.	IS: 2551	Danger Notice Plates.	
9.	IS: 2629	Recommended practice for hot dip galvanizing of Iron & Steel.	
10.	IS: 2633	Method of testing uniformity of casting of zinc coated articles.	
11.	IS: 3063	Single coil rectangular section spring washers for bolts, nuts screws.	
12.	IS: 5358	Hot dip galvanized coatings on fasteners.	
13.	IS: 5613 Part-I & II	Code of practices for design. Installation maintenance of overhead power lines.	

	Section-I	
14.	IS: 6610	Specification for heavy washers for steel structures
15.	IS: 6745	Methods of determination of weight of zinc coating of zinc coated Iron and Steel articles.
16.	IS: 12427	Hexagonal bolts for steel structures
17.		Indian Electricity Rules, 1956.
18.		Publication for regulation for electrical crossing of railway tracks.
19.	3534:1979	Outline dimensions of electric lifts (first revision)
20.	1860-1980	Code of practice for installation, operation and maintenance of passenger and goods lifts (first revision)
21.	6620:1972	Code of practice for installation, operation and maintenance of service lifts.
22.	4666:1980	Electric passenger and goods lifts.
23.	6383:1971	Electric service lifts.
24.	9803 : 1981	Buffers for electric passenger and good lifts.
25.	10191 : 1982	Car and counter weight guide rails, guide rail supports and fast rings for lifts; and.
26.	11615 : 1986	Car and counterweight guide shoes for electric passenger and goods lifts.
27.	11706 : 1986	General requirements of carframe for electric passengers and goods lifts.
28.	9878 : 1981	Safety gears and governors for electric passenger and goods lifts.
29.	10448:1983	Retiring cam for passenger and goods lifts.

# TECHNICAL SPECIFICATIONS

## 1.0 General Requirements

The installations shall generally be carried out in conformity with the requirements of Indian Electricity Act, 1910 as amended up to date and Indian Electricity Rules, 1956 framed there under, the relevant regulations of the Electric Supply Authority concerned and also with the specifications laid down in the Indian Standard IS: 2274/1963 "Code of Practice (Revised) for Electrical Wiring Installations (System Voltage exceeding 650V)". The work shall be executed as per National Electrical Code and if any item is not covered there under or there is any doubt, the specification approved by the Engineer-in-charge will be final and binding.

### **Ambient Conditions: -**

All Electrical installations and equipment shall be suitable to work in following ambient conditions.

Maximum Temperature	:	50degree Celsius
.Relative Humidity	:	100%
Location of the work site	:	Mundaamba I.E.,Khordha.

### **System Conditions:-**

*The Electrical installations and equipment shall be suitable for operation in following system conditions.*

Supply voltage	:	11000 Volts+/-10%
Supply frequency	:	50Hz +/-5%
Number of Phases	:	Three

### **Scope:-**

The scope of work shall cover procurement of all required materials, supply, delivery at site, labour for installation, testing and commissioning in complete shape for the following works –

**“CONSTRUCTION OF 11 KV UG LINE TOWARDS SHIFTING OF EXISTING 11 KV OH LINE FROM PREMISES OF M/S NESTLE AT MUNDAAMBA INDUSTRIAL ESTATE, KHORDHA.”**

**Materials:-**

All materials, fittings, appliances used in electrical installations shall conform to Indian Standard Specifications wherever these exist. Lists of approved materials are attached. Materials not included in the list as well as any particular make not included in the list may be approved by the Engineer-in-charge before use. All required materials covered under this specification shall be supplied and installed by the contractor complete in all respect except in cases where it is clearly mentioned otherwise. The materials and accessories required for completing the work will form part of the work although they have not been specified separately.

Selection of materials and installation work shall be such as to simplify operation, inspection, maintenance and testing. The work shall include all reasonable precautions and provisions for safety of operation and maintenance personnel.

**Samples of materials are required to be submitted by the contractor to CONCERNED DISCOMS or Engineer-in-charge, as the case may be, for obtaining approval prior to use at site. The GTP of major materials/ equipments is to be approved by CONCERNED DISCOMS. The original money receipt of the purchase of materials will be verified by the supplier Engineer/ Project in Charge/ Executive Engineer, CONCERNED DISCOMS, if required.**

**The safety aspects of the system at the time of execution of work shall strictly be observed in compliance to regulation 3,12,14,15,19,27,29,33,43,44 & 46 of CEA (measures relating to safety & Electric Supply) Regulation – 2010 as amended till date.**

**The makes and Technical Specifications given are indicative in nature and may change as per requirement. Bidders to execute the works as per approved technical Specifications/approved make and approved GTP of DISCOMs & IDCO.**

**Standard:-**

- i. Unless otherwise specified, all materials covered under this specification shall be designed, manufactured, tested and installed in conformity with the latest Indian Standard Specifications. In case such Indian Standard Specifications are not published equivalent British Standard Specifications shall be followed. All equipment shall conform to latest Indian Electricity Rules, PWD and Local/State laws or by-laws as regards to safety, earthing and other essential provisions specified therein.

**Tolerances: -**

Tolerances on all the dimensions shall be in accordance with provisions made in the relevant standards. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

**SERVICE CONDITIONS:**

- i. Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.
  - a) Maximum ambient temperature of air: 50°C
  - b) Maximum temperature of air in shade: 4 ° C
  - c) Maximum daily average ambient temperature: 42°C
  - d) Maximum yearly average ambient temperature:30°C
  - e) Relative Humidity: up to 85%
  - f) Average number of thunder storm days per annum: 25
  - g) Maximum annual Rainfall: 155cm
  - h) Maximum soil temperature at cable depth:30°C
  - i) Maximum soil thermal resistivity: 150°C cm/watt
  - j) Equipment and materials selected shall also be supplied and installed taking into consideration the Factories Act, Fire Regulations and Local laws or by-laws. All light fittings and equipment selected shall be of well tied out design. All materials used in the assembly of fittings and their accessories shall be of high quality and manufactured in accordance with the best modern practice.
- ii. All the materials supplied by the contractor according to the contract conditions will be subject to inspection and approval by the Engineer-in-charge or their authorized representative from time to time. The contractor shall extend all required facilities for such inspection free of cost. At the time of inspection, the inspecting officer shall have full liberty to reject any such material, which does not conform to specifications or the requirements. The owner shall not entertain any claim for the rejected materials. The contractor shall remove all rejected materials from the site at his own cost.
- iii. The owner shall not accept any surplus material procured by the contractor.
- iv. The contractor will be responsible to get electrical installations inspected by the Electrical Inspector of the State Government/ Discom (MRT) and to obtain the statutory clearance for energization. The owner will reimburse the necessary inspection fees on production of documentary evidences.
- v. The contractor should possess valid electrical contract licence and labour licence issued by the appropriate statutory authority of the State Government during the execution of the contract.
- vi. The contractor shall be registered with Provident Fund Department for engagement of Labours/ Employees.
- vii. The contractor should follow the environment policy of IDCO.
- viii. Safety first principle to be strictly adhered.

### **Inspection and Approval**

The contractor shall put up samples of all major items for inspection and testing by the IDCO's representatives and/or Engineer-in-charge for which the contractor shall furnish minimum 10 days clear notice in advance to enable them to depute their Inspecting Officer. Similar procedure shall be adopted for the approval of samples of minor materials/ accessories to be used for the work.

# **TECHNICAL SPECIFICATION FOR GI CHANNEL AND ANGLE.**

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**1. SCOPE:**

This specification covers the design, manufacture, testing and supply of GI Channel and Angle to be used in Structures. Scope also includes transportation & unloading at store / site.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS 2062	Hot Rolled Medium and High Tensile Structural Steel
IS 1852	Rolling and Cutting Tolerances for Hot Rolled Steel products
IS 2633	Methods for testing uniformity of coating of zinc coated Articles
IS 4759	Hot-dip zinc coatings on structural steel and other allied Products
IS 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles

**3. CLIMATIC CONDITIONS OF THE INSTALLATION:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

CONCERNED DISCOMS service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust insuspension during the dry months and is subjected to fog in cold months.

**4. GENERAL TECHNICAL REQUIREMENTS:**

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE			
		100X50X6 mm	75X40x4.8 mm	65X65X6 mm	50X50X6 mm
1	Material	Hot-Dip Galvanized Channel	Hot-Dip Galvanized Channel	Hot-Dip Galvanized Angle	Hot-Dip Galvanized Angle

2	Relevant Standard	IS: 2062, IS: 2633, IS: 2629, IS: 4759	IS: 2062, IS: 2633, IS:2629, IS: 4759	IS: 2062, IS: 2633, IS: 2629, IS: 4759	IS: 2062, IS: 2633, IS: 2629, IS: 4759
3	Make	SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed)			
4	Grade of Steel	E 250 A	E 250 A	E 250 A	E 250 A
5	Minimum Tensile Strength in Mpa	410	410	410	410
6	Yield Stress in Mpa	250	250	250	250
7	Percentage Elongation (Min.) at Gauge Length	23%	23%	23%	23%
8	Bend Test (Internal Dia)	Min-2t	Min-2t	Min-2t	Min-2t
9	Mass of Zinc Coating	705 gm/m <sup>2</sup>	705 gm/m <sup>2</sup>	705 gm/m <sup>2</sup>	705 gm/m <sup>2</sup>
10	Zinc Coating Thickness & No of Dips	100 Micron (6 Dip)	100 Micron (6 Dip)	100 Micron (6 Dip)	100 Micron (6 Dip)
11	Chemical composition	Grade: E 250 A (As per IS: 2062)	Grade: E 250 A (As per IS: 2062)	Grade: E 250 A (As per IS: 2062)	Grade: E 250 A (As per IS: 2062)
12	Standard length of supply	6 Metre Long			
13	Tolerances	As per IS 1852 latest Amendment			

## 5. GENERAL CONSTRUCTION:

The Chemical composition and Physical properties of the finished material shall be as per the equivalent standards. Chemical Composition and Physical Properties shall conforming to IS: 2062. The approved makes are SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed). Mass the Channel and Angles are as follows:-a) 100x50x6 mm:- 9.56kg/m

b) 75x40x4.8 mm:- 7.14kg/m

c) 65x65x6 mm:- 5.8kg/m

d) 50x50x6 mm:-4.5kg/m

### 5.1 CHEMICAL COMPOSITION

Chemical composition for Fe 410 WA Grade

a) C - 0.23% Max

b) Mn - 1.5% Max

c) S - 0.045% Max

d) P - 0.045%Max

e) SI - 0.40% Max

f) CE (Carbon Equivalent)- 0.42%

### 5.2 Galvanization:

All the channels and angles shall be hot dip galvanized, are as following:

- a) All galvanizing shall be carried out by the hot dip process, in accordance with Specification IS2629.
- b) The zinc coating (705 gms per sq.mt / 100Micron,6 dips) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing.
- c) There shall be no impurities in the zinc or additives to the galvanic bath which could have a detrimental effect on the durability of the zinc coating. Purity of zinc shall be Zn 99.95% or better.
- d) In the event of damage to the galvanizing the method used for repair shall be subject to the approval of the Engineer in Charge or that of his representative. Repair of galvanization at site will not be permitted in any situation.
- e) Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.
- f) After galvanizing no drilling or welding shall be performed on the galvanized parts. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to test as per IS-2633.
- g) Quality of Hot Dip Galvanization should comply with IS 2629, ISO 1461 & should be guaranteed for any type of damage due to harsh climatic condition for 5 Years. These channels and angles are to be used in coastal areas of Odisha where climate is hot, humid & saline. These areas are prone to flood & frequent rainfall.

## **6. MARKING:**

Following distinct non-erasable embossing is to be made on each Channel and Angles to be supplied to CONCERNED DISCOMS under this Tender.

- a) Manufacturer Name/ Trade Mark
- b) E-250 A  
Engraved Marking (Punching before galvanization)
- a) "CONCERNED DISCOMS"
- b) Year of manufacturing
- c) PO Number

## **7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:

### **7.1 ACCEPTANCE TESTS**

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Dimension Test & Weight (kg/M) Visual Examination,
- iv) Test in respect of Hot Dip Galvanization i.e. Thickness of zinc coating in microns

## **7.2 ROUTINE TESTS**

Same as Acceptance Test

## **7.3 TYPE TESTS**

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

## **8. TYPE TEST CERTIFICATES:**

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 / Other Government Labs** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to CONCERNED DISCOMS.

## **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the CONCERNED DISCOMS. 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 CONCERNED DISCOMS's representatives at all times when the work is in progress. Inspection by the CONCERNED DISCOMS 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 CONCERNED DISCOMS.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by CONCERNED DISCOMS
- c) CONCERNED DISCOMS 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 AT STORE:**

The material received at CONCERNED DISCOMS, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

Galvanization Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

**12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Not Applicable

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tenders specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

# **TECHNICAL SPECIFICATION FOR GI NUT AND BOLT.**

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**1. SCOPE:**

This specification covers the design, manufacture, testing and supply of GI Nuts and Bolts to be used in structures. Scope also includes transportation & unloading at store / site.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS: 1363/ Part-I & III	Hexagon Head Bolts, Screws and Nuts of Product Grade C Part 1: Hexagon Head Bolts (Size Range M 5 to M 64) Part 3: Hexagon Nuts (Size Range M5 to M64)
IS 14394	Industrial Fasteners - Hexagon Nuts of Product Grade C - Hot-Dip Galvanized (Size Range M12 to M36)
IS 1367/ Part- III, VI & XIII	Technical Supply Conditions for Threaded Steel Fasteners, Part 3: Mechanical Properties of Fasteners Made of Carbon Steel and Alloy Steel - Bolts, Screws and Studs Part 6: Mechanical Properties and Test Methods for Nuts with Specified Proof Loads Part 13: Mechanical Properties of Fasteners Made of Carbon Steel and Alloy Steel - Bolts, Screws and Studs
IS 2633	Methods for testing uniformity of coating of zinc coated Articles
IS 4759	Hot-dip zinc coatings on structural steel and other allied Products
IS 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles

**3. CLIMATIC CONDITIONS OF THE INSTALLATION:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

CONCERNED DISCOMS service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust insuspension during the dry months and is subjected to fog in cold months.

**4. GENERAL TECHNICAL REQUIREMENTS:**

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Material	Hot-Dip Galvanized Nut, Bolt & Washer
2	Relevant Standard	IS:1363,IS 1367, IS: 2633, IS: 2629.
3	Grade of Steel	5.6
4	Mass of Zinc Coating	As per IS 1367 Part XIII
5	Zinc Coating Thickness	As per IS 1367 Part XIII
6	Chemical Properties	C:-0.13-0.55 MaxP:-0.05 Max S:- 0.06 MaxB:-0.003 Max
7	Tensile Load	Table 6 of IS 1367 Part III

**5. GENERAL CONSTRUCTION:**

Bolts & Nuts should be strictly supplied confirming to IS-1363/Part-I & III. The Bolt and Nut should be hot dip galvanized. The Chemical Composition should be as per IS 1367 Part-III.

**6. MARKING:**

Following distinct non-erasable embossing is to be made on each Nut and Bolt to be supplied to CONCERNED DISCOMS under this Tender.

- a) Manufacturer's name
- b) Grade of steel
- c) Year of manufacturing

**7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:-

**7.1 ACCEPTANCE TESTS**

- i) Visual Inspection
- ii) Verification of Dimensions
- iii) Checking of threads,
- iv) Galvanization Test
- v) Proof Load Test
- vi) Hardness Test
- vii) Surface Integrity Test

**7.2 ROUTINE TESTS**

Same as Acceptance Test

**7.3 TYPE TESTS**

- i) Visual Inspection
- ii) Verification of Dimensions

- iii) Checking of threads,
- iv) Galvanization Test

#### **8. TYPE TEST CERTIFICATES:**

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 / Other Government Labs** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to CONCERNED DISCOMS.

#### **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the CONCERNED DISCOMS. 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 CONCERNED DISCOMS's representatives at all times when the work is in progress. Inspection by the CONCERNED DISCOMS 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 CONCERNED DISCOMS.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by CONCERNED DISCOMS
- c) CONCERNED DISCOMS 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 AT STORE:**

The material received at CONCERNED DISCOMS, 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 department.

#### **11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 12 months from the date of commissioning or 18 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the

Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

**12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Bidder shall submit the sample of material during submission of Bids.

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

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## 1. SCOPE

The Specification covers the technical requirements of design, manufacture, test at manufacturer's works, packing & forwarding, supply and unloading at store/ site of 11 kV Pin polymer insulator 5 KN used in 11 kV Overhead Transmission lines.

## 2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref. IS	Description
IEC: 61109	Definition, test methods and acceptance criteria for composite insulators for A.C. overhead lines above 1000V
IEC: 61952	Insulators for overhead lines – Composite line post insulators for alternative current systems with a nominal voltage greater than 1 000 V
IS: 2071/ IEC: 60060-1	Methods of High Voltage Testing
IS: 2486	Specification for Insulator fittings for Overhead power Lines with a nominal voltage greater than 1000V
IS: 13134/ IEC: 60815	Guide for the selection of insulators in respect of polluted Condition
IS 8263/IEC: 60437	Methods of RI Test of HV insulators.
IS: 4759	Hot dip zinc coatings on structural steel & other allied products
IS: 2629	Recommended Practice for Hot, Dip Galvanization for iron and Steel
IS: 2633	Testing of Uniformity of Coating of zinc coated articles
IS:6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles
STRI Guide 1.92/1	Hydrophobicity Classification Guide
ASTM D 578-05	Standard specification for glass fiber strands

## 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal Direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid, dust in suspension during the dry months, and is subjected to fog in cold months.

#### 4. GENERAL TECHNICAL REQUIREMENTS:

- i) The Composite insulators will be used on lines on which the conductor will be ACSR/AAAC of size up to 100 Sq.mm. The insulators should withstand the conductor tension, the reversible wind load as well as the high frequency vibrations due to wind.
- ii) Insulator shall be suitable for 3 Phase, 50 Hz effectively earthed 11KV Overhead Distribution System in a moderately/heavily polluted atmosphere.
- iii) **Bidder must be indigenous manufacturer and supplier of Composite insulator of rating 11kV or above** or must have developed proven in house technology and manufacturing process for composite insulators of above rating or possess technical collaboration/association with the manufacturer of composite insulators of rating 11kV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid which can be in the form of certification from Utilities concerned, or any other documents to the satisfaction of the Owner.
- iv) Insulators shall have sheds with good self-cleaning properties. Insulator shed profile, spacing, projection etc. and selection in respect of polluted conditions shall be generally in accordance with the commendation of IEC- 60815/ IS: 13134.
- v) The tolerances on all dimensions e.g. diameter, length and creepage distance shall be allowed as follows in line with-IEC 61109:
- $\pm (0.04d + 1.5)$  mm when  $d \leq 300$  mm
- $\pm (0.025d+6)$  mm when  $d > 300$  mm
- Where, d being the dimensions in millimetres for diameter, length or creepage distance as the case may be. **However, no negative tolerance shall be applicable to creepage distance.**
- vi) The composite insulators including the end fitting connection shall be standard design suitable for use with the hardware fittings of any make conforming to relevant IEC/IS standards.
- vii) All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating conditions.

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Type of insulator	11 KV Polymeric composite Pin Insulator
2	Reference Standard	IEC 61109
3	Material of FRP Rod	Borron free ECR
4	Material of sheds	High voltage grade Silicone rubber Wacker-Germany, Dow Corning-USA
5	Material of End Fittings	SGCI /MCI/FORGED STEEL
6	Material of sealing compound	RTV Silicon
7	Colour of sheds	Grey
8	Rated system voltage	11 KV
9	Highest system voltage	12 KV
10	Dry Power Frequency Withstand voltage	70 KV

11	Wet Power Frequency Withstand voltage	35 KV
12	Dry Lightning Impulse withstand voltage	Positive: 75 KV Negative: 75 KV
13	Dry Lightning Impulse Flashover voltage	Positive: 95 KV Negative: 95 KV
14	RIV at 1 MHz when energized at 10 KV / 30 KV (rms) under dry condition	< 50 microvolt
15	Creepage distance (min)	320 mm
16	Min Failing load/ SCL (Specified cantilever Load)	5 KN
17	Dia of FRP Rod	24 mm
18	Length of FRP Rod (min)	200 mm
19	Dia of weather sheds	≥90 mm
20	Thickness of housing	3 mm
21	Dry arc distance(min)	165 mm
22	Method of fixing sheds to housing	Injection moulding
23	Visible Discharge Voltage	9 kV
24	Type of sheds	Aerodynamic
25	Dia of bottom end fitting	20 mm
26	Thread length of bottom end fitting	150 mm (Min)

## 5. GENERAL CONSTRUCTIONS:

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

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

### 5.1 CORE

It shall be a glass-fibre reinforced epoxy resin rod of high strength (FRP rod). Glass fibres and resin shall be optimized in the FRP rod. Glass fibres shall be Boron free electrically corrosion resistant (ECR) glass fibre and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pultrusion process. The FRP rod shall be void free. Electrically Corrosion Resistant (ECR) grade fibre glass reinforced plastic (FRP) rod having at least 80% fibres by weight.

### 5.2 POLYMER HOUSING:

The FRP rod shall be covered by a seamless sheath of high voltage grade Silicone rubber housing of thickness 3mm minimum. It shall be one- piece housing using only Injection Moulding process to cover the core. The housing shall be designed to provide the necessary creepage distance and protection against environmental influences, external pollution and humidity. Housing shall conform to the requirements of IEC 60815 with latest amendments. All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating condition. It shall be extruded or directly moulded on core and shall have chemical bonding with the FRP rod. The strength of the bond shall be greater than the tearing strength of the polymer. Sheath material in the bulk as well as in the sealing / bonding area shall be free from voids.

### 5.3 WEATHERSHEDS

The composite polymer weather sheds made of high voltage grade Silicone rubber polymer shall be moulded as part of the sheath and shall be free from imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The weather sheds should have **silicon content of minimum 40% by weight**. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The interface, if any, between sheds and sheath (housing) shall be free from voids. Housing and weather sheds material shall have tensile strength of 3 Mpa with 400% elongation minimum and tear strength of 16 N/mm.

#### **5.4 HARDWARE FITTINGS:**

End fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminium alloy. Metal end fitting shall be suitable for pin type hardware support of respective specified mechanical load and shall be hot dip galvanized in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique. The outer of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is moulded over it. The material used in fittings shall be corrosion resistant. As the main duty of the end fittings is the transfer of mechanical loads to the core the fittings should be properly attached to the core by a coaxial or hexagonal compression process & should not damage the individual fibres or crack the core. The gap between fittings and sheath shall be sealed by flexible silicone elastomeric compound or silicone alloy compound sealant, system of attached of end fitting to the rod shall provide superior sealing performance between housing, i.e. seamless sheath and metal connection. The sealing must be moisture proof. The dimensions of end fittings of insulators shall be in accordance with the standard dimensions stated in IS: 2486 - Part-II. Outer portion of Pin should be Zinc sleeved with minimum 99.95% purity of Electrolytic high grade zinc. Bottom end fitting should be single unit without any joints. Nuts as per IS 1363 (P-III) and spring washer shall be as per IS 3063 with Latest amendments if any, Nuts and spring washer shall be hot dip galvanized. The design of the insulator shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The pin insulator shall not engage directly with hard metal.

#### **6. MARKING:**

Each insulator shall be legibly and indelibly marked (embossing/engraved) to show the following:

- a) Name & Trade mark of the manufacturer
- b) Voltage Grade
- c) Year of manufacture
- d) Minimum failing load in KN
- e) "TPCODL" Name should be mentioned on each insulator

#### **7. TESTS**

The bidder shall be required to submit complete set of the following test reports along with the offer: -

##### **7.1 ACCEPTANCE TESTS**

- i) Verification of dimensions
- ii) End Sealing test (FRP rod and Silicone rubber housing)
- iii) Visual examination (Free from voids, cavity, foreign particle and scratch/nick spot)
- iv) Verification of the locking system or the tightness of the interface between end fitting and insulator

- housing
- v) Galvanizing Test
- vi) Verification of the specified mechanical load
- vii) Bending Load Test
- viii) Dry Power Frequency Withstand Voltage Test
- ix) Wet Power Frequency Withstand Voltage Test
- x) Analysis of material properties of housing material
- xi) Analysis of material properties of Core material

## **7.2 ROUTINE TESTS**

- i) Visual examination (Free from voids, cavity, foreign particle and scratch/nick spot)
- ii) Mechanical Load Test (bending/cantilever)

## **7.3 TYPE TESTS**

### **A) For Insulators**

- i) Dry Power Frequency Withstand Voltage Test
- ii) Dry Power Frequency Voltage Flashover Test
- iii) Dry lightning impulse withstand voltage test.
- iv) Wet Power Frequency Withstand Voltage Test
- v) Wet Power Frequency Voltage Flashover Test
- vi) Wet lightning impulse withstand voltage test.
- vii) Mechanical failing load test.
- viii) Mechanical performance Test
- ix) Salt fog test: On insulators for 1000 hr as per IEC
- x) Galvanization test
- xi) Bending Test
- xii) Assembled Core Load time test
- xiii) Radio interference test.
- xiv) Verification of the Locking System or the tightness of the interface between end fittings & Insulator housing.
- xv) Determination of the average failing load of the core of the assembled insulator.

### **B) For Silicon rubber**

- i) Tensile Strength
- ii) Elongation
- iii) Tear Strength
- iv) Inclined plane Tracking & Erosion resistance test

- v) Volume Resistivity
- vi) Dielectric constant
- vii) Dielectric Strength
- viii) Density
- ix) Hardness
- x) Arc Resistance
- xi) Silicone Content
- xii) Flammability
- xiii) Limiting oxygen index test
- xiv) Resistance to weathering & UV.
- xv) Specific gravity

**C) For FRP rods**

- i) Verification of dimensions
- ii) Specific Gravity
- iii) Glass Content
- iv) Water Diffusion Test
- v) Hardness
- vi) Dye Penetration Test
- vii) Flexural Strength
- viii) Brittle fracture resistance test.
- ix) Water Diffusion Test

**8. TYPE TEST CERTIFICATES:**

The Bidder shall furnish the type test certificates of the for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI/ERDA** as per the relevant IS/IEC. For **High voltage Silicone rubber material used for Polymer housing** the test are conducted at **CIPET/CPRI** as per the relevant standards. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

**9. PRE DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- 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 AT STORES:**

The material received at TPCODL, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

The bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of guarantee period for any 'latent defects' if noticed by the company.

**12. PACKING:**

Supplier shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport and be packed in such a manner so as to protect the equipment from damage in transit. The material used for packing shall be environmentally friendly. All insulators shall be packed in strong corrugated box of min. 7 ply duly palette or wooden crates. The gross weight of the crates along with the material shall not normally exceed 100 Kg to avoid handling problem. The crates shall be suitable for outdoor storage under wet climate during rainy season. Each wooden case / crate / corrugated box shall have all the markings stencilled on it in indelible ink. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Bidder shall submit the sample of material during submission of Bids.

**14. 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. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

**15. 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. 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B"  
Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

# **TECHNICAL SPECIFICATION FOR HT STAY (GUY) INSULATOR.**

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20. SCHEDULE "B" DEVIATIONS

**1. SCOPE:**

This specification covers the design, manufacture, testing and supply of porcelain HT Guy Strain Insulators for use in Distribution system. Scope also includes transportation & unloading at store/site.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref IS	Description
IS 5300	Porcelain Guy Strain Insulators

**3. CLIMATIC CONDITIONS OF THE INSTALLATION:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of An intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

**4. GENERAL TECHNICAL REQUIREMENTS:**

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Manufacturer's Name	To be specified by Bidder
2	Type of insulator	Type C
3	Standard Specification to which the material shall confirm	As per IS: 5300
4	<b>ELECTRICAL CHARACTERISTICS</b>	
(a)	Dry one minute power frequency Flashover voltage	32 kV
(b)	Wet one minute power frequency Flashover voltage	15 kV
(c)	Dry one minute power frequency Withstand voltage	27 kV
(d)	Wet one minute power frequency Withstand voltage	13 kV
5	Minimum Failing Load	88 KN
6	Power Frequency Punctured withstand voltage	1.3 times of Actual Dry Flashover Voltage
7	<b>DIMENSIONS</b>	
(a)	Length	140 mm
(b)	Width	85 mm
(c)	Cable Hole Dia	25 mm
8	Creepage Distance	57 mm
9	Type of Glaze	Brown / Dark Brown

10	Weight per piece	1.1 Kg approx.
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**5. GENERAL CONSTRUCTION:**

- a) The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
- b) The design of the insulators shall be such that the stresses due to expansion and contraction in any part of the insulator shall not lead to its deterioration.
- c) The glaze shall be brown in color for insulators. The glaze shall cover the entire porcelain surface parts except those areas that serve as supports during firing.
- d) The standard guy strain insulators shall be of designation, 'C' as per IS: 5300 or its latest revision. The recommended type of guy strain insulators for use on guy wires of HT overhead line is Type-C.

**6. MARKING:**

Following distinct non-erasable embossing is to be made on each Insulator to be supplied to TPCODL under this Tender.

- a) "TPCODL"
- b) Failing Load in KN
- c) Manufacturer Name/ Trade Mark
- d) Year of manufacturing

**7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer: -

**7.1 ACCEPTANCE TESTS**

- i) Verification of Dimensions.
- ii) Temperature cycle test
- iii) Mechanical strength test
- iv) Porosity test

**7.2 ROUTINE TESTS**

- i) Visual examination

**7.3 TYPE TESTS**

- i) Visual examination
- ii) Verification of dimensions
- iii) Temperature cycle test
- iv) Dry one-minute power frequency withstand test
- v) Wet one-minute power frequency withstand test
- vi) Mechanical strength test
- vii) Porosity test

**8. TYPE TEST CERTIFICATES:**

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All tests shall be conducted at **CPRI / ERDA / Other Government Labs** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

#### **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL, 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 department.

#### **11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

#### **12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The materials are to be packed in crates or boxes for rough handling. Packing shall be marked with

the strength and voltage ratings. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Bidder shall submit the sample of material during submission of Bids.

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

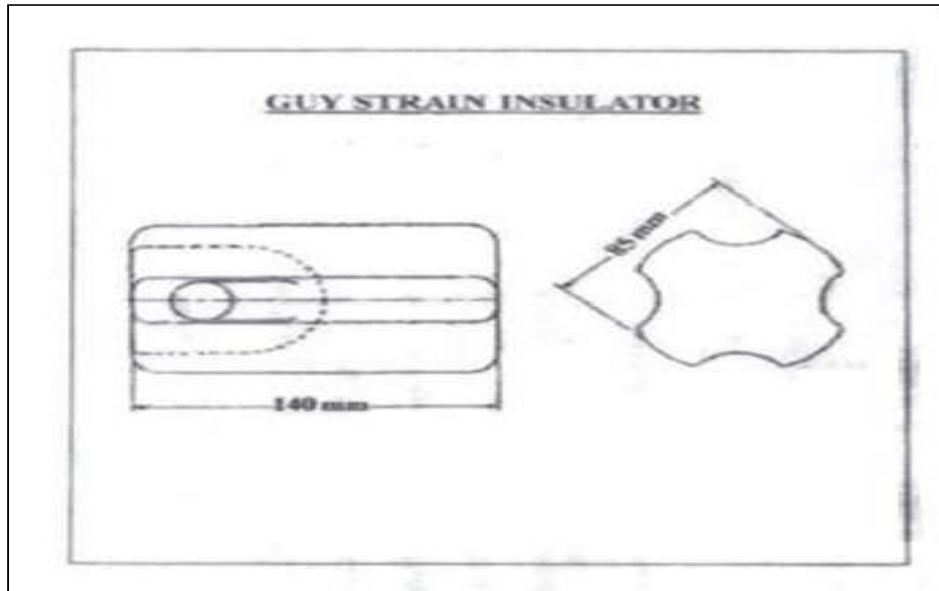
**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars.
- b) Work Experience details
- c) Type test certificates.
- d) Drawing (3 sets) of Guy Insulator containing complete information about manufacturing & fabrication etc.



**Note: -All Dimensions are in mm unless noted otherwise specified. This is an indicative drawing of Guy Insulator used for tender purpose only.**

# **TECHNICAL SPECIFICATION FOR HT STAY SET INCLUDING CLAMP**

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18. DRAWINGS AND DOCUMENTS

### 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 HT Stay Set.

### 2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref IS	Description
IS 4759	Hot Dip Galvanizing For Fabrication
IS 1852	Tolerance For Raw Material
IS 2062	Manufactured from raw material as per IS 2062 grade E-250 quality 'A'

### 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

### 4. GENERAL TECHNICAL REQUIREMENTS:

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Manufacturer Name & Address	To be specified by Bidder
2	Referred IS	IS: 2062, IS: 2633, IS: 2629, TPCO-OTH-010.
3	Dimensions	
4	<b>Anchor Rod (20mm Dia): 1 No.</b>	
a)	Dia of Rod	20mm (+ 5%, - 3%)
b)	Overall length of Anchor rod	1800mm (+ 0.5%)
c)	Inside Dia of Rounded Eye	40mm (+ 3%)
d)	Length of threaded portion	40mm (+ 11%, - 5%)

e)	Size of MS Nut & Bolt, Square MS Washers confirming to IS 1387 (1967) and IS 1363 (1967)	20mm Sq. Washer 50X 50 X 8mm
<b>5</b>	<b>Anchor Plate: 1 No.</b>	
a)	Size of the MS Anchor plate	300x300x8 mm
b)	Dia of the hole made at the centre of the plate	22mm
<b>6.(A)</b>	<b>Turn Buckle</b>	
(i)	Dia of the eye bolt	20mm (+ 3%, - 2%)
(ii)	Length of the eye bolt	450mm
(iii)	Length of the threaded portion of the bolt	300mm
(vi)	Inner dia of the circular eye made at other end of the bolt.	40mm
<b>(B)</b>	<b>Bow with welded angle</b>	
(i)	Dia of the MS Rod used for bow	20mm dia
(ii)	Overall length and height of the bow	995mm 450mm
(iii)	Magnitude of the angle in radians by which bow is bended at the top	10 R
(iv)	Length and size of the GI Angle welded at the order end of the bow	200mm & 100x50x4.8 mm Channel
(v)	Number of holes made in the GI Channel/ angle	3
(vi)	Dia of the holes	22mm (3Nos.)
<b>7</b>	<b>Thimble: 1 No.</b>	
a)	Thickness of the MS Sheet used for thimble	1.5mm
b)	Size of thimble	75x22x40mm
<b>8</b>	Minimum strength of the welding provides on various components of Guy/Stay Sets (IS:823/1964)	4900Kg.
<b>9</b>	Average weight of finished stay set	14.523 kg (min) / 15.569 kg (Max)
<b>10</b>	Surface Finish of stay set	Hot Dip Galvanised
<b>11</b>	All Tolerance of the dimensions/weight	± 5%

## 5. GENERAL CONSTRUCTION:

### 5.1 ANCHOR ROD WITH MS CHANNEL

Overall length of rod should be 1800 mm made out of 20 mm diameter MS rod. One end of rod to be made into a round eye having an inner diameter of 40 mm. Other end fitted with MS channel 100 x 50 x 4.8 mm; 200 mm long. Hot Dip galvanized as per IS 4759-1996.

### 5.2 RCC BASE PLATE

All material shall be of RCC. With concrete ratio 1:2:4 And 6 no's of 8 mm TMT bar both ways shall be used for reinforcement. Reinforcement bars cross point be welded or perfectly tied up with soft wire. Constructional details and dimension as mentioned in the drawing.

### 5.3 EYE BOLT

Eye bolt to be made of 20 mm dia MS Rod having an overall length of 450 mm. One end of the rod to be threaded up to 300 mm length. The other end of the rod shall be rounded into a circular eye of 40 mm inner dia with proper and good quality welding. Eye Bolt being a threaded fastener be hot dip galvanized as per relevant IS : 1367 (part 13) – 1983.

## **6. MARKING:**

Following distinct non-erasable embossing to be made on each HT Stay Set Supplied to TPCODL under this Tender.

a) Manufacturer Name/ Trade Mark

Engraved Marking (Punching before galvanization)

a) "TPCODL"

b) Year of manufacturing

## **7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:

### **7.1 ACCEPTANCE TESTS**

i) Visual examination, Verification of dimension and marking test.

ii) Tensile Strength.

iii) Galvanization (Uniformity) test.

iv) Cube test/ Compression test

### **7.2 ROUTINE TESTS**

Same as Acceptance Test

### **7.3 TYPE TESTS**

i) Chemical Composition

ii) Mechanical Properties

iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

## **8. TYPE TEST CERTIFICATES:**

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 / Other Government Labs** as per relevant IS. Type tests should have been conducted in certified 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, same shall be carried out without any cost implication to TPCODL.

## **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

Galvanization Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

**12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Not Applicable

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

**TECHNICAL SPECIFICATION FOR 7/8 GI STAY WIRE (33kV), 7/10 GI STAY WIRE (11kV) AND 7/12 GI STAY WIRE (LT)**

SI.No	TECHNICAL PARTICULARS	DESIRED VALUE		
		7/8 SWG	7/10 SWG	7/12SWG
1	Nominal Diameter	4.00 mm	3.15 mm	2.5mm
2	Sectional Area in sq. mm	87.92(for strandedwire)	54.52(for strandedwire)	34.35(for strandedwire)
3	Tolerance in diameter	+0.06 mm to -0.03 mm	+0.06 mm to -0.03 mm	+0.06 mm to -0.03 mm
4	Tensile strength	700-1100(N/mm2)	700-1100(N/mm2)	700-1100(N/mm2)
5	Minimum breaking Load (KN)	8.80(for single wire) 54.90(for stranded wire)	5.46(for single wire) 34.52(for stranded wire)	3.44(for single wire) 21.40(for stranded wire)
6	Type of coating Heavy/Medium/Light	Heavy	Heavy	Heavy
7	Variety Hard/Soft	Hard	Hard	Hard
8	Weight of Zn Coating(gm/mtr.2)(Afterstranding)	260	240	240
9	No of dips the coating is able to withstand at 18±2°C	2x1 Min, 1x1/2 Min	2x1 Min, 1x1/2 Min	2x1 Min, 1x1/2 Min
10	Adhesion Test (wrap test at 1turn per second coiling while stress not exceeding % nominal tensile strength)			
a)	Min. Complete turn of wrap	10	10	10
b)	Diameter of mandrel on which wrapped	4xNominal Diameter	4xNominal Diameter	4xNominal Diameter
11	Freedom from defects	The wire shall be free from all kinds of surface defects.	The wire shall be free from all kinds of surface defects.	The wire shall be free from all kinds of surface defects.
12	<b>Chemical composition of the MS Wire used shall not exceed</b>			
a)	Sulphur	0.055%	0.055%	0.055%
b)	Phosphorous	0.055%	0.055%	0.055%
c)	Carbon	0.23%	0.23%	0.23%
13	Standard	IS: 2141,4826,6594	IS: 2141,4826,6594	IS: 2141,4826,6594
14	Wt. of Each Coil(Kg)	70-100	70-100	70-100
15	Marking	Coil attached with a metallic tag containing:		
		Manufacturer make or Trade mark, ISI Mark		
		Coil no, Size, TPCODL-marking		
		Mass of coil, Length, Manufacturing month & year		

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## 1. SCOPE

The Specification covers the design, manufacture, testing preferably at manufacturer's works before supply and delivery of combined unit of hardware fittings for string insulators suitable for use in 33kV and 11kV overhead power lines.

The combined units offered shall be complete with all components which are necessary (excepting disc insulator) or usual for their effective performance and easy maintenance and inter changeability at site. Such parts shall be deemed to be within the scope of contract.

## 2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref. IS	Description
IS 2486 (Part 1) IS 2486 (Part 2) IS 2486 (Part 3)	Specification for metal fittings of insulators for overhead power lines with nominal voltage greater than 1000 V. Specification for Insulator fittings for overhead power lines with nominal voltage greater than 1000V. (dimensional requirements) Specification for Insulator fittings for overhead power lines with nominal voltage greater than 1000 V. (locking devices)
IS 4759	Specification for hot-dip zinc coatings on structural steel and other allied products.
IS : 6745	Determination of mass of zinc coating on zinc coated iron and steel articles.
IS : 2633	Method for testing uniformity of coating on zinc coated.
IS 6603	Stainless Steel Bars and Flats
IS 2016	Plain washers
IS:1573	Specification for electroplated coatings of zinc on iron and steel.
IS 209	Specification of Zinc
IS 6639, BS:916	Specification for Hexagonal bolts and nuts

## 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm

6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal Direction	Equivalent to Seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	Equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

#### 4. GENERAL TECHNICAL REQUIREMENTS:

- i) All ferrous parts including fasteners shall be hot dip galvanized, after all machining has been completed. Nuts may however be tapped (threaded) after galvanizing and the threads oiled. Spring washers shall be electro-galvanized. The bolt threads shall be undercut to take care of the increase in diameter due to galvanizing. Galvanizing shall be done in accordance with IS-2629-1985 and shall satisfy the tests mentioned in IS: 2633-1986. Fasteners shall withstand four dips while spring washers shall withstand three dips of one-minute duration in the standard Preece test. Other galvanized materials shall be guaranteed to withstand at least six successive dips each lasting one minute under the Standard Preece test for galvanizing.
- ii) The zinc coating shall be perfectly adherent of uniform thickness, smooth, reasonably bright, continuous and free from imperfections such as flux, ash, rust stains, bulky white deposits and blisters. The zinc used for galvanizing shall be of grade Zn 99.95 as per IS 209.

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE		
1	Type	<b>B&amp;S type</b>		
2	Ultimate Strength	70 KN (3 Bolted)	90 KN (4 Bolted)	120 KN (4 Bolted)
3	Suitable for conductor Size	AAAC-80 Sq mm, 100 Sq mm	AAAC-148 Sq Mm	AAAC-232 Sq Mm
4	Slip strength of tension clamp	95% of UTS	95% of UTS	95% of UTS
5	Referred IS Standard	IS 2486	IS 2486	IS 2486
6	Material Used			
a)	Cross Arm Strap	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
b)	Ball Eye	Forged Steel	Forged Steel	Forged Steel
c)	Socket Eye	Forged Steel	Forged Steel	Forged Steel
d)	Bolted Type Tension Clamp and Keeper	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy
e)	Security Clip	Stainless steel	Stainless steel	Stainless steel
f)	Split Pin	Stainless steel	Stainless steel	Stainless steel
g)	Cotter Pin and Bolt	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel

				(HDG)
h)	Nuts	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
i)	Spring Washer	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
j)	Plain Washer	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
k)	Zn confirming to grade	IS 209	IS 209	IS 209
m)	Size of U Bolt	M16	M16	M16
7	Galvanizing	IS 2633, IS 2629	IS 2633, IS 2629	IS 2633, IS 2629

## 5. GENERAL CONSTRUCTIONS:

### Fittings for Strain Insulators with clamp

- i) Cross arm strap confirming to IS 2486 (Part 2). Forged Steel ball eye for attaching the socket end of the Disc insulator to the cross arm strap. Dimensions shall be in accordance with IS: 2486 (Part-2) unless otherwise specified.
- ii) Cross-arm straps shall be manufactured from MS Flat hot dip galvanized and to connect the cross-arm/bracket of the structure at one end and the Ball Clevis at the other end.
- iii) It should be complete with hexagonal bolts, nuts, spring washers and Cotter pin at the threaded end to lock the unit. Minimum Threaded portion of the bolt shall be 30mm.
- iv) Aluminum alloy thimble socket made of permanent high strength aluminum alloy for attaching the disc insulator at one end and for accommodating the loop of conductor at the other end. The thimble socket shall be attached to the disc insulator with the help of locking pin as per the dimensions given in IS:2486 (Part 2).
- v) The tension hardware with three bolts and four bolts strain hardware shall have minimum slip strength not less than 95% of the strength of respective conductor.
- vi) All forgings & castings shall be of good finish and free from flaws or any other defects which may cause decrement of efficiency while in operation. The edges on the outside of the fittings such as at the ball socket & holes and the grooves shall be smooth & rounded. Sharp radius of curvature, ridges etc. which may lead to localized pressure or cause damage to the conductors in service shall be avoided. The clamp shall permit the conductor to slip before the failure of conductor occurs.
- vii) All parts of different fittings which provide for interconnection shall be made such that sufficient clearance is provided at the connection point to ensure free movement. All ball and socket connections shall be free in this manner, but care shall be taken that too much clearance between ball and socket is avoided.
- viii) All ferrous fittings and the parts other than those of stainless steel, shall be galvanized. Small fittings like spring washers, nuts, etc. should be electro-galvanized-Coating thickness as per IS: 1573.
- ix) The nominal dimensions of the ball and sockets, ball eye and cross-arm straps are as per the IS:2486 (Part 2).

### FASTENERS: Bolts, Nuts & Washers:

- i) All bolts and nuts shall conform to IS-6639. U bolt, Hexagonal Bolt, Nut, Plain Washer and all other ferrous parts shall be Hot dip Galvanized. In case of Hot Dip Galvanization, minimum Value of Mass of zinc coating should be 705 g/m<sup>2</sup>. All bolts and nuts shall have hexagonal heads, the heads being truly concentric, and square with the shank, which must be perfectly straight.
- ii) Flat washers and spring washers shall be provided wherever necessary and shall be of positive lock type. Spring washers shall be electro-galvanized. The thickness of washers shall conform to IS-2016.
- iii) The split pin to be used on the cotter pin shall be of Humpback type & shall be made of Stainless Steel conforming to IS: 6603 with a minimum hardness of 160 HV.
- iv) Locking devices (R Type) for ball and socket lockers shall be of Stainless Steel conforming to IS: 6603 with minimum hardness of 160 HV. The dimension shall conform to IS: 2486.

**6. MARKING:**

Each Hardware fittings shall be legibly and indelibly marked (embossing/engraved) to show the following:

- a) Name & Trade mark of the manufacturer
- b) Year of manufacturing
- c) Minimum failing load in KN
- d) "TPCODL"

**7. TESTS**

The bidder shall be required to submit complete set of the following test reports along with the offer: -

**ACCEPTANCE TESTS**

**For Clamps**

- i) Visual Examination Test
- ii) Chemical Composition Test
- iii) Verification of dimensions
- iv) Mechanical Test
- v) Ultimate Strength Test
- vi) Galvanizing Test
- vii) Electrical resistance test

**On Insulator string fittings**

- i) Visual Examination
- ii) Chemical Composition Test
- iii) Verification of dimensions
- iv) Ultimate Strength Test
- v) Galvanizing Test

**ROUTINE TESTS**

- i) Visual Examination Test
- ii) Mechanical Routine Test

## **TYPE TESTS**

### **For Clamps**

- i) Visual Examination
- ii) Verification of dimensions
- iii) Slip strength tests
- iv) Ultimate Strength test
- v) Electrical resistance test
- vi) Heating Cycle test
- vii) Galvanizing/ Electroplating Test

### **On Insulator string fittings except Clamps**

- i) Visual Examination
- ii) Verification of dimensions
- iii) Mechanical Test
- iv) Galvanizing Test
- v) Chemical Composition Test

## **8. TYPE TEST CERTIFICATES:**

The Bidder shall furnish the type test certificates of the for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI/ERDA/Other Government Labs** as per the relevant IS/IEC. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

## **9. PRE DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- 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 AT STORES:**

The material received at TPCODL, 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 department.

**GUARANTEE:** Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be. The bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of guarantee period for any 'latent defects' if noticed by the company.

#### **11. PACKING:**

Supplier shall ensure that all the material covered under this specification shall be prepared for rail/road transport and be packed in such a manner so as to protect the equipment from damage in transit. The material used for packing shall be environmentally friendly. Fittings for different sizes of conductors shall be packed in different boxes/gunny bags and shall be complete with their minor accessories fitted in place and colour codes on tags/fittings shall be marked to identify suitability for different sizes. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

#### **12. TENDER SAMPLE:**

Bidder shall submit the sample of material during submission of Bids.

#### **13. 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. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

#### **14. TESTING FACILITIES:**

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

**15. 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.

**16. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**17. DRAWINGS AND DOCUMENTS**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

# **TECHNICAL SPECIFICATION FOR GI EARTHING PIPE.**

## **CONTENTS**

1. SCOPE
2. APPLICABLE STANDARDS
3. CLIMATIC CONDITIONS OF THE INSTALLATION
4. GENERAL TECHNICAL REQUIREMENTS
5. GENERAL CONSTRUCTIONS
6. MARKING
7. TESTS
8. TYPE TEST CERTIFICATES
9. PRE-DISPATCH INSPECTION
10. INSPECTION AFTER RECEIPT AT STORES
11. GUARANTEE
12. PACKING
13. TENDER SAMPLE
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15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS

### 1. SCOPE:

The specification covers technical requirements of design, Manufacturing, testing, Inspection, supply and transportation of Heavy type GI Earth Pipe Electrode. Scope also includes transportation & unloading at store / site.

### 2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS 1239 (Part-1)	Specification of steel tubes, Tubular and other wrought steel fittings
IS 1239 (Part-2)	Specification of steel tubes, Tubular and other steel fittings
IS 10748	Hot- rolled steel strip for Welded Tubes and Pipes
IS: 228	Methods of Chemical analysis for steels
IS: 4759	Specification for Hot Dip Zinc Coating on structural steel and other allied products
IS: 4711	Methods for sampling of steel pipes, tubes, fittings
IS 3043	Code for practice of Earthing

### 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	Equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed up to 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

#### 4. GENERAL TECHNICAL REQUIREMENTS:

SL. No	TECHNICAL PARTICULAR	DESIRED VALUE		
1	Diameter of earthing Pipe	40 mm dia	50 mm dia	100 mm dia
2	Standard	IS 1239	IS 1239	IS 1239
3	Material	GI Pipe	GI Pipe	GI Pipe
4	Make	JINDAL /TATA	JINDAL /TATA	JINDAL /TATA
5	Class	Heavy	Heavy	Heavy
6	Outdoor diameter	47.9 mm min. to 48.8 mm max.	59.7 mm min. to 60.8 mm max.	113.1 mm min. to 115 mm max.
7	Wall thickness	4 mm	4.5 mm	5.4 mm
8	% of Elongation	20	20	20
9	Tensile strength	320 N/mm <sup>2</sup>	320 N/mm <sup>2</sup>	320 N/mm <sup>2</sup>
10	Length of pipe earthing	3000 mm	3000 mm	3000 mm
11	Dimensions of holes	12 mm	12 mm	12 mm
12	Tolerance on dimensions/weight	+/-5 %	+/-5 %	+/-5 %
13	Galvanizing shall confirm	IS: 2633, IS: 2629, TPCO-OTH-010.	IS: 2633, IS: 2629, TPCO-OTH-010.	IS: 2633, IS: 2629, TPCO-OTH-010.
14	Dimension of clamp	50 x 6 GI flat	50 x 6 GI flat	50 x 6 GI flat

Note: - For design and other parameter refer to the drawing on page No:-7.

#### 5. GENERAL CONSTRUCTION:

For welded and seamless plain end steel tubes intended for different use in electricity distribution utility shall comply IS 1239 (Part-1). Plain ends of the tubes are cleanly finished by normal deburring process. For tubes of any thickness the minimum mass of Zinc Coating is 360 gm Sq.mtr. The Zinc coating on the tube shall be uniform and tested in accordance with IS 4736. The welded tubes shall be manufactured from hot rolled steel strip for welded tubes and pipes confirming to IS 10748. Pipe shall be strictly from approved vendors i.e. TATA/JINDAL. The hot dip galvanization shall be done only after the all fabrication and welding done. Zinc electroplated/painted material will not be accepted. The nut bolt and washer s provided shall be as per the relevant IS. Chemical composition for GI earth pipe are in below:

Carbon: 0.20% (max.)

Manganese: 1.30% (max.)

Phosphorus: 0.04% (max.)

Sulphur: 0.04% (max.)

#### 6. MARKING:

The unit shall be appropriately marked as

- TPCODL
- Manufacture's name or trademark
- PO No.
- Year of Manufacturing

## **7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:-

### **7.1 ACCEPTANCE TESTS**

- i) Visual Inspection
- ii) Verification of Dimensions
- iii) Tensile Strength
- iv) Bend Test
- v) Hot Dip galvanizing
- vi) Determination of mass of Zinc coating on Zinc coated iron and steel

### **7.2 ROUTINE TESTS**

Same as Acceptance Test

### **7.3 TYPE TESTS**

- i) Visual Inspection
- ii) Verification of Dimensions
- iii) Tensile Strength
- iv) Bend Test
- v) Flattening test (dia.>50mm)
- vi) Hot Dip galvanizing
- vii) Determination of mass of Zinc coating on Zinc coated iron and steel

## **8. TYPE TEST CERTIFICATES:**

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 / Other Government Labs** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

## **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports

- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs, within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

**12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Not Applicable

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

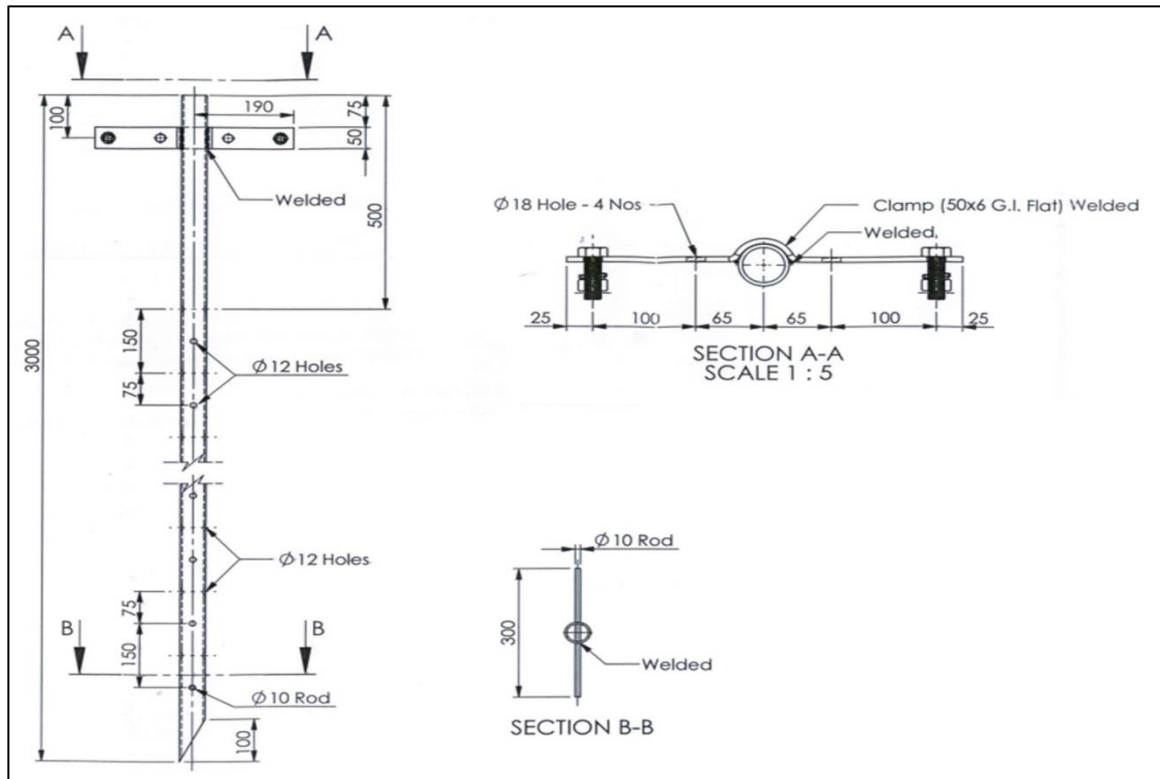
Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about

manufacturing



NOTE: - The drawing is for tender purpose only.

## **Technical Specifications For Specification For WPB Pole (11MTR & 13MTR)**

### **CONTENTS**

1. SCOPE
2. APPLICABLE STANDARDS
3. CLIMATIC CONDITIONS OF THE INSTALLATION
4. GENERAL TECHNICAL REQUIREMENTS
5. GENERAL CONSTRUCTIONS
6. MARKING
7. TESTS
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9. PRE-DISPATCH INSPECTION
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15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS

**1. SCOPE:**

This specification covers the design, manufacture, testing and supply of 160mm X 152 mm WPBpole, 11 mtr. & 13 mtr. long having unit weight of 30.44Kg per meter. Scope also includes transportation & unloading of poles at store / site.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS 12778	Hot Rolled Parallel Flange Steel Sections for Beams, Columns and Bearing Piles - Dimensions and Section Properties
IS 2062	Hot Rolled Medium and High Tensile Structural Steel
IS 12779	Rolling and cutting tolerances for hot rolled parallel flange beam and column sections
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS 2633	Methods for testing uniformity of coating of zinc coated Articles
IS 4759	Hot-dip zinc coatings on structural steel and other allied Products
IS 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles

**3. CLIMATIC CONDITIONS OF THE INSTALLATION:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m

8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

#### 4. GENERAL TECHNICAL REQUIREMENTS:

SI.NO	TECHNICAL PARTICULARS	DESIRED VALUE
1	Length of Joist in mtr.	11mtr / 13mtr
2	Make	SAIL/TATA/ RINL/JINDAL <b>(Billet with re rolling not allowed)</b>
3	Weight in kg/m with $\pm 2.5\%$ Tolerance	30.44
4	Sectional Area (cm <sup>2</sup> )	38.8
5	Flange slope in deg	90
6	Cutting length tolerance	100 (no negative tolerance)
7	Depth(D) of Section (mm) with $\pm 3.0$ mm Tolerance	152
8	Width(B) of Flange (mm) with $\pm 0.7$ mm Tolerance	160
9	Thickness of Flange (Tf) (mm) with $\pm 1.5$ mm Tolerance	9
10	Thickness of Web (Tw) (mm) with $\pm 0.7$ mm Tolerance	6
11	Corner Radius of fillet or root (R1) (mm)	15
12	Moment of Inertia	
a	Ixx (cm <sup>4</sup> )	1673
b	Iyy (cm <sup>4</sup> )	615.6
13	Radius of Gyration (cm)	
a	Rxx	6.57
b	Ryy	3.98
14	Modulus of Section Zxx (cm <sup>3</sup> )	
a	Zyy (cm <sup>3</sup> )	220.1
b	Zxx(cm <sup>3</sup> )	76.9
15	GI Base Plate in mm	300 x 300 x 12

SI.NO	TECHNICAL PARTICULARS	DESIRED VALUE
16	GI Stiffener Flange in mm	150 x 60 x 6
17	GI Stiffener Web in mm	150 x 100 x 6
18	<b>Mechanical Properties</b>	
a)	Grade	E-350A
b)	Yield stress in Mpa	350 Min
c)	Tensile stress in Mpa	490 min
d)	Lo= (5.65 So) Elongation %	22 min
e)	Bend test	Shall not crack
19	<b>Chemical properties</b>	
a)	Grade	E 350A
b)	Carbon	0.2 % Max
c)	Manganese	1.55 % max
d)	Sulphur	0.045 % max
e)	Phosphorous	0.045 % max
f)	Silicon	0.45 % max
g)	Carbon equivalent	0.47 % max
h)	De oxidation method	Semi killed or killed
20	Supply condition	Hot rolled
21	Galvanizing standard	IS 2633, IS 2629, TPCO-OTH-010
22	The zinc coating (705 gms per sq.mt / 100Micron) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing. Zinc Coating shall withstand for 6 dips(min) in Dip Test process for WPB Pole	705 gms per sq.mt / 100 Micron with 6 Dips(min)

## 5. GENERAL CONSTRUCTION:

The Wide Parallel Beam support structures shall be fabricated from mild steel, grade A and in lengths dictated by design parameters. Supplier has to supply Baseplate with dimension 300mm x 300mm x 12mm thickness along with Stiffener 150 x60x6 (flange) & 150x100x6 (web). Complete fabrication drawing shall be submitted for approval. Holes should be as per GA drawing provided by TPCODL. Arc welding to be used for fabrication / jointing of Base plate & stiffener to the pole. However, in case of any discrepancy between the above data & the relevant IS, the values indicated in the IS shall prevail. All the acceptance Tests / routine tests shall be carried out as per relevant IS. The approved makes are SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed).

### Galvanization:

WPB Pole shall be hot dip galvanized, are as following:

- All galvanizing shall be carried out by the hot dip process, in accordance with Specification IS 2629. However, high tensile steel nuts, bolts and spring washer shall be electro galvanized.
- The zinc coating (705 gms per sq.mt / 100Micron) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing.
- There shall be no impurities in the zinc or additives to the galvanic bath which could have a detrimental effect on the durability of the zinc coating. Purity of zinc shall be Zn 99.95% or better.
- In the event of damage to the galvanizing the method used for repair shall be subject to the approval of the

Engineer in Charge or that of his representative. Repair of galvanization at site will not be permitted in any situation.

- e) The threads of all galvanized bolts and screwed rods shall be cleared of spelter by spinning or brushing. A die shall not be used for cleaning the threads unless specifically approved by the Engineer in Charge. All nuts shall be galvanized. The threads of nuts shall be cleaned with a tap and the threads oiled.
- f) Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.
- g) After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to tests per IS-2633.
- h) Quality of Hot Dip Galvanization should comply with IS 2629, ISO1461 & should be guaranteed for any type of damage due to harsh climatic condition for 5 Years. These poles are to be used in coastal areas of Odisha where climate is hot, humid & saline. These areas are prone to flood & frequent rainfall.

#### **6. MARKING:**

Following distinct non-erasable embossing is to be made on each WPB Poles to be supplied to TPCODL under this Tender.

- a) ISI Mark
  - b) WPB 160
  - c) E-350 A
  - d) Manufacturer Name/ Trade Mark
- Engraved Marking (Punching before galvanization)
- a) "TPCODL"
  - b) P.O No and Date of Manufacturing

#### **7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer: -

##### **ACCEPTANCE TESTS**

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Dimension Test & Weight (kg/M) Visual Examination,
- iv) Test in respect of Hot Dip Galvanization i.e. Thickness of zinc coating in microns

##### **ROUTINE TESTS**

Same as Acceptance Test

##### **TYPE TESTS**

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

**8. TYPE TEST CERTIFICATES:**

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/Other Government Labs** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

**9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all

times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

Galvanization Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

**12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/roadtransport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Not Applicable

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tenders specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

**TECHNICAL SPECIFICATION FOR HEAT SHRINKABLE STRAIGHT THROUGH JOINT & TERMINATION FOR 11 KV POWER CABLE**

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## 1. 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 11 kV Heat Shrink Cable Straight through Joints and Terminations with all accessories and necessary training for trouble free & efficient performance.

## 2. APPLICABLE STANDARDS:

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

S. No.	IEC/IS	Description
1	IS-13573(part2): 2011	Test requirements - Cable accessories for extruded power cables (for working voltages 3.3 kV and up to including 33 kV)
2	IS 7098(part2):2011	Cross-linked polyethylene insulated thermoplastic sheathed cables (for working voltages from 3.3 kV up to and including 33 kV)
3	IS 692 : 1994	Paper insulated lead sheathed cables for rated voltages up to and including 33 kV
4	IEC 60502 : 2009	Power cables with extruded insulation and their accessories for rated voltages from 1 kV up to 30 kV
5	ASTM D-2303	Standard Test Methods for Liquid Contaminant, Inclined-plane tracking and Erosion of insulating materials
6	ASTM D-2671	Standard Test Methods for Heat Shrinkable Tubing
7	ENA TS 09-13:1981	High Voltage Heat Shrinkable Components for use with HV solid type cables up to and including 33 kV
8	IEC 61238(part1) : 2003	Test methods and requirements - Compression and mechanical connectors for power cables for rated voltages up to 30 kV
9	IS 8308 : 2003	Compression type tubular in-line connectors for Aluminium conductors of insulated cables
10	IS 8309 : 2003	Compression type tubular terminal ends for Aluminium conductors of insulated cables
11	IS 2633:1986	Method for testing of uniformity of zinc coating
12	IS 4826 : 1979	Hot dipped galvanized coatings on round steel wires
13	IS 12444:1988	Continuously Cast and Rolled Electrolytic Copper Wire Rods for electrical conductors
14	IS 191	Copper
15	IS 10810	Methods of test for cables
16	IEC 60216 part 2	Determination of thermal endurance properties of electrical insulating materials
17	IEC 60216 part 8	Instructions for calculating thermal endurance characteristics using simplified procedures

### 3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed up to 300 Kmph. The atmosphere is generally laden with mild acid, dust in suspension during the dry months, and is subjected to fog in cold months.

### 4. GENERAL TECHNICAL REQUIREMENTS:

A. 11 kV XLPE Insulated Underground Cables as per IS 7098 – 2: 11 kV ('E)

- a) A2XCWY- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, wire GI armour, PVC sheath)
- b) A2XCWaY -(Aluminium conductor, XLPE insulation, copper tape screen, Aluminium wire armour, PVC sheath)
  - i) 3CX70 sq.mm. A2XCWY/A2XFY
  - ii) 3CX95 sq.mm. A2XCWY/A2XFY
  - iii) 3CX120 sq.mm. A2XCWY/A2XFY
  - iv) 3CX150 sq.mm. A2XCWY/A2XFY
  - v) 3CX185 sq.mm. A2XCWY/A2XFY
  - vi) 3CX240 sq.mm. A2XCWY/A2XFY
  - vii) 3CX300 sq.mm. A2XCWY/A2XFY
  - viii) 3CX400 sq.mm. A2XCWY/A2XFY
  - ix) 1CX400 sq.mm A2XCWaY
  - x) 1CX630 sq.mm. A2XCWaY
  - xi) 1CX1000 sq.mm. A2XCWaY
  - xii) HT AB- 55/95/150 sq.mm. – Straight Through Jointing/ Outdoor Jointing

**B. HT Aerial Bunched Cables with Aluminium alloy catenary : 11 kV ('E)**

- a) A2XCY- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, PVC sheath)
- b) A2XC2Y- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, HDPE sheath)
- c) A2XWaY- (Aluminium stranded compacted conductor, XLPE insulation, Aluminium wire screen, PVC sheath)
- i) 3CX95 sq.mm. A2XCY/ A2XC2Y/ A2XWaY
- ii) 3CX150 sq.mm. A2XCY/ A2XC2Y/ A2XWaY
- iii) 1CX55 sq.mm. A2XCY/ A2XC2Y/ A2XWaY
- iv) 1CX95 sq.mm. A2XCY/ A2XC2Y/ A2XWaY
- v) 1CX150 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

C. **PILCA Insulated Cables as per IS 692: 11 kV, ('E) Belted APLST**

(Al stranded sector shaped, paper insulated, lead sheath, steel tape sheath).

- i) 3CX150 sq.mm. Belted APLST
- ii) 3CX240 sq.mm. Belted APLST
- iii) 3CX300 sq.mm. Belted APLST

According to standard sizes of cables, following types of cable joints and terminations shall be required:

- a) Tinned coated Mechanical Lugs and Mechanical Connectors are specified corresponding to joint and terminations.

For remaining joints and terminations, Aluminium compression lugs and ferrules shall be applicable.

Type & size of cable	Type of Joint
3CX70, 3CX95, 3CX120, 3CX150, 3CX185, 3CX240 sq.mm. XLPE insulated cable	Indoor termination
	Outdoor termination
	Straight through joint
3CX300 sq.mm. XLPE insulated cable	Indoor termination
	Outdoor termination
	Straight through joint
3CX400 sq.mm. XLPE insulated cable	Indoor termination
	Indoor termination with Tinned coated mechanical lugs 300-400mm <sup>2</sup> (for RMUs)
	Outdoor termination
	Straight through joint with 300-400mm <sup>2</sup> mechanical connector
3CX185, 3CX240 sq.mm XLPE insulated cable	Outdoor termination with Compression Lug
1CX400 & 1CX630 sq.mm. XLPE insulated cable	Indoor termination
	Indoor termination with tinned coated mechanical lug(for RMUs)
	Straight through joint with Mechanical Lug

1CX1000 sq.mm. XLPE insulated cable	Indoor termination
	Outdoor termination joint
	Straight through joint
1CX55 sq.mm. XLPE insulated cable	Outdoor termination joint
	Straight through joint
1CX95 sq.mm. XLPE insulated cable	Outdoor termination joint
	Straight through joint
1CX150 sq.mm. XLPE insulated cable	Outdoor termination joint
	Straight through joint
PILCA to XLPE transition joints	Screened Transition joint 3CX185-400 sq.mm. XLPE insulated cable WITH 3CX150-300 sq.mm. PILCA insulated cable sector shaped (with mechanical connector)
Straight through joints between XLPE insulated cables	i) 3CX185 – 400 sq.mm. XLPE (with mechanical connector) ii) 3CX150-300 sq.mm. XLPE insulated cable (with compression reducer ferrule)
3CX300 sq.mm. PILCA insulated cable	Indoor termination
HS Joint 11KV single phase XLPE (One Phase Repair joint)	Straight through single-phase repair joint in 3Cx 300 -400mm <sup>2</sup> with extra-large (440 – 450 mm length) aluminium mechanical connector.

**General requirement for Heat Shrinkable Jointing and Termination kit:**

- The jointing kit containing heat shrinkable tubing, mastics and other accessories for making a complete joint and termination shall be designed to meet TPCODL specification, ENA TS 09-13, IEC 60502 and IS 13573, part-2 and other relevant standards.
- Cable joint and termination material shall not be adversely affected in any manner even after contact with material used in cable construction and material used as accessories in the construction of cable joints and terminations and there will be no chance of corrosion developing on any metal surface.
- Assembled jointing kit components shall perform without distress in system with parameters(mentioned below):

S. No.	Parameter	Units	Requirement
1	Max. Withstand System Voltage	kV	12
2	Partial Discharge at 1.73 U <sub>o</sub>	pC	<10
3	Impulse Peak Withstand	kV	75 kV
4	Continuous operation withstand Temperature	°C	90

	Short Circuit withstand temperature	°C	250
5	Withstand short circuit current	kA/1Sec	3CX95 Sq.mm Cable : 8.93 kA 3CX120 Sq.mm Cable : 11.28 kA 3CX150 Sq.mm Cable : 14.1 kA 3CX185 Sq.mm Cable: 17.39 kA 3CX240 Sq.mm Cable: 22.56kA 3CX300 Sq.mm Cable: 28.2 kA 3CX400 sq.mm Cable : 37.7 kA 1CX1000 Sq.mm Cable : 94.0 kA 1CX630 Sq.mm Cable :59.4 kA 1CX400 Sq.mm Cable :37.7 kA 1CX150 sq.mm. HT ABC: 14.2 kA 1CX95 sq.mm. HT ABC: 9 kA
6	Storage Temperature Range	°C	-10°C to + 45°C
7	Shelf life of kit components excluding mastic and solution	Years	Min. 5
8	Shelf life of mastic and solution	Years	Min. 2

**General Technical Particulars for Heat Shrinkable Insulation Tubing/ Sleeves/ Wrap around Sleeve:**

S.No.	Parameter	Requirement
1	Visual Examination	Free from protrusions, pinholes, cracks, nicks and other visible defects.
2	Wall thickness Ratio	0.6 or 60% (Minimum at any two points of measurements)
3.	Density	
4	Internal diameter of tube after full recovery	Shall not be higher than as specified in approved BOM / GTP
5	Longitudinal change	10% Max.
6	Electric Strength	10 KV /mm (Minimum)
7	Tensile Strength	10 N/mm <sup>2</sup> (Minimum) and (8 N/mm <sup>2</sup> for anti-tracking)
8	Ultimate Elongation	200% (Minimum)
9	Heat Shock	No splitting, cracking, dripping or flowing after 30 minutes at 200°C Min. (For stress control tube: 30 Minutes at 250°C Min.)
10	Low Temperature Flexibility	No cracking after 4 hrs. at minus -20°C Max.

11	Volume Resistivity	1x 10 <sup>10</sup> Ohm- meter (Minimum) (For stress control, tube VR: 1x 10 <sup>7</sup> Ohm- meter min.)
12	Tracking resistance	No tracking, erosion to top surface or flame failure after 1hr @ 2.5KV
		1hr @2.7KV 1Hr@ 3.0 KV 20 min@ 3.25KV
13	Flame Retardant (Applicable only for Anti tracking Tubes/ sleeves)	After 1-minute burn: Burnt or charred length 250 mm max.

#### **General Technical Particulars for Heat Shrinkable moulded components/ Breakouts/Weather sheds**

Sl.No.	Parameter	Specified limit
1	Visual Examination	Free from protrusions, pinholes, cracks, nicks and other visible defects.
2	Wall thickness Ratio	0.6 or 60% (Minimum at any two points of measurements)
3	Internal diameter of tube after full recovery	Shall not be higher than as specified in approved BOM / GTP.
4	Longitudinal change	25% Max.
5	Dielectric Strength	10 KV /mm (Minimum)
6	Tensile Strength	8 N/mm <sup>2</sup> (Minimum)
7	Ultimate Elongation	200% (Minimum)
8	Heat Shock	No splitting, cracking, dripping or flowing after 30 minutes at 250°C Min.
9	Low Temperature Flexibility	No cracking after 4 hrs. @ minus -20°C Max.
10	Volume Resistivity	1x 10 <sup>10</sup> Ohm- meter (Minimum)
11	Flame Retardant (For anti-tracking moulded components)	After 1-minute burn: Burnt or charred length 250mm max.

**4.6. Service Support:** Bidder shall have own setup in Odisha for jointing and termination services along with supervision and other necessary allied services for ensuring quality of installed jointing and terminations.

#### **5. GENERAL CONSTRUCTION:**

##### **Components of Indoor/ Outdoor Termination Kit:**

Termination kit shall be designed based on heat shrink technology and shall be suitable for installation for 11 kV, three core and single core aluminum conductor, XLPE insulated (in line with TPCODL Specification for underground and AB cable, IS 7098-part 2, and IS 13573 Part 2 &3).

Length of 11KV terminations (from bottom of breakout to center of lughole) shall be:

i) HT ABC

- 450mm  
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ii) 1 core cable I/D & O/D - 550 mm

iii) 3 core cable I/D & O/D - 800 mm

S. No.	Components	Requirement
1	Compression Lugs/ Tinned coated Mechanical Lugs	<p><u>Compression Lugs:</u></p> <ul style="list-style-type: none"> <li>- Material: Aluminium</li> <li>- All Aluminum lugs with anti-corrosive paste shall be long barrel type as per IS 8309: 2003.</li> <li>- Dimensions shall be as annexure-I of this specification.</li> <li>- 1000mm<sup>2</sup> Aluminum lugs shall be without palm hole.</li> </ul> <p><u>Mechanical Lugs:</u></p> <ul style="list-style-type: none"> <li>- Tinned coated Aluminium</li> <li>- As per IEC 61238(part1): 2003.</li> <li>- Dimensions shall be as annexure-I of this specification.</li> </ul>
2	Lug Seal, Anti-tracking tube, weather sheds, Stress control tube	<ul style="list-style-type: none"> <li>- Heat Shrinkable</li> <li>- Fire resistant and weather resistant as per ENA TS 09- 13 – for lug seals, weather sheds and Anti-tracking tubes</li> </ul>
3	Mastic tape	<ul style="list-style-type: none"> <li>- Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant.</li> <li>- Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENA TS 09- 13.</li> </ul>
4	Heat Shrink Breakout	<ul style="list-style-type: none"> <li>- Fire resistant and weather resistant as per ENA TS 09- 13.</li> <li>- Adhesive coated Breakouts shall be provided on outer sheath of the cable to prevent water ingress.</li> </ul>
5	Tinned coated copper braid	<ul style="list-style-type: none"> <li>- Shall be completely insulated by adhesive coated fire retardant and weather resistant HS tube/sleeve up to copper lug.</li> <li>- Fire resistant and weather resistant as per ENA TS 09- 13.</li> <li>- Size and length is as follows:</li> <li>- 25 mm<sup>2</sup> x 500 mm x 1 Run for 95, 120 &amp; 150 mm<sup>2</sup> cables.</li> </ul> <p>Additionally 1 no. 95 mm<sup>2</sup> Al long barrel lugs with sealing sleeves/ mastic shall be provided for armor back fold earth</p>
		<p>bonding in Aluminum armored 150 mm<sup>2</sup> HT ABC.</p> <ul style="list-style-type: none"> <li>- 50 mm<sup>2</sup> X 600 mm X 1 Run for above 150 mm<sup>2</sup> &amp; up to 400 mm<sup>2</sup> cables.</li> <li>- 70 mm<sup>2</sup> X 500 mm X 1 Run for 630 mm<sup>2</sup> &amp; 1000mm<sup>2</sup> cables.</li> </ul> <p>Additionally 3 nos. X 150mm<sup>2</sup> Al lugs with sealing sleeves/ mastic for armor back fold earth bonding.</p>
6	Tinned coated copper braid as a Leakage Current Collector	<ul style="list-style-type: none"> <li>- Leakage current collector tinned copper braid</li> <li>- 1R X 7 mm<sup>2</sup> X 150 mm per core shall be provided for terminations.</li> </ul>

7	Tinned copper wire mesh	<ul style="list-style-type: none"> <li>- Minimum 2.5mm<sup>2</sup> tinned copper mesh shall be provided on armour circumference beneath the copper braid.</li> <li>- Length of copper wire mesh shall be provided in BOM submission.</li> </ul>
8	Sub-kit components	<ul style="list-style-type: none"> <li>- Tapes, Mastic, GI back-up rings, Worm Drive clip/ Jubilee clip of stainless steel, adhesive cloth, cleaning solvents and other necessary items.</li> <li>- Compatible Supporting ring with SS jubilee clips shall be provided to connect tinned copper braids.</li> <li>- Soldering on copper screen is not acceptable.</li> <li>- Roll spring shall be provided for screen connections.</li> <li>- Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring should be used for same.</li> </ul>
9	Submission of BOM and instruction sheet	<ul style="list-style-type: none"> <li>- Participating bidder shall submit BOM (during pre-bid) with dimensions of each size and quantity of HS joint and termination. Also instruction sheet shall be provided in each kit.</li> <li>- *Note: BOM shall be approved by TPCODL authorized official at the time of pre-bid.</li> </ul>

**Components of Straight Through jointing kit:**

S. No.	Components	Requirement
1	Heat Shrinkable insulating tube/ Sleeve	<ul style="list-style-type: none"> <li>- Surface of material: shall be smooth and free from protrusion, voids and nicks.</li> <li>- Recovered thickness: Recovered thickness of insulation tubes over ferrule or connector circumference shall not be less than 4.32 mm at any point of measurement.</li> <li>- Wall thickness ratio (before recovery) of all sleeves/ tubes shall not be less than 60% at any two points of measurement.</li> </ul>
2	Ferrules/ Mechanical Connectors	<ul style="list-style-type: none"> <li>- Material : 99% Electrolytic grade Aluminium with Anti-corrosive paste</li> <li>- Shape: As per IS 8308</li> <li>- Dimensions as per Annexure-I of this Specification</li> <li>- Conductivity of ferrules/mechanical connectors shall be as per IS 8309: 2003/ IEC 61238(part1).</li> <li>- Conductivity of Aluminium shall be min. 60% of IACS.</li> </ul>
3	Mastic Tape	<ul style="list-style-type: none"> <li>- Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant.</li> <li>- Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENA TS 09-13.</li> </ul>

4	<p>Tinned coated copper braid for GI armour continuity</p> <p>/ Ferrules for Aluminium armour continuity</p>	<p>Tinned coated copper braid for GI armour continuity:</p> <p>Uniformly tinned coated copper braid shall be provided for armour continuity.</p> <ul style="list-style-type: none"> <li>- Wrap tinned copper wire mesh with 50% overlap around the joint area and continue 25 mm over the copper screen on both sides. Bind the copper wire mesh on copper screen.</li> <li>- Uniformly tinned coated copper braid shall be provided for armor continuity. Length of tinned copper braid shall be as per approved BOM.</li> <li>- Size of tinned copper braid shall be: 50 mm<sup>2</sup> x 1 Run for 150-400 sq.mm. three core cables.</li> </ul> <p>Ferrules for Aluminium armour continuity:</p> <ul style="list-style-type: none"> <li>- In single core cables, 1CX400,1CX630 and 1CX1000 sq.mm., Aluminium armor continuity shall be done using 2 nos. long barrel type of size 150 sq.mm. and 185 sq.mm. ferrules respectively.</li> <li>- In Aluminium armored HT ABC, 1CX95 sq.mm. and 1CX150 sq.mm., armor continuity shall be done using 2 nos. 50 sq.mm. ferrules.</li> <li>- In Corrugated Armored Tin Copper Braid is required</li> <li>- For Copper screened HT ABC, continuity of armour shall be through 2.5 sq.mm. copper wire mesh.</li> </ul>
5	Tinned copper wire mesh	<ul style="list-style-type: none"> <li>- Uniformly tinned coated copper mesh shall be provided for screen continuity.</li> <li>- Minimum 2.5mm<sup>2</sup> tinned copper mesh shall be provided on both sides of armour circumference beneath the copper braid.</li> <li>- Length of copper wire mesh shall be provided in BOM submission.</li> </ul>
6	<p>GI wire mesh/ Copper wire mesh</p>	<ul style="list-style-type: none"> <li>- Mechanical protection shall be provided in GI armored cables by means of heavily zinc coated GI mesh as per IS 4826.</li> <li>- In 1C Aluminium armored cables, for mechanical protection, copper wire mesh shall be provided.</li> </ul>
7	Breakouts	<ul style="list-style-type: none"> <li>- Adhesive coated Breakouts shall be provided on outer sheath at both sides on the cable to prevent water ingress.</li> </ul>
8	Wrap around insulating tube/Sleeve as outer	<ul style="list-style-type: none"> <li>- Material: cross-linked polyolefin (Heat Shrinkable) as a waterproof seal.</li> </ul>

	most tube	<ul style="list-style-type: none"> <li>- Shape: Wrap around form with hot-melt adhesive liner on the inner surface of the sleeve (Upon heating, the sleeve shrinks and the adhesive melts, creating a water-tight bond between the sleeve and the cable).</li> <li>- Stainless steel channel shall be provided along the wrap around to close the sleeve during installation.</li> <li>- Excellent mechanical and corrosion protection, and atmospheric sealing.</li> <li>- High split resistance.</li> <li>- *Note: Overlapping of wrap around sleeve is not acceptable.</li> <li>- Additionally, adhesive coated sleeve approx. 300 mm length shall be provided at ferrule joint area beneath the wrap around sleeve.</li> </ul>
9	Sub-kit Components	<ul style="list-style-type: none"> <li>- Tapes, Mastic, GI back-up rings, Worm Drive clip/ Jubilee clip of stainless steel, adhesive cloth, cleaning solvents and other necessary items.</li> <li>- Compatible support rings (Aluminium for single core and GI for three core cables) with four nos. SS jubli clips shall be provided to connect tinned copper braid.</li> <li>- For copper screen bonding, roll spring shall be provided.</li> <li>- Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring shall be provided for earthing continuity.</li> </ul>
10	Submission of BOM and instruction sheet	<ul style="list-style-type: none"> <li>- Participating bidder shall submit BOM (during pre-bid) with dimensions of each size and quantity of HS joint and termination. Also instruction sheet shall be provided in each kit.</li> <li>- *Note: BOM shall be approved by TPCODL authorized official at the time of pre-bid.</li> </ul>

**6. MARKING:**

Following details shall be printed on the box:

- a. Manufacturer's name
- b. Month & Year of manufacturing
- c. Voltage Grade
- d. Property of TPCODL
- e. Material code
- f. PO No.

HS Sleeves/ tubes and breakout components shall be embossed with:

- a. Month and year of manufacturing
- b. Manufacturer name
- c. Batch no. / Lot no.
- d. Shrink ratio
- e. Size
- f. Type

**7 TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:

**7.1 ACCEPTANCE TESTS:**

Test	Clause No.	Reference Standard
Visual inspection	3.15	ENA -TS 09-13
Physical verification of kit contents and dimensions	As per TPCODL approved BOM	
Electric Strength test	3.4	ENA -TS 09-13
Ultimate Elongation tests	3.12	ENA -TS 09-13
Tensile Strength	3.12	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13
Wall thickness ratio	3.3	ENA -TS 09-13
Expanded and recovered diameters	3.3	ENA -TS 09-13
Longitudinal change after recovery	3.3	ENA -TS 09-13
Heat shock test	3.7.1/3.7.2	ENA -TS 09-13
Low temperature flexibility	4.5	ENA -TS 09-13
Insulation build up thickness after shrink on Ferrule	8.1	IS 10810 -6
Flame retardant test on anti-tracking tubes and anti-tracking moulded components and earth braid protective tube after shrink on mandrill for terminations	3.5.1/ 3.5.2	ENA -TS 09-13
Area measurement of tinned copper braids (Area of one wire x no. of wires x no. of carriers)	As per TPCODL specification/ approved BOM	
Conductivity test on ferrules/ connectors/ lugs	8.3	IS 8309
Uniformity of zinc coating on GI mesh	4.1	IS 2633

#### ROUTINE TESTS

Test	Clause No.	Reference Standard
Visual inspection of tubing and moulded components for free from pin holes, cracks, nicks, protrusion and other defects	3.15	ENA -TS 09-13
Dimension check	As per TPCODL approved BOM	
Electric Strength	3.4	ENA -TS 09-13
Ultimate Elongation	3.12	ENA -TS 09-13
Tensile Strength	3.12	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13

Wall thickness ratio	3.3	ENA -TS 09-13
Expanded and recovered diameters of tubes	3.3	ENA -TS 09-13

**TYPE TESTS:**

**(i) Terminations & Straight Through joints**

Test	Clause No.	Reference Standard
Conductor resistance with Ferrule/Lugs/Mechanical connectors	4.1	IS 13573(Part-2)
AC Voltage withstand Test (Air)	4.2	IS 13573(Part-2)
AC Voltage withstand test (under wet conditions) (for outdoor termination only)	4.2	IS 13573(Part-2)
Partial Discharge	7.0	IS 13573(Part-2)
Impulse voltage test	6	IS 13573(Part-2)
Heat Cycle test in air and water	9.1 and 9.2	IS 13573(Part-2)
Thermal Short Circuit Test for Screen	10	IS 13573(Part-2)
Thermal Short Circuit Test for Conductor	11	IS 13573(Part-2)
DC Voltage Withstand	5	IS 13573(Part-2)
Dynamic short circuit test	12	IS 13573(Part-2)
Thermal Endurance test	IEC 60216 part 2 & 8	
Salt fog test (Only for Outdoor terminations only)	13	IS 13573(Part-2)

**(II). Kit Components**

**a) For Tubing and Moulded Components**

Test	Clause No.	Reference Standard
Corrosion Resistance	3.1	ENA -TS 09-13
Density	3.2	ENA -TS 09-13
Dimensions	3.3	ENA -TS 09-13
Electric Strength	3.4	ENA -TS 09-13
Flame Retardance	3.5	ENA -TS 09-13
Heat Shock	3.7	ENA -TS 09-13
Low temperature flexibility	3.8	ENA -TS 09-13

Relative Permittivity	3.9	ENA -TS 09-13
Tensile strength and Ultimate elongation	3.12	ENA -TS 09-13
Thermal Ageing	3.13	ENA -TS 09-13
Tracking Resistance	3.14	ENA -TS 09-13
Visual Examination	3.15	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13
Water Absorption	3.17	ENA -TS 09-13

**b) For Compression Lugs, Compression Ferrules and Mechanical connectors**

Test	Clause No.	Reference Standard
Conductivity test	8.3	as per IS 8309/ IEC 61238, part - 1

**8 TYPE TEST CERTIFICATES:**

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/other Govt. Lab** as per relevant IS. Type tests should have been conducted 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, it shall be carried out without any cost implication to TPCODL.

**9 PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL 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 Project Engineering 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 TPCODL up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is later.

Further Bidder shall also stand guarantee towards poor workmanship in installation of straight through joint and terminations installed by bidder's jointer up to 60 months from the date of installation.

Bidder shall be liable to undertake to replace/rectify such defects at own costs, within mutually agreed time frame, and to the entire satisfaction of TPCODL, failing which TPCODL shall be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company'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 TPCODL.

## **12. PACKING AND TRANSPORT:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

## **13. TENDER SAMPLE:**

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

## **14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

## **16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

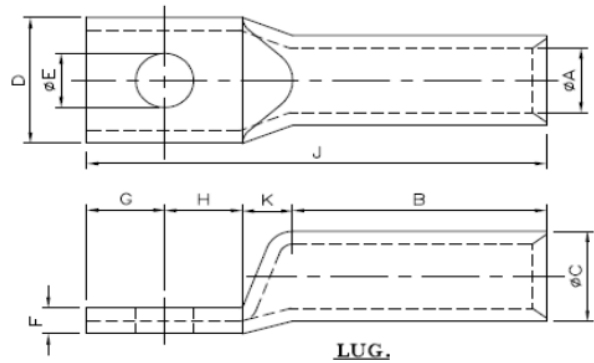
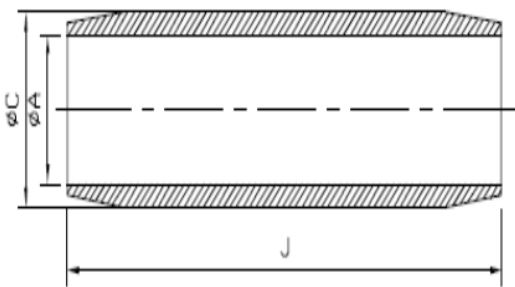
Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule “A” Guaranteed Technical Particulars & Schedule “B” Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 Set of Hard Copy & Soft Copy PDF File containing complete information about manufacturing.

**Annexure- Dimensions Ferrules & Lugs HT**

Dimensional details of Aluminum ferrules for HT AL circular stranded compacted XLPE cables			
Cable Size in MM <sup>2</sup>	φA (mm) +0.3mm	φC (mm) +0.3 mm	J (mm) ±3mm
95	12	16.9	108
150	15.1	21.2	116
300	21.8	30.2	150
400	25	34.8	150
630	31.7	44.4	200
1000	41	56	250

Dimensional details of Aluminum Lugs for HT circular stranded compacted XLPE cables							
Cable Size in MM <sup>2</sup>	φE (mm) ±0.1mm in centre of palm	φA (mm) +0.5mm	φC (mm) +0.5 mm	D (mm) ±1.5mm	F (mm) ±0.5mm	B±3.0mm	J (mm) ±5mm
95	13	12	16.9	23.5	4.9	73	109
150	13	15.1	21.2	29.5	6	83	128
300	17	21.8	30.2	42	8.4	89	157
400	17	25	34.8	48	9.8	113	187
630	17	31.7	44.4	61	12.7	140	225
1000	-	41	56	77.5	15	160	280

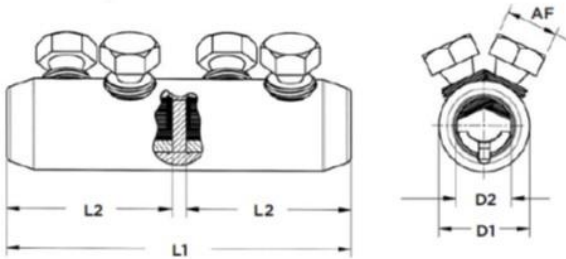


For remaining cable sizes, dimensions of Ferrules & Lugs shall be as per IS.

## Annexure- Dimensions Mechanical connectors & Mechanical Lugs

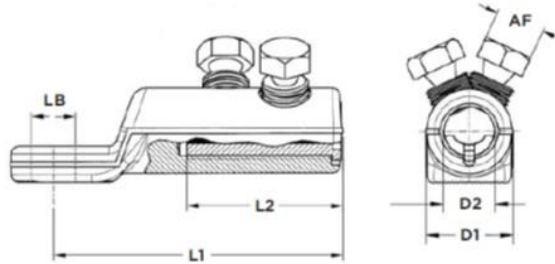
Aluminium Mechanical connectors

Cable Size in MM <sup>2</sup>	φD1 (mm)	φD2 (mm)	L (mm)
185-400	50	25.5-26	440- 450
185-400	42	25.5-26	170-200
500- 630	50	33- 33.5	180-230
1000	60	40	180-230



Tinned Aluminium Mechanical Lugs

Cable Size in MM <sup>2</sup>	φLB (mm)	φD1 (mm)	φD2 (mm)	L (mm)
185-400	17	42	25.5-26	137-150
500- 630	17	50	33- 33.5	150-180
1000	2x17	60	40- 40.5	180- 240



## **TECHNICAL SPECIFICATION FOR 11 kV XLPE ARMoured CABLE**

### **CONTENTS**

1. SCOPE
2. APPLICABLE STANDARDS
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18. DRAWINGS AND DOCUMENTS

## 1. SCOPE:

This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store, performance of 11 kV XLPE ARMoured cable, for trouble free and efficient operations.

Inclusive sizes: -

3 CORE CABLE	1 CORE CABLE
3C X 95 sq.mm.	1C X 300 sq.mm.
3C X 120 sq.mm.	1C X 400 sq.mm.
3C X 185 sq.mm.	
3C X 150 sq.mm.	1C X 630 sq.mm.
3C X 300 sq.mm.	
3C X 400 sq.mm.	1C X 1000 sq.mm.
3C X 400 sq.mm. (co-extruded cable)	

## 2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS 7098 (Part 2)	Cross-linked Polyethylene (XLPE) insulation for Cables
IS 8130	Conductors for insulated electrical cables and flexible cords
IS 10418	Specification for Drums for Electric cables
IEC 60228	Conductor for insulated cables
IS 3975	Low carbon galvanized steel wires, formed wires and tapes for armoring of cables
IS 5831	Specification for PVC insulation sheath for electric cables
IEC-60811	Test methods for insulations and sheaths of electric cables and cords.
ASTM D 6097	Standard test method for relative resistance to vented water tree growth in Solid Dielectric insulating materials
ICEA T 31-610	Test method for conducting longitudinal water penetration resistance tests on blocked conductors
IS 10810	Methods of tests for cables
IS 4905	Methods for random sampling
IS 4984	High density polyethylene pipes for water supply
IS 2530	Methods of test for polyethylene moulding materials and polyethylene compounds

IS 4826	Specification for hot dipped galvanized coatings on round steel wires
IS 5:2007	Colors for ready mixed paints and enamels
ASTM 2863	Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics(Oxygen Index)
IEC 60754	Apparatus and procedure for the measurement of the amount of halogens evolved during the combustion of materials taken from electric or optical fiber cable constructions
IEC-60502 (Part-2)	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1.2 kV) up to 30 kV (Um = 36 kV) - Part 2: 22 kV Cables for rated voltages from 6 kV (Um = 7.2 kV) up to 30 kV (Um= 36 kV).
IEC 332	Test on electric cables on the fire conditions
ASTM 2843	Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics

SL.NO.	CONDITONS	VALUES
1	Max. altitude above sea level	1200m
2	Max. Ambient Temperature	50 °C
3	Max. Daily average ambient temp	35 °C
4	Min Ambient Temp	0 °C
5	Maximum temperature attainable by an object exposed to sun	60 °C
6	Maximum Humidity	95%
7	Minimum Humidity	10%
8	Average No. of thunderstorm days per annum	70
9	Average Annual Rainfall	150 cm
10	Average No. of rainy days per annum	120
11	Thermal Resistivity of soil	150 Deg. Ccm/W
12	Wind Pressure	126 kg/sq. m up to an elevation of 10 meter.

14	Earthquakes of intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
15	Earthquakes of intensity in vertical direction	equivalent to seismic acceleration of 0.15g
16	Wind velocity	300 km/hr.

### 3. LIMATIC CONDITIONS OF THE INSTALLATION:

Environmentally, some of the regions, where the work will take place include coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas. Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

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 0.1 g.

### 4. GENERAL TECHNICAL REQUIREMENTS:

S. No.	Description	Requirement	
		3 CORE CABLE	1 CORE CABLE
1	Voltage grade	11 kV (Earthed system)	
2	Max System voltage	12 kV	
3	Frequency	50 Hz	
4	Variation in frequency	+/- 3%	
5	Conductor	Watertight Stranded Aluminum (compacted circular)	
6	Conductor screen	Semi conducting tape and screen	
7	Insulation	XLPE	
8	Insulation screen	Shall have three layers:	Shall have three layers:
9		a) Bonded Semiconducting, b) Semiconducting water swellable tape, c) Metallic copper tape	a) Bonded Semiconducting, b) Semiconducting water swellable tape, c) Metallic copper tape d) Polyester transparent tape over copper screen
10	Core identification strip	Beneath copper screen	NA
11	Inner sheath	Pressure Extruded PVC ST- 2 with PP fillers	Extruded PVC ST-2
S. No.	Description	Requirement	

12	Armour	GI wire round binded with rubberized cotton binding tape	Aluminum wire binded by rubberized cotton tape
13	Outer sheath	PVC ST-2 FRLSH type of color 'Crimson Red shade' code:355 as per IS 5:2007	
14	Outer sheath (for co-extruded cable)	a) Inner layer: HDPE ST-7, Crimson Red shade b) Outer sheath: HDPE ST-7, Black color	NA
15	Guarantee	up to a period of 60 months from the date of commissioning or 72 months from the date of last supplies made under the contract whichever is earlier.	

## 5. GENERAL CONSTRUCTION:

The cross-linked polyethylene insulated (XLPE) 11 kV Cable (Dry cured & water cooled) shall be manufactured and tested strictly in accordance with the Indian Standard IS 7098 (Part – 2)/ Relevant IEC/International standards and its latest amendments.

All material used in the manufacturing of cables shall be new 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 different laying configuration of cables shall be provided by the Bidder.

### Conductor

S. No.	Parameter	Requirement							
1	Conductor	As per IS 8130							
2	Class	Class II							
3	Material	Plain Aluminium, grade H2/H4							
4	Shape	Stranded Compacted Circular							
5	Nominal size of conductor mm <sup>2</sup>	95	120	150	185	300	400	630	1000
6	Min. number of strands	15	15	15	30	30	53	53	53
7	Max. DC resistance@ 20 deg C (Ohm/km)	0.32	0.25	0.206	0.164	0.1	0.08	0.047	0.03
8	Conductor Short circuit current rating for 1 second	9 kA	11.3 kA	14.2 kA	17.5 kA	28.3 kA	37.7 kA	59.4 kA	94.3 kA
9	Min. weight of conductor (kg/km/core)	24 4	308	390	480	780	1080	1650	2600

10	Longitudinal water sealing of conductor	<p>a) Non-conductive water swellable yarn/ tape/ combination of both shall be provided in between interstices of the conductor.</p> <p>b) Also, this 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.</p> <p>c) It shall not affect the electrical conductivity of the conductor.</p>
11	Cleanliness and uniformity	<p>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.</p> <p>b) Stranded Conductor shall be free from oil traces &amp; aluminum dust. Conductor (after stranding) shall be super cleaned</p> <p>c) Traces of aluminum dust on conductor or conductor screen shall not be acceptable.</p>
12	Conductor jointing	Not acceptable in any strand or in any conductor after it is stranded.
13	Raw material supplier	Conductor raw material shall be procured from reputed suppliers viz., BALCO/ HINDALCO/ NALCO/ Vedanta/ Equivalent (in-line with TS)
14	Diameter of conductor	To be specified by bidder

S. No.	Parameter	Requirement
1	Material	<p><b>1<sup>st</sup> layer:</b> Semi-conducting tape</p> <p><b>2<sup>nd</sup> layer:</b> Semi-conducting compound</p>
2	Configuration	<p><b>1<sup>st</sup> layer:</b> Semi-conducting tape shall be applied over conductor with nominal thickness of 0.2 mm.</p> <p><b>2<sup>nd</sup> layer:</b> Semi-conducting compound screen shall be applied through triple extrusion process.</p>
3	Min. thickness	Minimum thickness of semi-conducting compound screen shall be 0.5 mm at any point of measurement.
4	Resistivity	Resistivity of semiconducting conductor screen shall not exceed 1000 $\Omega$ -m
5	Uniformity on interfacial region	Interfacial region between conductor screen and insulation shall be uniform. Protrusion/ convolution/ other defects are not acceptable in the region.
6	Raw material supplier	Semiconducting compound shall be procured from reputed raw material suppliers viz. Dow/ Borealis/ Hanwa/ Equivalent (in-line with TS)

**Insulation:**

S. No.	Parameter	Requirement
1	Material and extrusion process	XLPE insulation shall be applied through CCV/VCV line by triple extrusion process with 'Dry Curing' and 'Water Cooling'.
2	Raw material supplier	a) <b>XLPE compound shall be super cleaned and procured from reputed raw material suppliers viz. Dow/Borealis/Hanwa/Equivalent (in-line with TS)</b> b) Both XLPE and semi conductive compounds shall be used from same raw material supplier.
3	Thickness and Eccentricity	a) Nominal thickness shall be 3.6 mm. b) Minimum thickness shall be 3.14 mm at any point of measurement. c) Eccentricity of insulation shall not exceed 10%.
4	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.
5	Cleanliness and uniformity	Interfacial region between insulation and insulation screen shall be uniform. Protrusion/convulsion/ other defects are not acceptable. Core shall be free from void and contamination.

**Insulation Screen & Core identification strip:**

S. No.	Parameter	Requirement
1	Material	a) <b>1<sup>st</sup> layer:</b> Semi-conducting compound b) <b>2<sup>nd</sup> layer:</b> Semi-conducting water swellable tape c) <b>3<sup>rd</sup> layer:</b> Annealed copper tape
2	Configuration	<b>a) 1<sup>st</sup> layer: Non-Metallic Part:</b> Extruded Insulation semiconducting screen shall be bonded type. Resistivity shall not exceed 500 $\Omega$ -meter. Surface of insulation screen shall be smooth, free from cavity/nicks/scratches/ other visible defects. Min. thickness shall be 0.3 mm at any point of measurement.  <b>b) 2<sup>nd</sup> layer: Water Swellable tape:</b> Semi-conducting water swellable tapes shall be applied over non-metallic screen. Minimum thickness of water swellable shall be 0.3 mm and minimum overlapping shall be 15%.  <b>Core identification strip:</b>  <b><u>3 CORE CABLE:</u></b> - Each of the three core identification strips shall

S. No.	Parameter	Requirement
		<p>be applied longitudinally beneath copper screen. Width of the colored strip shall be 7-10 mm. R, Y, B.</p> <p><b><u>1 CORE CABLE: - NA</u></b></p> <p>c) <b>3<sup>rd</sup> layer: Metallic Part:</b>            Annealed copper tape, helically wound over the water swellable tape with minimum 15% overlap.            Minimum thickness shall be 0.045 mm at any point of measurement.</p>
3	Raw material supplier	Semiconducting compound shall be procured from reputed raw material suppliers viz.,Dow/Borealis/Hanwa / Equivalent (in-linewith TS)
4	Diameter of cores	To be specified by bidder
5	Weight of cores/km (approx.)	To be specified by bidder
6	Weight of copper tape/km (approx.)	To be specified by bidder

**Fillers:**

S. No.	Parameter	Requirement	
		3 CORE CABLE	1 CORE CABLE
1	Material	Virgin Polypropylene fibers of natural color	NA
2	Configuration	Virgin Polypropylene fibers shall be tightly filled in empty space as fillers.	

**Inner Sheath:**

S. No.	Parameter	Requirement	
		3 CORE CABLE	1 CORE CABLE
1	Material	Black colored Polyvinyl chloride (PVC) type ST-2 compound	

2	Configuration	<p>The laid-up cores shall be provided with <i>pressure extruded</i> Polyvinyl chloride (PVC) type ST-2 compound conforming to IS: 5831 with latest amendments. Pressurized extrusion is required to remove any gaps remaining in between the fillers and to make the cable as circular as possible. It shall be applied to fit closely on to the laid-up cores and shall be possible to remove easily without causing any damage to the underlying insulated cores and screens.</p>	<p>Extruded PVC ST-2 type conforming to IS: 5831. It shall be applied to fit closely and shall be possible to remove easily without causing any damage to the underlying insulated cores and screens.</p>
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**Armour:**

S. No.	Parameter	Requirement
1	Material	Polyvinyl chloride (PVC) ST-2 <b>FRLSH</b> type compound with ' <b>lead naphthenate</b> ' additive
2	Configuration	Polyvinyl chloride (PVC) ST-2 <b>FRLSH</b> type compound with ' <b>lead naphthenate</b> ' additive as 'termite & rodent repellent' applied by extrusion process.
3	Min. Thickness at any point of measurement	<b>3 CORE CABLE</b>
		95 sq.mm      120 sq.mm      150 sq. mm      185 sq. mm.      300 sq.m m      400 sq.mm.
		2.2 mm      2.2 mm      2.36 mm      2.52 mm      2.84 mm      3.0 mm
		<b>1 CORE CABLE</b>
		300 sq. mm.      400 sq.mm      630 sq.mm      1000 sq.mm 1.56 mm      1.72 mm      1.88 mm      2.2 mm
4	Color	Crimson Red color, color code: 540 as per IS 5:2007.
5	Surface uniformity	Surface of outer sheath shall be free from cavity/ nicks/ other visible defects.
6	Raw material supplier	<b>PVC compound shall be procured from reputed raw material suppliers viz., Shakun, Kalpana, KLJ, DCM ShriRam. Equivalent(in-line with TS)</b> PVC compound from cable manufacturer shall be considered only after factory evaluation for the same.
7	Weight of outer sheath/km	To be provided by bidder

**5.8 Outer Sheath (for Normal cable  
Outer Sheath (for Co extruded 3C Cable)**

S. No.	Parameter	Requirement
1	Inner layer	HDPE ST-7, Crimson red of color code 540, Minimum thickness at any point of measurement – 3 mm
2	Outermost layer	HDPE ST-7, Black color, Nominal Thickness at any point of measurement – 2 mm. Carbon content shall be as per IS 7098
3	Surface uniformity	Surface of outer sheath shall be free from cavity/ nicks/ other visible defects.
4	Raw material supplier	<b>HDPE shall be procured from reputed raw material suppliers viz., Shakun, Kalpana, KLJ, SCJ Plastics, and Borealis,</b> Equivalent (in-line with TS)
5	Weight of outer sheath/km	To be provided by bidder
6	Weight of HDPE/km	To be provided by bidder

**Sealing End Cap:**

S. No.	Parameter	Requirement
1	Material	Adhesive coated polyolefin heat shrinkable
2	Configuration	Adhesive coated polyolefin heat shrinkable end cap shall be provided at both ends of the cable.
3	Additional requirements	2 nos. additional cable end caps shall be provided with each drum and placed in the drum.

**Other Requirements:**

S. No.	Parameter	Requirement
1	Overall diameter of cable in mm	To be provided by bidder
2	Weight of Overall cable in kg/km	To be provided by bidder

**6 MARKING:**

Steel drums shall be provided. Drum shall be free from sharp edges and visual defect. Stencil plate on one flange side of the drum and laminated paper sheet on other side flange of drum.

Cable length on one drum shall be 250 meters max. +/- 5%. (As per PO Terms.)

**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 Jacket (For normal Cable)& HDPE layer (for co-extruded cable):**

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

- i) TPCODL/ TPWODL/ TPNODL/ TPSODL
- ii) Manufacturer's name
- iii) Month & Year of Manufacturing
- iv) Voltage grade
- v) Size of the cable
- vi) Purchase Order no.

vii) Cable code

Note: - Sequential meter marking shall be printed.

## 7 TESTS:

The bidder shall be required to submit complete set of the following test reports along with the offer: -

### **ACCEPTANCE TESTS**Test

#### **on Conductor**

Conductor resistance test

Test for non-conductivity of water swellable tape/yarn of conductor

Visual inspection for conductor cleanliness

Conductor water penetration test

#### **Test on Conductor Screen**

Thickness of semi-conducting tape over conductor

Test for conductivity of semi-conducting tape over conductor

Resistivity of extruded semi-conducting conductor screen

Thickness of extruded semi-conducting conductor screen

#### **Test on Insulation**

Tensile strength & Elongation at break (before ageing)

Insulation thickness

Eccentricity and Ovality of insulation

Hot set test

7.1.13 Volume resistivity

7.1.14 Void & contamination test on core (by silicon oil dip method)

7.1.15 Surface smoothness of insulation

#### **Test on Insulation Screen**

7.1.16 Resistivity of insulation screen

7.1.17 Thickness of insulation screen

7.1.18 Visual inspection for any convolution/ protrusion between conductor screen and XLPE insulation, XLPE insulation and insulation screen

7.1.19 Thickness & % Overlapping of semi-conducting water swellable tape

7.1.20 Thickness & % Overlapping of copper tape

#### **Test on Inner Sheath**

PVC thickness  
Color of inner sheath

**Test on Armour (For 3 Core)**

Tensile test  
Mass of zinc coating  
Uniformity of zinc coating  
Adhesion test  
Diameter and no. of wires  
Coverage %

**Test on Armour (For 1 Core)**

Tensile test  
Wrapping test  
Resistance test  
Diameter and no. of wires  
Coverage %

**Test on Outer sheath (for Normal cable)**

Thickness  
Tensile strength and Elongation at break (before ageing)  
Color of outer sheath  
Surface uniformity of outer sheath (on full drum)/ shall be free from any damage-void, nick, cavity  
7.1.38 Presence of lead naphthenate in PVC outer sheath  
7.1.39 Flammability test  
7.1.40 Oxygen index  
7.1.41 Temperature index  
7.1.42 Acid gas generation  
7.1.43 Smoke density

**Test on Outer sheath (for 3 Core extruded cable) INNER LAYER**

Thickness  
Tensile strength and Elongation at Break (before ageing)  
Color

**OUTER LAYER**

Thickness

Tensile strength and Elongation at Break (before ageing)  
Carbon Content  
Color  
Surface uniformity of outer sheath (on full drum)/ shall be free from any damage-void, nick, cavity

### **Test on Complete Cable**

Partial discharge test  
High voltage test

#### **ROUTINE TESTS**

- i) Conductor resistance test
- ii) Partial discharge
- iii) High voltage test with power frequency
- iv) Resistance test for Aluminium armour

#### **TYPE TESTS Tests**

##### **on Conductor**

Conductor resistance test  
Conductor water penetration test

### **Tests on Insulation**

Tensile strength & Elongation at break (before ageing)  
Ageing in air oven  
Tensile strength & Elongation at break  
Tests for thickness of insulation  
Eccentricity and Ovality of insulation  
Hot set test  
Shrinkage test  
Gravimetric test (Water absorption)  
Volume resistivity/ Insulation Resistance

### **Tests on Inner Sheath**

PVC thickness

### **Tests on Extruded semi-conducting screen**

Volume resistivity test of conductor screen

Volume resistivity test of core screen

### **Tests on Outer Sheath (PVC)**

Flammability test for outer sheath

Thickness

Tensile strength and Elongation at break (before ageing)

Tensile strength and Elongation at break (after ageing)

Variation due to ageing

Loss of mass test

Shrinkage test

Hot deformation test

Heat shock test

Thermal stability test

Flammability test

Temperature index

Acid gas generation

Smoke density

### **Tests on Outer Sheath - HDPE ST 7 (for Co-extruded cable)**

7.3.30 Thickness

7.3.31 Tensile strength and Elongation at break (before ageing)

7.3.32 Tensile strength and Elongation at break (after ageing)

7.3.33 Shrinkage test

7.3.34 Carbon Black Content

### **Tests on Armour for 3 Core Cable**

7.3.35 Tensile test

7.3.36 Torsion test

7.3.37 Wrapping test

7.3.38 Resistance test

7.3.39 Mass of zinc coating

7.3.40 Uniformity of zinc coating

7.3.41 Adhesion test

### **Tests on Armour for 1 Core Cable**

7.3.42 Tensile test

- 7.3.43 Torsion test
- 7.3.44 Wrapping test
- 7.3.45 Resistance test

#### **Tests on complete cable**

- Partial discharge test
- Thermal ageing test
- Bending test
- Dielectric power factor test
- High voltage test
- Heat cycle test
- Impulse withstand test

#### **Additional Test (To be checked by Inspector)**

- Raw material consumption
- Color coding identification over copper screen (for 3C cable)
- Sequential marking check
- Cable drum length verification
- Packaging of cable on cable drum
- Diameter over outermost sheath of co-extruded cable
- Weight of outer sheath of co-extruded cable/ km
- Weight of total HDPE of co-extruded cable/ km.

#### **8 TYPE TEST CERTIFICATES:**

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 relevant IS. However, TOWODL/ TPWODL/ TPNODL/ TPSODL/ TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report under exceptional circumstances after due diligence/ scrutiny by DISCOM. Tests should have been conducted during the period not exceeding 10 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, same shall be carried out without any cost implication to TOWODL/ TPCODL/ TPNODL/ TPSODL.

#### **9 PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TOWODL/TPCODL/ TPNODL/ TPSODL. 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 TOWODL/ TPCODL/ TPNODL/ TPSODL's representatives at all times when the work is in progress. Inspection by the TOWODL/ TPCODL/ TPNODL/ TPSODL 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 TOWODL/ TPCODL/ TPNODL/ TPSODL. Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TOWODL/ TPCODL/ TPNODL/ TPSODL
- c) TOWODL/ TPCODL/ TPNODL/ TPSODL 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 AT STORE:**

The material received at TOWODL/ TPCODL/ TPNODL/ TPSODL, 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 department.

**11 GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 60 months from the date of commissioning or 72 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

**12 PACKING:**

- a) **Standard length of Cable:** The cable shall be supplied in continuous standard length of 250 (3 cores) & 500 (Single core) running meters with +/- 5% tolerance.
- b) **Filling condition:** Drum shall not be overfilled.
- c) **Cable drum:** The cable shall be wound on non-returnable steel drums without any extra cost to TOWODL/ TPCODL/ TPNODL/ TPSODL 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. Additional 2 nos. end caps shall be provided with each drum.
- 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.  
A metal preservation shall be applied to the entire drum.
- f) Bottom end of cable should be clamped on drum by jute or nylon rope.

- g) All ferrous metal parts used shall be treated with a suitable rust-free finish or coating to avoid rusting during transit or storage. The drums shall withstand normal handling and transport.
- h) **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.
- i) **Packaging shall be as per climate change perspective. Cable wound on cable drum shall be covered by recyclable PVC sheet for dust proof.**

**13 TENDER SAMPLE:**

Not Applicable

**14 QUALITY CONTROL:**

The bidder shall submit QAP 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. 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 TESTING FACILITIES:**

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

**16 MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17 SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18**

**DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B"

Deviations

- b) Work Experience details
- c) Type test certificates.

# **Technical Specification for HDPE Pipe**

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**1. SCOPE:**

This specification covers the design, manufacture, testing and supply of High Density Polyethylene (HDPE) pipe 200 MM Scope also includes transportation & unloading of pipes at TPCDOL/TPCODL/TPNODL/TPSODL store / site.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

SI.No	IS	Description
1	IS 4984:2016	Specification for Polyethylene Pipes for Water Supply (fifth revision)
2	IS 7328:1992	High Density Polyethylene Materials for Molding and Extrusion – Specification(first revision)
3	IS 2530	Methods of test for polyethylene molding materials and polyethylene compounds

**3. CLIMATIC CONDITIONS:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150Cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL/TPNODL/TPWODL/TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

**4. GENERAL TECHNICAL REQUIREMENTS:**

SI.No	TECHNICAL REQUIREMENTS	200MM	160 MM	125 MM	110MM	25MM

1.	Nominal size or Outside diameter (mm)	200 MM	160 MM	125 MM	110 MM	25MM
2.	Wall thickness (mm)	14.7(min) 16.3(max)	11.8(min) 13.1(max)	9.2(min) 10.2(max)	8.1 (min) 9.0 (max)	1.9 (min) 2.2 (max)
3.	Standard dimension ratio(SDR)	SDR- 13.6	SDR- 13.6	SDR- 13.6	SDR- 13.6	SDR- 13.6
4.	Min. required strength of PE resin 200 C for 50 years life	8Mpa	8Mpa	8Mpa	8Mpa	8Mpa
5.	Design Stress at 20 <sup>0</sup> C	6.3Mpa	6.3Mpa	6.3Mpa	6.3Mpa	6.3Mpa
6.	Melt Flow Rate of polymer (sample pre-heated for 10 mins at 190°C, and weight application of 5kgf)	Shall Not deviate from MFR of the resin by more than 30%	Shall Not deviate from MFR of the resin by more than 30%	Shall Not deviate from MFR of the resin by more than 30%	Shall Not deviate from MFR of the resin by more than 30%	Shall Not deviate from MFR of the resin by more than 30%
7.	Raw material grade	PE-80	PE-80	PE-80	PE-80	PE-80
8.	Nominal pressure rating	PN-8	PN-8	PN-8	PN-8	PN-8
9.	Range of Base Density of HDPE @ 27 deg C	930 to 960 Kg/M3	930 to 960 Kg/M3	930 to 960 Kg/M3	930 to 960 Kg/M3	930 to 960 Kg/M3
10	% of Antioxidant	<0.3% by mass of finished resin	<0.3% by mass of finished resin	<0.3% by mass of finished resin	<0.3% by mass of finished resin	<0.3% by mass of finished resin
11	Color of pipe	Black with blue identification stripes(3 Strips of 3MM Wide)	Black with blue identification stripes (3 Strips of 3MM Wide)	Black with blue identification stripes (3 Strips of 3MM Wide)	Black with blue identification stripes (3 Strips of 3MM Wide)	Black with blue identification stripes (3 Strips of 3MM Wide)
12	Identification Stripes	As per IS:4984- 2016 Clause 6.2.1	As per IS:4984- 2016 Clause 6.2.1	As per IS:4984- 2016 Clause 6.2.1	As per IS:4984- 2016 Clause 6.2.1	As per IS:4984- 2016 Clause 6.2.1

13	Surface finish	Internal and External surface of the pipe shall be smooth and free from grooving and other defects	Internal and External surface of the pipe shall be smooth and free from grooving and other defects	Internal and External surface of the pipe shall be smooth and free from grooving and other defects	Internal and External surface of the pipe shall be smooth and free from grooving and other defects	Internal and External surface of the pipe shall be smooth and free from grooving and other defects
14	Carbon Black content	2.5 ± 0.5 %	2.5 ± 0.5 %	2.5 ± 0.5 %	2.5 ± 0.5 %	2.5 ± 0.5 %
15	Overall migration	Max. 10 Mg/dm <sup>2</sup>	Max. 10 Mg/dm <sup>2</sup>	Max. 10 Mg/dm <sup>2</sup>	Max. 10 Mg/dm <sup>2</sup>	Max. 10 Mg/dm <sup>2</sup>
16	Reversion	<= 3 %	<= 3 %	<= 3 %	<= 3%	<= 3%
17	Hydraulic Characteristics	No sign of localized swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localized swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localized swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localized swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localized swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))
18	Continuous Temperature withstand capacity	120 °C	120 °C	120 °C	120 °C	120 °C
19	Standard Length	6 Meters	6 Meters	6 Meters	6 Meters	6 Meters
20	Marking	As per <b>Clause:6 (Marking)</b> of this technical specification				

## 5. GENERAL CONSTRUCTION:

PE resin used for the manufacture of HDPE pipe shall conform to the following requirements:

- a) The material used for the manufacture of pipes should not constitute toxic hazard, should not support microbial growth and should not give rise to unpleasant taste or odor, cloudiness or discoloration of water. Pipe manufacturers shall obtain a certificate to this effect from the

manufacturer of raw material.

- b) Polyethylene, which may include co-polymers of ethylene and higher olefin, in which the higher olefin constituent does not exceed 10 percent (mass/mass) and density of 910- 950 kg/m<sup>3</sup>.
- c) The resin shall be compounded with carbon black. Carbon black particle size should be less than 0.025 microns.
  
- d) The percentage of anti-oxidant used shall not be more than 0.3% by mass of finished resin. The anti-oxidant used shall be physiologically harmless and shall be selected from the list given in IS 10141
  
- e) **Visual appearance:** The internal and external surface of the pipe shall be smooth, clean and free from grooving and other defects. The ends of the pipes shall be cleanly cut square with the axis of the pipe to within the tolerances given below and free from deformity. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible, if the wall thickness remains within the permissible limits. Pipe should be capable to withstand internal pressure creep rupture test without showing signs of localized swelling, leakage or weeping and shall not burst.

## 6. MARKING:

Marking on the HDPE pipe shall carry the following minimum information:

- a) Manufacturer name
- b) Pipe Designation (Material grade, SDR, Nominal outside diameter, Pressure rating)
- c) ISI mark
- d) Date and year of manufacture
- e) PO No. & Date
- f) Property of TPCODL/TPNODL/TPWODL/TPSODL.

## 7. TESTS:

All Routine, Acceptance & Type Tests shall be carried out in accordance with the relevant IS as mentioned above. All Routine /Acceptance Tests shall be witnessed by TPCODL/TPNODL/TPWODL/TPSODL representative.

### 7.1 ACCEPTANCE TESTS

The following tests shall be conducted in presence of TPCODL/TPNODL/TPWODL/TPSODL representative on the samples taken from the offered lot material:

- i. Visual appearance and dimensions
- ii. Melt flow rate
- iii. Density
- iv. Reversion test
- v. Elongation at break
- vi. Carbon black content
- vii. Carbon black dispersion
- viii. Oxidation induction
- ix. Internal pressure creep rupture test (hydrostatic resistance test) @ 80°C for 48 hrs

## 7.2 ROUTINE TESTS

Same as Acceptance Test

## 7.3 TYPE TESTS

- i. Tensile strength for butt fusion
- ii. Overall migration
- iii. Internal pressure creep rupture test (hydrostatic resistance test) @ 27 deg C for 100 hrs
- iv. Internal pressure creep rupture test (hydrostatic resistance test) @ 80 deg C for 165 hrs
- v. Internal pressure creep rupture test (hydrostatic resistance test) @ 80 deg C for 1000 hrs
- vi. Slow crack growth rate test

## 8. TYPE TEST CERTIFICATES:

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 **CIPET/CPRI/ERDA/other Govt Lab** as per relevant IS. Type tests should have been conducted 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, it shall be carried out without any cost implication to TPCODL/TPNODL/TPWODL/TPSODL.

## 9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. 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

TPCODL/TPNODL/TPWODL/TPSODL's representatives at all times when the work is in progress. Inspection to rejection. Bidder shall grant free access to the places of manufacture to by the TPCODL/TPNODL/TPWODL/TPSODL 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 TPCODL/TPNODL/TPWODL/TPSODL. Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL/TPNODL/TPWODL/TPSODL
- c) TPCODL/TPNODL/TPWODL/TPSODL 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 AT STORE:

The material received at TPCODL/TPNODL/TPWODL/TPSODL 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 Project Engineering department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such

Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be. Galvanization

Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

**12. PACKING AND TRANSPORT:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

**13. TENDER SAMPLE:**

Not Applicable

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

Supplier/ Manufacturer shall have adequate in house testing facilities for carrying out all routine tests &

acceptance tests as per relevant Indian standards.

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars.
- b) Work Experience details
- c) Type test certificates.
- d) Drawing (3 sets) of HDPE Pipe containing complete information about manufacturing etc.

# **TECHNICAL SPECIFICATION FOR 11KV LIGHTENING ARRESTER (10 KA)**

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### 1. SCOPE:

This specification covers the design, manufacture, testing and supply of 12kV,10kA, Station class-SL, (class-II) Metal Oxide Gap less Polymeric Lightning Arrester. The specific requirements are covered in the enclosed technical data sheet. Some of the parts that may have not been specifically included, but otherwise form part of the Lightning arrester as per standard practice or necessary for proper operation will be deemed to be also included in this specification. The successful bidder shall not be eligible for any extra charges for such accessories etc. Scope also includes transportation & unloading at store / site.

### 2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IEC 60099-4	Specification for surge arrestor without gap for AC System
IS 3070 & IS 15086	Specification for Metal Oxide Gap less Lightning arresters for alternating current System
IS 6209	Method of Partial Discharge Measurement
IS 8704 & IS 731	Guide for selection of creepage distance of polymeric housing insulator.
ISO 48	Rubber, vulcanized or thermoplastic -- Determination of hardness (hardness between 10 IRHD and 100 IRHD).
IEC 60721-3-2	Classification of environmental conditions. Classification of groups of environmental parameters and their severities. Transportation
IEC 60071	Insulation co-ordination -- Part 1 definitions, principles and rules; -- Part 2: Application Guide
IEC 60507	Artificial pollution tests on high voltage insulators to be used on ac systems
IEC 60815-1	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions --Part 1: Definitions, information and general principles
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS 2633	Methods for testing uniformity of coating of zinc coated articles
IS 4759	Hot-dip zinc coatings on structural steel and other allied products

### 3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150mm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

**4. GENERAL TECHNICAL REQUIREMENTS:**

<b>SL. NO.</b>	<b>TECHNICAL PARTICULARS (Class-SL,Class-II)</b>	<b>DESIREDVALUE</b>
<b>1</b>	Installation	Outdoor
<b>2</b>	Reference standards (Latest Amend.)	IS 3070, IEC 61109, IEC 60099
<b>3</b>	Arrester Type and Housing	Metal Oxide Gapless Cage typewith Polymeric housing
<b>4</b>	Normal System Voltage	11 kV
<b>5</b>	Highest System Voltage	12 kv
<b>6</b>	Rated Frequency	50 Hz
<b>7</b>	Maximum Continuous Operating Voltage (M.C.O.V)	9.6 kV (rms)
<b>8</b>	Arrester Rating	12 kV (rms)
<b>9</b>	<b>Discharge Current</b>	

a	Nominal Discharge Current	10 kA
b	Switching impulse discharge current	0.5kA
10	Short Circuit rating	25 kA
11	<b>Voltage Withstand on Arrester Housing</b>	
a	Standard rated short duration Power Frequency withstand Voltage (Dry/Wet) as per IS:2165	28kV (rms)
b	Standard rated Lightning Impulse withstand Voltage (Peak in kV)	75kV (Peak )
12	Lightning Impulse Protection Level (at 10kA)	49 kV
13	<b>Long Duration Current</b>	
a	Peak Current	75 A
b	Virtual duration of Peak T	1000 T (Micro Sec)
14	High Current impulse Operating Duty	65 kA (Peak)
15	Creepage Distance of Arrester Housing	31mm/KV (min) or 380 mm (min)
16	Partial Discharge at 1.05 times M.C.O. V	<10 pc
17	Energy Absorption capacity (KJ/KV)	>=4KJ/KV
18	Repetitive charge transfer withstand (coloumbs), Qrs	>=1.0
19	<b>Temporary over voltage (TOV)</b>	
a	1 sec	15kVp
b	10 sec	14kVp
20	<b>Maximum Lightning Impulse Residual voltage with 8/20 microsecond wave</b>	
a	at 5kA	35kVp
b	at 10kA	38kVp
c	at 20kA	--
21	<b>Maximum switching current impulse residual voltage in kVP at 500 A</b>	21 kVp
22	Max. Cantilever Strength	12 Kg-M(minimum)
23	Total height of the arrester	To be specified by bidder
24	Total weight of the arrester	To be specified by bidder
25	No. of Metal oxide blocks in arrester	To be specified by bidder
26	Rating of individual ZnO blocks used for assembly	To be specified by bidder
27	Power Losses of the Arrester in watt	To be specified by bidder
28	Type of Mounting	Bracket type
29	Material of Insulating base	UV resistant Fire retardant DMC
30	<b>Disconnecter (optional)</b>	
a	Disconnecter connecting lead	Insulated flexible tinned plated copper braid with lugs
b	Size of Insulated Tinned copper braid	25 sq.mm
c	Length of Insulated Tinned copper braid	300 mm
31	Insulating Terminal Cap	Polyolefin
32	Material of Nuts and bolts	Stainless Steel

#### 5. GENERAL CONSTRUCTION:

Lighting arrestors shall be station class, zinc oxide and gapless type suitable for operation under the system conditions specified. This shall be self-supporting, structure mounting type. Each unit of arrester assembly shall be hermetically sealed, leak tested and protected against ingress of moisture and shall be

individual demountable. The seal shall be properly designed and tested for operation under extreme weather conditions.

### **5.1 Assembly:**

Lightning arrestor shall be supplied along with the insulating base/Mounting bracket, terminal connector, insulating terminal cap (Polyolefin) and necessary hardwares. The assembly consists of a stack of metal oxide elements arranged in cage type designs. All metal parts shall be of non-rusting and non-corroding metal. Bolts, screws and pins shall be provided with lock washers. Lightning arrestor construction shall be suitable to withstand seismic loading, short circuit forces, wind load, the force exerted on the arrestor base and to terminal imposed by the line conductor. All similar parts, particularly removable ones, shall be interchangeable.

- a) The 12kV 10kA station class Lightning Arrestor shall have L-shaped terminal clamp suitable for conductor size of 148 sqmm.
- b) Housing shall be polymeric to provide thermal dissipation of heat generated in the metaloxide elements during over voltage and line discharge. Polymeric housing shall be free from flaws affecting the mechanical and electrical strength of the arrestor. Housing shall be capable to withstand the temperature rise due to the non-uniform field distribution, caused by the pollution on the surface of the housing.
- c) The arrestor shall have thermal stability to withstand the heat generated from ZnO element due to continuous operating voltages and surges. It shall remain in undamaged condition, capable protective function.
- d) Arrestors shall incorporate anticontamination feature to prevent arrestor failure, consequent to uneven voltage gradient across the stack in the event of contamination of the arrestor insulating material. These features shall be described in detail when submitting the Bid. Arrestors shall be capable of discharging over voltages occurring during switching of unloaded transformers, capacitors banks and long lines. No radio interferences shall be caused by the arrestors operating at the normal rated voltage.
- e) Bidder shall mention energy handling capacity.

### **5.2 EARTHING TERMINALS:**

Earth Terminals shall be provided with Lightning arrestor.

### **5.3 MECHANICAL STRENGTH:**

- a) The Lightning Arrestor and its base shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability.
- b) The Lightning Arrestor shall not come out of their positions by gravity, wind pressure, vibrations or reasonable shocks.

### **5.4 DISCONNECTORS (OPTIONAL):**

- a) Each Individual unit of Lightning Arrestor with disconnecter shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire life time of the Lightning Arrestor with disconnecter under the specified service conditions. Disconnectors shall give the visible indication of the failed arrestor. The Lightning Arrestor with disconnecter shall be suitable for bracket type mounting. Disconnecter shall be suitable for screwing directly to LA with terminal of M10.
- b) The corresponding units of Lightning Arrestor with disconnecter of the same rating shall be interchangeable without adversely affecting the performance. All the necessary flanges, bolts, nuts, clamps etc. required for assembly of complete Lightning Arrestor with disconnecter and accessories and mounting on purchaser's support structure shall be included in bidder's scope of supply. The mounting details for mounting the Lightning Arrestor with disconnecter on purchaser's support shall be given along

with bid.

## 5.5 MOUNTING BRACKET:

- a) The 12kV 10kA Distribution class Lightning Arrester shall be fixed over a mounting bracket made of UV resistance, Fire retardant DMC material.
- b) The 12kV 10kA Station class Lightning Arrester shall be fixed over a mounting arrangement made of Hot dip galvanized MS material.

## 6. MARKING:

A stainless steel rating plate, of at least 1 mm thickness, shall be fitted to each Lightning Arrester in a visible position and shall carry all the information as specified in the standards. The letters on the rating plate shall be engraved black on the white/silver background. Fixing screws for outdoor use shall be of stainless steel or any other corrosion resistant metals. The Name plate shall be embossed with "PO no. with date" & "TPCODL",

The following information shall be mentioned on the Name Plate

- a) Continuous operating Voltage
- b) Rated Voltage
- c) Rated Frequency
- d) Nominal Discharge Current
- e) Pressure relief rated current in kA r.m.s.
- f) Manufacturer's Name
- g) Type and Identification of the complete
- h) Year/Month of Manufacture
- i) Serial Number.
- j) Warrantee/guarantee clause

## 7. TESTS:

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components and fittings shall also be type tested as per the relevant standards. Following tests shall necessarily be conducted on lightning arrester in addition to others specified in IS/IEC standards: -

### 7.1 ACCEPTANCE TESTS

- a) Measurement of Power frequency reference voltage
- b) Lightning impulse residual voltage test on complete arrester or arrester unit.
- c) Internal Partial Discharge test
- d) Visual Examination
- e) For arrester units with sealed housing leakage check shall be made on each unit by any sensitive method adopted by the manufacturer on the arrester and on surge monitor

All acceptance tests shall be witnessed by TPCODL / the purchaser's or his authorized representative. The above mentioned tests shall be made on 100 % of arrestors to be supplied.

### 7.2 ROUTINE TESTS

- a) Measurement of reference voltage test
- b) Residual Voltage Test on complete arrester
- c) Internal partial discharge test. This test shall be performed on each arrester unit. The test sample may

be shielded against external partial discharges. Internal partial discharge shall not exceed 10 pC

- d) Satisfactory absence from partial discharges and contact noise shall be checked on each unit by any sensitive method adopted by the manufacturer.
- e) For Arrester units with sealed housing leakage check shall be made on each unit by any sensitive method adopted by the manufacturer on the arrester and/or on surge monitor.

### **7.3 TYPE TESTS**

- a) Insulation withstand tests, including lightning impulse voltage withstand test
- b) Residual voltage tests, including steep current impulse residual voltage test, lightning impulse residual voltage test and switching impulse residual voltage test.
- c) Operating duty tests
- d) Long duration current impulse withstand test/Repetitive charge transfer rating, Qrs.
- e) Moisture Ingress test and water immersion test.
- f) Weather ageing test
- g) Short circuit test (low/high current)
- h) Power frequency (voltage vs Time curve)
- i) Bending moment test
- j) Hot dip Galvanizing test on exposed steel parts.
- k) Internal partial discharge test
- l) Dry and wet power frequency voltage withstand test.
- m) Seal leak rate test
- n) Pressure relief test.
- o) Tests on arrester disconnectors- Time current characteristics (optional)

### **7.4 SPECIAL THERMAL STABILITY TEST:**

The test requires additional agreement between manufacturer and purchaser prior to the commencement of arrester assembly.

### **8. TYPE TEST CERTIFICATES:**

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 relevant standard. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPCODL.

### **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material.

- a) Test reports

- b) MDCC issued by TPCODL
- c) TPCODL 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 AT STORE:**

The material received at TPCODL, 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 department.

**11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

The bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of guarantee period for any 'latent defects' if noticed by the company.

**12. PACKING AND TRANSPORT:**

Bidder shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be taken at site. The material should be packed in vertical position in individual box in such a way that the shape of rain shed does not get deformed during transportation and storage.

**13. TENDER SAMPLE:**

One sample to be submitted during technical bid submission. This shall be Non-returnable basis.

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. 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. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

The successful bidder will have to submit technical compliance document and drawing as per RCline items for getting approval before mass manufacturing.

Manufacturing shall start only after getting CAT-A approved drawings or as per intimation from TPCODL.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be prepared based on TPCODL specifications and statutory requirements and shall be submitted with the bid:

- a) Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details.
- b) Description of the equipment and all components including brochures.
- c) General Drawing arrangement of lightning arrester.
- d) Sectional drawing showing internal blocks etc.
- e) Bill of material.
- f) Experience Certificate and list.
- g) Type test certificates.
- h) List of makes of major components.
- i) Foundation plan

**Drawings / documents to be submitted after the award of the contract are as under: List of Drawings/Parameters to be submitted:**

- a) Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
- b) General Arrangement Drawing of the Lightning arrester (Front view and Top view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
- c) Sectional drawing showing the blocks arrangement.
- d) Terminal and connection drawings
- e) Type Test Certificates.
- f) Installation/ Mounting Instructions/Drawing.

**Additional Documents to be submitted:**

- a) List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.
- b) Type test certificates of the raw materials and bought out accessories.

- c) The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.

All the documents & drawings shall be in English language.

After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPCODL for approval.

**Instruction Manuals:**

Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

**TECHNICAL SPECIFICATION FOR 11 KV AB SWITCH (400 A & 200 A).**

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2. APPLICABLE STANDARDS
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## **1. SCOPE**

This specification covers design, manufacturing, testing at manufacturer's works, inspection, packing & delivery of 11 KV Air Break Switch with accessories for out-door installation for use on transformer centers and tap line in Central Odisha. Aforesaid item(s) shall include loading and unloading at anywhere in Odisha.

It is not the intent to specify completely herein all the details of design and construction of Air Break Switches. However, AB Switches will conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the supplier's guarantee, in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specifications and shall have the power to reject any material, which in his judgment i.e. not in accordance with the specifications/drawings.

The A. B. Switches offered shall be complete with all components necessary for its effective and trouble-free operation along with associated equipment etc. such components shall be deemed to be within the scope of supplier's supply, irrespective of whether those are specifically brought out in the specification and/or in order or not. Also similar parts particularly removable ones shall be interchangeable.

## 2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref. IS	Description
IS 9920 (part-I to V)	Specification for helically formed fittings for Overhead lines up to 33 kV
IS 2633 (Part 1)	Method for testing uniformity of coating on zinc coated
IS 2544	Porcelain post insulators for systems with nominal voltage greater than 1000 V olts [ETD 6: Electrical Insulators and Accessories]
IEC 61109	Insulators for overhead lines - Composite suspension and tension insulators for a.c. systems with a nominal voltage greater than 1 000 V - Definitions, test methods and acceptance criteria
IEC 60168:1994+AMD1:1997+AMD2:2000 CSV	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V
IS 9530	Recommended practice for silver plating
IS 5925	Recommended practice for silver plating for general engineering purposes
BS 2816	Testing of silver plating thickness
IS 1239	GI pipe('B' class or Medium class)
IS: 5561	Electrical Power Connectors

## 3. CLIMATIC CONDITIONS OF THE INSTALLATION

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	1500 mm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal Direction	Equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	Equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid, dust in suspension during the dry months, and is subjected to fog in cold months.

## 4. GENERAL TECHNICAL REQUIREMENTS

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE	
1	Rating of AB Switch	<b>400 Amps AB Switch</b>	<b>200 Amps AB Switch</b>
1.a	Reference standards (latest amend.)	<b>IS 9920, IEC 129, IEC 61109, IS 1239</b>	
2	Installation	Outdoor	Outdoor
3	Suitable for Mounting	Horizontal Rotating Type	
4	Type	3 Pole	3 Pole
5	Service Voltage	11 kV	11 kV
6	Rated Voltage	12 kV	12 kV
7	Rated Frequency	50 Hz	50 Hz
8	Current Carrying Capacity	400 Amps	200 Amps

9	Rated short time current	16 kA for 1sec	16 kA for 1sec
10	Rated peak withstand current	40 kA	40 kA
11	Rated main active load breaking capacity	10 Amp	10 Amp
12	Rated line charging breaking capacity	2.5A	2.5A
13	Rated Transformer off load breaking Capacity	6.3A	6.3A
14	One minute power frequency withstand voltage Dry	35kV RMS	35kV RMS
15	One minute power frequency withstand voltage Wet	35kV RMS	35kV RMS
16	Dry flashover Voltage	55kV	55kV
17	Power Frequency puncture withstand voltage	1.3 times of actual dry flashover Voltage	
18	Visible Discharge Voltage	9kV RMS	
19	1 Minute Power Frequency withstand voltage between pole and earth	28kV	28kV
20	1 Minute Power frequency withstand voltage across the isolation distance	32kV	32kV
21	Impulse withstand voltage for positive and negative polarity (1.2 / 50) micro second wave)		
A	Across Isolating distance	85kV Peak	85kV Peak
B	To earth and between poles	75kV Peak	75kV Peak
22	No. of Post Per Pole (Polymeric, IEC 61109)	2	2
23	Total No. of post	6	6
24	Minimum Creepage Distance	320 mm	320mm
25	Phase to Phase Clearance	760mm	760mm
26	Isolation Distance in switch open condition	380mm	380 mm
27	Vertical clearance from Top of Insulator cap to mounting channel	254mm (min)	254mm (min)
28	Copper contacts Temp in Air should not exceed	65Degree	65 Degree
29	Size of fixed contacts (Copper Type Electrolytic with silver plated)	80mmx50mmx8mm	70mmx35mmx6mm
30	Size of Moving contacts (Copper Type Electrolytic with silver plated)	220mmx50mmx8mm	220mmx35mmx6mm
31	Moving Contact supporting Angle	50mmx50mmx5mm	45mmx45mmx5mm
32	Size of rods used for arcing horns	10 mm	10 mm
33	Insulation for tinned Copper braid/rope	Polyolefin, (RSFR-H) type	Polyolefin, (RSFR-H) type
34	Copper Flexible BRAIDED Tape -320mm Long, Tinned plated with Brass Nut, bolt & Washers	450gm /Mtr	450gm /Mtr
35	Minimum size*Length of Coupling Hot Dip GI Solid Pipe for Phase coupling pipe, B Class (Nominal Bore)	25mm Dia & 1800 mmlong	25mm Dia & 1800mmlong
36	Operating Down Pipe, B class (IS 1239) (Nominal bore)	32mm Dia & 7Mtr Long (one piece)	32mm Dia & 7Mtr Long (one piece)

37	Temperature Rise Limit (w.r.t ambienttemp) Tinned Copper contacts Terminals Metal Parts	50°C 40°C 40°C	50°C 40°C 40°C
38	Bearings	4 nos. self-lubricating bearing to be provided with grease nipple including 4 <sup>th</sup> bearing being a thrustbearing.	
39	Locking arrangement	Provision for pad locking at both 'ON' & 'OFF' Position	
40	Earth Terminal	M12 Bolts with nuts and flat washer shall be provided at base channel as earthing Terminal.	
41	'T' Connection	The T connection provided on the channel having 'moving contact' shall be G.I Nut & bolt at the bottom end to facilitate replacement of this unit only during requirements & avoid entire change of arm.	
42	'I' bolt	The I bolt shall be longer with 75 mm thread.	
43	Mounting Channel HDG 86 microns	75x40x4.8 mm Length 480 mm min. (C/C slotted hole 18x 36 mm- 250mm)	
44	Connectors	Connectors shall be of hard drawn electrolytic copper or brass. The connector should be of 4 bolted type and suitable for 80- 100 sqmm AAC conductor. Or SOCKET: Two no. of bimetallic copper sockets shall be used at both ends suitable for 80-100 sqmm AAC conductor.	
45	Marking/Engraving	TPCODL, Serial No., Manufacture's name or trademark, Month & Year of Manufacturing.	

## 5. GENERAL CONSTRUCTIONS/REQUIREMENTS

1. The Air break switch shall be outdoor type, rotating type gang operated and shall be suitable for horizontal installation having 2 no. of polymeric post insulators per phase.
2. The Rotating type operating mechanism shall be suitable for manual operation from ground level and shall be designed in such way that all the three phases shall open and close simultaneously in smooth way.
3. The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 10mm for 400 A and 8mm for 200 A AB switch of M.S. Hot dip galvanized.
4. The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer.
5. Each joint shall be provided with one plane and one spring of not less than 2mm thickness.
6. Connectors shall be of H D electrolytic copper.
7. The minimum cross section for fixed contact shall be 400 sq.mm for 400 Amp AB Switch and 200 sq.mm for 200 Amp AB Switch.
8. Tinned Copper braid/rope shall be insulated by Polyolefin (RSFR-H) type to prevent animal electrocution. It shall be 320 mm long minimum and shall weigh 450 G/M. It shall be punched at both ends.
9. All ferrous parts shall be hot dip galvanized with heavy coating after proper surface treatment as per standards. Coating thickness shall not be less than 86micron at any point.
10. All Copper parts shall be silver plated as per relevant standards and coating thickness not less than 10 microns at any point.
11. Equipment grounding shall be provided by bidder at two points with terminals.
12. All the nut bolt used must be Hot dip Galvanized and of size not less than M10.
13. A rigid base of galvanized steel channel of size approx. 75x40x4.8 mm Length 480 mm min. (C/C slotted

hole 18x 36 mm- 250mm shall be provided with clamps and bolts for Horizontal mounting firmly on steel structure.

14. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.
15. The phase coupling rod, operation rod with intermediate guide braided with flexible electrolytic copper, tail piece of required current carrying capacity and operation mechanism with 'ON' & 'OFF' positions shall be provided.
16. The operation rod shall be medium gage of 32mm diameter nominal bore G.I. pipe single length 7 meters. The phase coupling rod for gang operation shall be of medium gauge 25mm dia & 2100 mm length nominal bore G.I. pipe.

Technical particulars	400 Amps AB Switch	200 Amps AB Switch
Switching Blades	It shall be made out of electrolytic copper with silver plated. The approximate size shall be 250mm x 50 x 8mm for 11 KV. The switch shall have such a spring mechanism so as to ensure that the speed of the opening of contact is independent of speed of manual operation.	It shall be made out of electrolytic copper with silver plated. The approximate size shall be 220mm X 35 X 6mm. The Switch shall have such a spring mechanism so as to ensure that the speed of the opening of contact is independent of speed of manual operation.
Fixed Contacts	The fixed jaw type female contacts (80x50x8)mm for 11 KV shall be made of electrolytic copper ( minimum 95 % copper composition) duly electroplated controlled by phosphorus bronze/Stainless Steel high pressure spring housed in robust G.I. Cover. It is essential that provision shall be made in fixed female contacts to take the shock arising from the closing of moving contact blade without the same being transmitted to the post insulator.	The Fixed Jaw type female contacts of size (70x35x6) mm shall be made of electrolytic copper (minimum 95% copper composition) duly silver coated controlled by phosphorous bronze/Stainless steel high pressure spring housed in robust G.I. Cover. It is essential that provision shall be made in fixed female contracts to take the shock arising from the closing of move contract blade without the same being transmitted to the post insulator.
Terminal Connectors	Terminal connectors for both movable and fixed should be of copper flats of same size similar to that of moving contact blades (minimum 95% copper composition). The fixed connector shall of size 80 mm x 50 x 8 mm and the size of movable connector shall be size 80 x 50 x 8 mm with machine finishing duly silver plated with 2 nos. of 3/8" stainless steel bolts, nuts, plain washers & spring washers should be provided along with 2 nos solder less bimetallic sockets for each connector suitable sockets for each connector suitable up to 80- 100 mm <sup>2</sup> AAA conductor.	Terminal connectors shall be robust in design. The size of fixed connector shall be (65 X 35 X 6 mm) and size of movable connector shall be of (65 X 35) X (65 X 35) X 6mm of copper casting with uniform machine finishing duly silver plated made out of minimum 95% copper composition with 2 nos. 12mm dia holes provided with suitable brass bolts and double nuts, flat washers & 2nos. bimetallic solder less sockets suitable up to 80-100 mm <sup>2</sup> conductor.

## 6. MARKING

Below parameters should be embossed on SS sheet of thickness 1mm with black background. It should be riveted on MS channel of AB switch:

1. Rated Voltage
2. Manufacturer's Name
3. Month/Year of Manufacture
4. Serial Number
5. PO no.
6. Rated normal current in Amps
7. Rated one second short-time current in

## 7. TESTS CERTIFICATE

### 7.1 Type Test

The A.B. switches shall be subjected to the following type tests in accordance with clause No. 6 of IS-9920 (Part-1)/2002.

- (i) Tests to prove that the temperature rise of any parts does not exceed the values specified in part-2 of this standard.
- (ii) Tests to prove the capability of the switch to carry the rated peak withstand current and the rated short time current.
- (iii) Measurement of the resistance of the main circuit.
- (iv) Tests to prove the ability of the switch to make and break the specified currents.
- (v) Tests to verify the insulation level including withstand tests at power frequency voltages on auxiliary equipment if any. Di-electric tests include impulse withstand tests, power frequency voltage withstand tests, and power frequency voltage withstand tests.
- (vi) Tests to prove satisfactory operation and Mechanical endurance.
- (vii) Tests to prove the integrity of the external insulation under conditions of the air pollution.

Note 1: The type test certificate should not be more than 5 years old as on due date of opening of tender.

Note 2: Type test certificate of polymeric post Insulator shall be submitted and shall be issued from CPRI/ERDA or Government lab only.

## **7.2 Acceptance Tests**

The following acceptance test should be carried out as per IS: 9920 (P4/1985) on number of samples selected from the offered lot.

- (i) Visual Inspection.
- (ii) Checking of Dimensions (of all parts as per the approved drawing).
- (iii) Power frequency voltage dry test.
- (iv) Measurement of the resistance of the main circuit.
- (v) Test to prove satisfactory operation
- (vi) Galvanizing test as per IS: 2633.
- (vii) Temperature rise test.

## **7.3 Routine Tests:**

Supplier shall provide a control plan, which will be implemented on AB switches. Routine test reports should be submitted by the manufacturer with inspection call.

The following routine tests as outlined in clause No.4 of IS: 9920 (Part4/1985) shall be carried out by the manufacturer on each unit to check certain essential requirements.

- I. Power frequency voltage dry tests.
- II. Measurement of the resistance of the main circuit.
- III. Test to prove satisfactory operation.

The tenderer shall clearly indicate what testing facilities are available in the works of manufacturer & whether facilities are adequate to carry out all Acceptance & Routine Tests. These facilities should be available to TPCODL's representative if deputed or carry out or witness the tests in the manufacturer works.

## **8. TESTS**

Along with the bid, the bidder must submit Type Test Reports on Ab switches as per this technical specification, carried out within last five years from the date of opening of techno-commercial bid of the tender from CPRI/ERDA labs only. Otherwise the tender may be rejected.

## **9. PRE DISPATCH INSPECTION**

The Material shall be subject to inspection by a duly authorized representative of the TPDCOL. 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 always grant free access to the places of manufacture to TPCODL's representatives when the work is in progress. Inspection by the TPCODL 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 TPCODL.

Following documents shall be sent along with material

- a. Test reports
- b. MDCC issued by TPCODL
- 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 AT STORES**

The material received at TPCODL 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 Project Engineering 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 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 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**

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 SAMPLE**

Bidder shall submit the sample of material with the offer (in case of first supply to TPCODL).

#### **14. 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. The Purchaser's engineer or its nominated representative shall have free access to

the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

**15. 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. 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. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS**

Following documents shall be prepared based on TPCODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

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

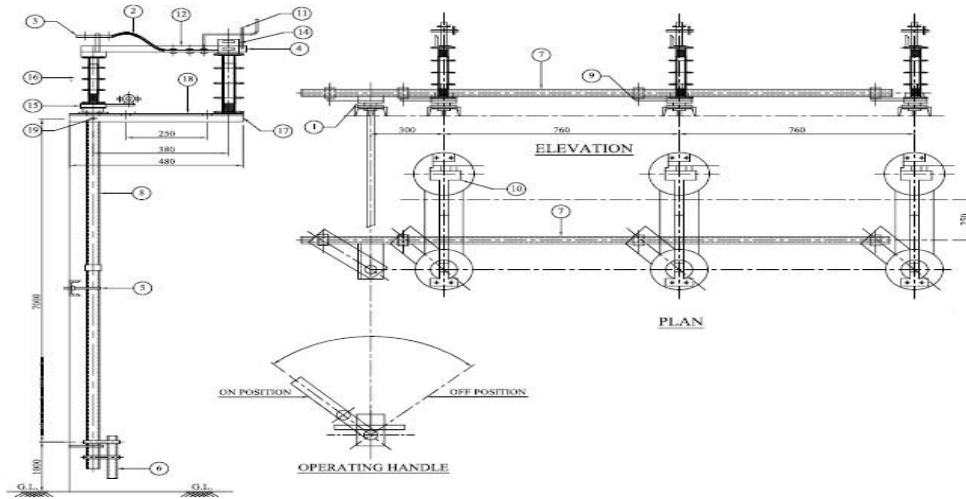
After the approval of the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be autopositive suitable for reproduction, before the dispatch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

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

SI. 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.		√	√
4	Installation Instructions		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√
7	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

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



**Indicative drawing of 11 KV 400 A and 200 A AB Switch**

## **Technical Specifications for 55sqmm and 80sqmm AAA Conductor**

### **1. 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 AAAC Conductors(55Sq.mm, 80Sq.mm) with all accessories and necessary training for trouble free & efficient operation.

### **2. APPLICABLE STANDARDS:**

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

<b>SI. No</b>	<b>IEC/IS</b>	<b>Description</b>
<b>1</b>	IEC :1089	Round wire concentric lay overhead electrical standard Conductor
<b>2</b>	IS 398:4	Aluminum Alloy Stranded Conductors
<b>3</b>	IS 9997	Aluminum Alloy redraw rods for electrical purposes
<b>4</b>	IEC 502 : 1994	Extruded solid dielectric insulated power cables for rated voltage 1.0 kV up to 30 kV
<b>5</b>	IEC 104	Aluminum Magnesium Silicon alloy wire for overhead line conductors
<b>6</b>	IS 1778	Reels and drums of bare conductor.

### **3. CLIMATIC CONDITIONS:**

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPWODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed up to 300 Kmph. The atmosphere is generally laden with mild acid, dust in suspension during the dry months, and is subjected to fog in cold months.

### **4. GENERAL TECHNICAL REQUIREMENTS:**

The wires shall be of heat treated aluminium, magnesium silicon alloy containing approximately silicon-0.5 to 0.9 %, magnesium-0.6 % to 0.9%, Fe-0.5% (maximum) , Copper- 0.1% (max ), Mn- 0.03%, Cr-0.03%, Zn-0.1%, B-0.06%, and having the mechanical and electrical properties specified in the table and be smooth and free from all imperfections, such as, spills, splits and scratches.

Neutral grease shall be applied between the layers of wires. The drop point temperature of the grease shall not be less than 120°C.

SL. NO.	TECHNICAL PARTICULARS	UNIT	RABBIT (55 Sq.mm)	RACCOON (80 Sq.mm)
1	<b>Make</b>			
a)	Aluminum Alloy rod		HINDALCO/BALCO/ VEDANTA	
b)	Conductor		Name of Company to be mentioned	
2	<b>Type</b>	No/mm	7 / 3.15	7 / 3.81
3	<b>Particulars of Raw material</b>			
a)	Si	%	0.50 - 0.90	0.50 - 0.90
b)	Mg	%	0.60 0.90	0.60 0.90
c)	FE	%	0.50 max	0.50 max
d)	Cu	%	0.10 max	0.10 max
e)	Mn	%	0.03 max	0.03 max
f)	Cr.	%	0.03 max	0.03 max
g)	Zn	%	0.10 max	0.10 max
h)	B	%	0.06 max	0.06 max
i)	Other Elements(Each)	%	0.03 max	0.03 max
j)	Other Elements(Total)	%	0.10 max	0.10 max
k)	Aluminium	%		
4	<b>Aluminium Alloy wire</b>			
i	Diameter (mm)			
a)	Normal	mm	3.15	3.81
b)	Maximum	mm	3.18	3.85
c)	Minimum	mm	3.12	3.77
ii	Cross Section Area of Nominal dia wire	Sq. mm	7.793	11.40
iii	Minimum Breaking Load of each strand after stranding	KN	2.29	3.34
iv	Minimum elongation % on gauge length of 200 mm (After Strand)	%	4	4
v	Max. Resistance at 20 Deg.C	Ohm/KM	4.290	2.938
5.1	Nominal Sectional Area	sq. m	<b>55</b>	<b>80</b>
5.2	Overall Diameter	mm	9.45	11.43
5.3	Approx. Mass	Kg. /Km	149.2	218.26
5.4	Minimum Ultimate Breaking Load of Conductor	KN	16.03	23.41
5.5	Lay ratio of conductor	Min. /Max.	10 / 14	10 / 14
5.6	Calculated Max. resistance of conductor at 20° C	Ohm/ Km.	0.621	0.425
6	Standard length of conductor (meter)	Mtr.	2000	2000
6.1	Continuous max. current carrying capacity in still air at 40°C	Amp	230	295

	ambient temperature			
6.2	Temperature rise for above current		35° Cover the ambient	35° Cover the ambient
6.3	Tolerance on standard length of Conductor (%)	%	±5	
6.4	Direction of lay for outside layer		Right Hand	
7	<b>Modulus of Elasticity</b>	Kg/cm <sup>2</sup>	0.6324 x 10 <sup>6</sup> Kg/cm <sup>2</sup>	
10	Joints		There shall be no joints in any wire of a stranded conductor	
11	Co-efficient of liner expansion per deg. C	Per °C	23x10 <sup>-6</sup>	

Maximum resistance values given have been calculated from the maximum values of the resistivity as specified and the cross sectional area based on the minimum diameter.

## 5. GENERAL CONSTRUCTION:

The conductors shall be constructed as per IS 398 (Part IV). The steel strands shall be uniformly grease coated as anti-corrosive agent in Rabbit & Raccoon conductors. Neutral Lithium based Grease shall comply to IS 7623.

### Lay Ratios for Aluminium Alloy Stranded Conductors

Number of Wires in Conductor	LAY RATIOS							
	3/6 Wire Layer		12 Wire Layer		18 Wire Layer		24 Wire Layer	
	Min	Max	Min	Max	Min	Max	Min	Max
7	10	14	---	---	---	---	---	---
19	10	16	10	14	---	---	---	---

## 5.1 MATERIALS

- 5.1.1** The materials shall be as per clause 4.0 & 6.0 of IS 398 (Part IV). The Aluminum conductor strands shall be drawn from 99.5% pure electrolytic EC grade Aluminum rods.
- 5.1.2** Aluminum raw material shall be procured from NALCO, BALCO, HINDALCO and VEDANTA only.
- 5.1.3** The galvanized steel wire shall be drawn from high carbon steel rods produced by either acid or base open hearth process, electric furnace or basic oxygen process.
- 5.1.4** Steel raw material shall be from Tata Steel, Jindal steel, SAIL only
- 5.1.5** Grease shall be from BPCL, HPCL, Balmer Lawrie only

## 5.2 SURFACE CONDITION

**5.2.1** Surface conditions of the conductor shall be generally as per clause 7.0 of IS 398 (Part IV). The wires used for standard conductor shall be smooth and free from imperfections, such as spills and split. The conductor shall be free from points, sharp edges, abrasions and other departures from

smoothness on uniformity of surface contour that would increase radio interference and corona losses. When subjected to tension up to 50% of the ultimate strength of the conductor, the surface shall not depart from the cylindrical form on any part of the compartment, parts or strands, more relative to each other in such a way as to get out of place and disturb the longitudinal smoothness of the conductor.

**5.2.2** The zinc coating on steel wire shall be uniform, adherent, smooth and free from such imperfections as flurry, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits, and blisters.

**6. MARKING:**

Each drum shall have the following information stenciled on it in indelible ink along with other essential data:

- a) Contract/Award letter number
- b) Name and address of consignee.
- c) Manufacture's name and address.
- d) Drum and lot number
- e) Size and type of conductor
  - f) Length of conductor in meters
- g) Arrow marking for unwinding
- h) Position of the conductor ends
  - i) Number of turns in the outer most layer.
- j) Gross weight of the drum after putting lagging.
- k) Average weight of the drum without lagging. ISI mark Manufacturer Name/ Trade Mark "TPWODL"  
P.O No and Date

**7. TESTS:**

The bidder shall be required to submit complete set of the following test reports along with the offer:

**7.1 ACCEPTANCE TESTS:** Acceptance Test On Finished Conductor

- i) Lay Ratio/Direction of the lay Mechanical Properties
- ii) Diameter
- iii) Breaking Load / Tensile Test
- iv) Resistance
- v) Wrapping Test
- vi) Elongation

**7.2 ROUTINE TESTS**

- i) Check for Joints
- ii) Surface Condition of the strand and stranded conductor
- iii) All acceptance test
- iv) Check the drum

**7.3 TYPE TESTS**

Type Test of Finished Conductor

- i) UTS test on stranded conductor Mechanical Properties
- ii) DC resistance test on stranded conductor

## **8. TYPE TEST CERTIFICATES:**

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/Other Govt. Lab** as per relevant IS. Type tests should have been conducted 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, same shall be carried out without any cost implication to TPWODL.

## **9. PRE-DISPATCH INSPECTION:**

The material shall be subject to inspection by a duly authorized representative of the TPWODL. 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 TPWODL's representatives at all times when the work is in progress. Inspection by the TPWODL 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 TPWODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPWODL
- c) TPWODL 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 AT STORE:**

The material received at TPWODL 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 Project Engineering 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 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 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 period, 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 AND TRANSPORT:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. Standard Length of both the conductors is 2000 Mtrs (2 Lengths per drum). The bidder shall provide instructions regarding handling and storageprecautions to be taken at site.

**13. TENDER SAMPLE:**

Required

**14. QUALITY CONTROL:**

The bidder shall submit QAP 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. 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. TESTING FACILITIES:**

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

**16. MANUFACTURING FACILITIES:**

The successful bidder shall 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.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 Set of Hard Copy & Soft Copy PDF File containing complete information about manufacturing.

Major Equipment /Items approved Vendor List		
Sl. No	Description of Equipment or Material	TPCODL approved Vendor List
1	AB Switch	M/s High Tension Electrical Equipments Pvt. Ltd / M/s Rahul Electricals / M/s Sigma Power Industries / M/s Ultima Switchgears Ltd. / M/s Indian Metal Industries / M/s Indian Power Industries / M/s National Casting & Engineering Co. / M/s Pramoda Engineering Works / M/s Samal Industries
2	WPB Pole	M/s Vijay Transmission Pvt Ltd / M/s Swastika Steel & Allied Products Pvt. Ltd. / M/s Supreme & Co Pvt Ltd & M/s Utkal Galvanizers Ltd / M/s Rukmani Electricals and Components Pvt Ltd / M/s Reliable Sponge Pvt Ltd / M/s New Laxmi Steel & Power Pvt Ltd / M/s K L Steels Pvt Ltd / M/s Dharam Industries / M/s Reliable Sponge Pvt Ltd
3	HT Polymer Pin & Disc Insulator	M/s Adinath Industries / M/s Ele Chem Systems Pvt. Ltd / M/s Hindustan Chemicals / M/s Jainco Transmission Ltd / M/s Prime Insulators Pvt Ltd / M/s Prithvi Industries Pvt. Ltd. / M/s Scenario Powertech Pvt Ltd / M/s Hobb International / M/s Rashtriya Electricals & Engineering Corporation Pvt Ltd, Ghaziabad
4	GI Items (Channel , Angel , Flat, Pipe, V cross Arm, Clamps Stay Set, Nut bolts)	M/s Dharam Industries / M/s Industrial Forging Industries Pvt Ltd / M/s J B Construction & Services / M/s Jainco Transmission Ltd / M/s KSE Electricals / M/s New Laxmi Steel & Power Pvt Ltd / M/s Pramoda Engineering Works / M/s Rahul Electricals / M/s Reliable Sponge Pvt Ltd / M/s Rukmani Electricals and Components Pvt Ltd / M/s Vijay Transmission Pvt Ltd / M/s. High Tension Electrical Equipments Pvt. Ltd / M/s Samal Industries (HT and LT stay Set)
5	GI Type(Stay Wire, Barbed Wire, Earthing Coil, Earthing Wire)	M/s Industrial Forging Industries Pvt Ltd / M/s Jainco Transmission Ltd / M/s R K Wire Products Ltd
6	HT Hardware fitting	M/s Industrial Forging Industries Pvt Ltd / M/s Jainco Transmission Ltd / M/s Pramoda Engineering Works / M/s Samal Industries
7	HDPE Pipe	Ms Flexiflow Polymers LLP / M/s Aadi Polyextrusion & Moulding Pvt. Ltd / Ms Anuja Ceramics Pvt Ltd/ M/s Hari Udyog Pvt Ltd / M/s Lingaraj Pipes Pvt. Ltd/ Ms Magnum Fibres Pvt, Ltd. / M/s Metroplast Industries / M/s SHREE SALASAR INDUSTRIES / M/s Valentina Pipes Pvt. Ltd/ Ms Balaji Techproducts Pvt. Ltd/ Ms Oriplast LTD / Ms Rarean Fluid Tech. Pvt. Ltd / Ms Sidhi Vinayak Polymer Industries / Ms Mahanadi Polymers Pvt LTD / Ms Shaakya Polymer Pvt, Ltd / M/s. Skipper Limited / Ms. Orison Plastic Pvt Ltd
8	HT XLPE UG Cable	M/s APAR Industries Ltd / M/s Dynamic Cables Ltd / M/s KEI Industries Ltd. / M/s Havells India Pvt. Ltd / TORRENT ELECTRICALS LTD / Ms KEC

		International Ltd / M/s GEMSCAB Industries Ltd / Ms Polycab India Limited
9	HT & LT Cable Termination & Jointing Kit	M/s 3M Electro & Communication India Pvt Ltd / M/s Behr Bircher Cellpack BBC India Pvt. Ltd. / M/s Nexans (PCA Technologies Pvt Ltd.) / M/s Raychem RPG Pvt Ltd.
10	Lighting Arrestor (Polymer Type)	M/s Orange Power T&D Equipments(P) Ltd / M/s Elektrolites Power Pvt Ltd / M/s Oblum Electrical Industries Pvt Ltd / M/s Rashtriya Electricals & Engineering Corporation Pvt Ltd / M/s New Aquaria Electeck Pvt. Ltd. / M/s Engineer Enterprise
11	AAA Conductor	M/s Akhandalamani Electricals & Constructions / M/s APAR Industries Ltd / M/s Cables India Pvt Ltd / M/s Laser Power & Infra Pvt Ltd / M/s Mahavir Transmission Limited / M/s MMP Industries Ltd / M/s Pobon DPC & Cables Pvt. Ltd / M/s. Lumino Industries Ltd / M/s KJV Alloy Conductors Pvt. Ltd / M/s. Geetansh Cables & Conductors Pvt. Ltd / M/s Polytech Wire and Cables Pvt. Ltd.

**CERTIFICATE OF NO RELATIONSHIP**

I/We hereby certify that I/We\* am/are\* **related / not related** (\*) to any officer of IDCO of the rank of Deputy Manager & above I/We\* am/are\* aware that, if the facts subsequently proved to be false, my/our\* contract will be rescinded with forfeiture of E.M.D and security deposit and I/We\* shall be liable to make good the loss or damage resulting from such cancellation.

(\*) - Strike out which is not applicable

Signature of the Tenderer

Date:-

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**WORK EXPERIENCE**

**LIST OF SIMILAR NATURE OF PROJECTS EXECUTED**

Name of Employer	Name of location and name of work	Contract price in Indian Rupees/ Agreement no.	Major Items of works	Stipulated date of commencement / completion of the work as per Agreement	Actual date of completion of the work	Value of work actually executed during last 7 / Current financial years								Reasons for delay in starting/Completion,if any	
						Financial year							Value		
1	2	3	4	5	6	7							Current FY	8	9
						2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	Total	

**Note:** The above information is to be certified by the Engineer in Charge / Employer not below the rank of Executive Engineer. Column '7' & '8' is to be filled up for the last 7 (Seven) financial years. Incomplete & uncertified Schedule-D will not be accepted under any circumstances.

Signature of the Employer

Signature of the Tenderer

Date.....

Date.....

**INFORMATION REGARDING CURRENT LITIGATION, DEBARRING EXPELLING OF  
TENDERER OR ABANDONMENT OF WORK BY THE TENDERER**

1. a) Is the tenderer currently involved Yes / No  
in any litigation relating to the works.
- b) If yes: give details:
2. Has the tenderer or any of its Yes / No  
constituent partners been debarred/  
expelled by any agency in India  
during the last 7 years.
3. a) Has the tenderer or any of its Yes / No  
constituent partners failed to  
perform on any contract work in  
India during the last 7 years.
- b) If yes, give details:

**Note:**

If any information in this schedule is found to be incorrect or concealed, qualification application will summarily be rejected.

**Signature of Tenderer**

**AFFIDAVIT**

1. The undersigned do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither my / our firm / company / individuals \_\_\_\_\_ nor any of its constituent partners have abandoned any road/ bridge/Irrigation /Buildings or other project work in India nor any contract awarded to us for such works have been rescinded during the last seven years prior to the date of this bid.
3. The undersigned hereby authorise(s) and request(s) any bank, person, firm or Corporation to furnish pertinent information as deemed necessary and as requested by the Department to verify this statement or regarding my (our) competency and general reputation.
4. The undersigned understands and agrees that further qualifying information may be requested and agree to furnish any such information at the request of the Department.

(Signature of Tenderer)

Title of Officer

Name of Firm

Date:

**CERTIFICATE OF EMPLOYMENT OF UNEMPLOYED GRADUATE**

**ENGINEER / DIPLOMA HOLDERS**

**(For Super Class / Special Class / 'A' Class Contractors only)**

I / We hereby certify that at present, the following Engineering personnel are working with me / in our firm / company and their bio-data are furnished below.

<b>Sl. No.</b>	<b>Name of Engineering personnel appointed for supervising contractor's work with address</b>	<b>Qualification</b>	<b>Date of Appointment</b>	<b>Monthly emolument</b>	<b>Whether full time engagement and continuous</b>	<b>If they are superannuated / retired / dismissed or removed personnel from state Govt./ Central Govt. / Public Sector Undertaking / private Companies and s or any one ineligible for Government service</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>

Signature of the Tenderer.

Date:-

**SAMPLE FORMATS**

**UNDER TAKING**

**This is to certify that**

1. My firm has neither been associated, directly or indirectly, with the Consultant or with any other entity that has prepared the design, specifications, and other documents for the Project nor has any person associated with been proposed as Project Manager for the Contract.
2. My firm has not engaged any agency and any of its affiliates engaged by the Engineer-in-Charge to provide consulting services for the preparation or supervision of this work.
3. My firm has not engaged any Engineer of gazetted rank employed in Engineering or Administrative duties in an Engineering Department of the Government of Odisha or other gazetted officer retired from Government service during last two years without prior permission of the Government of Odisha in writing on or before submission of this tender. I am aware that my contract is liable to be cancelled if either I or any of my employees is found any time to be such a person who had not obtained the permission of the Government of Odisha as aforesaid.

Signature of the Tenderer.

Date:-

Note: i. Strike out whichever is not applicable

ii. In case any person is under his employment with due permission from Government, the same may be cited in a separate letter.

RELATIONSHIP DECLARATION

To,

The Tender Inviting Officer,

Subject: (Name of the Work)

Reference : (Bid reference number)

**Sir,**

Pursuant to clause **2 of the ITB**, it is to inform that I have relative(s) employed as an Officer in the rank of an Assistant Engineer/Under Secretary under the \_\_\_\_\_ Department. His (Their) details are as follows.

Relationship:

Name:

Designation

Office

Address

Pursuant to clause **2 of the ITB**, I am to submit herewith the names of persons who are working under my firm having near relatives to any gazetted officer in the rank of an Assistant Engineer/Under Secretary in the \_\_\_\_\_ Department.

Sl No	Name of the my employee and his designation in the firm	Presently working at	Details of his relatives working in the Department
			Relationship Name: Designation Office Address
			Relationship Name: Designation Office Address

I am also duty bound to inform the relationship of any subsequent employment with any gazetted officer in the rank of an Assistant Engineer/Under Secretary in the \_\_\_\_\_ Department. I **am aware that any** breach of this condition would render my firm liable for penal action for suppression of facts.

Yours Sincerely

Signature of the Tenderer.

Date:-