



COVER – I

TECHNICAL BID DOCUMENTS / DETAILED TENDER CALL NOTICE FOR THE WORK

COVER – I

Name of the Work: Supply, Installation, Testing & Commissioning of 11kV dedicated feeder for providing power supply to Industries at Indranipatna Industrial Estate, Choudwar, Cuttack.

(Percentage rate based Tender)

Estimated Cost Put To Tender:

₹ Rs.2,20,28,726.00

CHIEF GENERAL MANAGER (P&C)

IDCO, BHUBANESWAR

Sl. No.	CONTENTS	PAGES
1.	Tender Call notice	
2.	Check list	
3.	Contract data	
4.	Instruction to Bidders(ITB)	
5.	Detailed Tender Call Notice	
6.	Technical specification.	
7.	Annexure – I (DELETED)	
8.	Schedule A to K (Excluding Schedule–B, Schedule–C & Schedule-K)	

INVITATIONS FOR BIDS (IFB)**Bid Identification No.P&C/EST/E-14/2026-27**

The Chief General Manager (P&C), IDCO, IDCO Towers, Janpath, Bhubaneswar-751022, invites **Percentage rate based bids** in double cover system, in online mode only, for the following work.

Sl. No.	Name of Work	Value of work (Approx.)	Divisional Head With Headquarters	Bid Security/EMD	Cost of document	Period of completion	Class of Bidder
1	Supply, Installation, Testing & Commissioning of 11kV dedicated feeder for providing power supply to Industries at Indranipatna Industrial Estate, Choudwar, Cuttack.	Rs.2,20,28,726.00	Divisional Head, Electrical Division-1, Bhubaneswar	Rs.2,20,287.00 (1% of estimated Cost) to be paid online.	Rs. 11,800/- (To be paid online)	5(Five) Calendar Months	HT Electrical Contractors having valid License issued by ELBO with experience in similar nature of work.

1. Bid documents such as DTCN / BoQ etc. can be seen from www.tendersodisha.gov.in during the period from **17:00 hours of dt.29.07.2026 to 17:00 hours of dt.13.08.2026**.
2. The Queries may be sent to cgmpc@idco.in with copy marked to banashri.rath@idco.in , rakeshkumar.sahu@idco.in . The bidder may contact **Mob: 9940275082**
3. Bid for the above mentioned work should be uploaded to e-procurement portal between **17:00 hours of Dt. 29.07.2026 to 17:00 hours of dt. 13.08.2026**.
4. The Technical Bid should consist of Credentials of the firm, VAT/ GST return statements filed for last 3 years, PAN, EPF latest challan, GST Registration Number, experience certificate, Schedule-D and all other documents as mentioned in the bid document.
5. The Technical Bid will be opened online on **dt.14.08.2026 at 11:30 hours** at IDCO Tower, Bhubaneswar in the office of the Chief General Manager (P&C), IDCO, IDCO Towers, Janpath, 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-

Chief General Manager (P&C)

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 Rs.11,800/- (To be paid online)	No.4 & 5(i)			
02.	Bid Security (EMD) of Rs. 2,20,287.00/- (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. (to be submitted by the successful lowest (L1) bidder only within 7 days of issue of LOA)	No.62			
<u>Documents to be Uploaded (other than Paper cost and EMD.</u>					
04.	Copy of valid Electrical HT Contractor License issued by ELBO, Govt. of Odisha having experience in similar nature of works.	No.5(i) & 21(Required)			
05.	Copy of valid GST Registration Certificate	No.5(i) & 21(Required)			
06.	Copy of PAN Card	No.5(i) & 21(Required)			
07.	EPF Registration	No.5(i) & 21(Required)			
08.	EPF Latest Challan (within two months of this tender)	No.5(i) & 21(Required)			
09.	Copy of Profit & Loss Statement	No.5(i)			
10.	Relationship Certificate in Schedule – A & Schedule-I	No.35(Required)			
11.	Works Experience: List of projects under execution / executed that are similar in nature to the work (Information in Schedule-B & Schedule-D is mandatory. Bidders should furnish all the information in Schedule-B & Schedule-D duly certified by Employer / Department as prescribed in the DTCN and in no other formats, failing which the bid shall be treated as non-responsive and shall summarily be rejected.	Schedule –B Schedule –D (Required)			
12. (A)	Information regarding current litigation, debaring / expelling of the tender or abandonment of the work by the tenderer (Schedule-E)	No.49(Required)			
(B)	Affidavit (Schedule-F), in original, duly Notarised (within 3 months of tendering)	No.49(Required)			
13.	Similar nature of work (Schedule –D) of appropriate amount as per clause no- No. 112 (g) of DTCN	No. 112 (g) (Required)			
14.	Qualification of Key personnel engaged. (Schedule (G)	No. 64(Required)			
15.	Work Programme. (in Bar chart for Completion within 5 calendar months)	(Required)			
16.	e-mail ID	(Required)			
17.	Contact no	(Required)			
NB: 1. Documents as per the requirement of the DTCN & Technical Specification should be uploaded even though those are not mentioned in the above check list. 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.					

CONTRACT DATA**A. GENERAL INFORMATIONS**

SI No	Item	Details
1	Name of the Work	Supply, Installation, Testing & Commissioning of 11kV dedicated feeder for providing power supply to Industries at Indranipatna Industrial Estate, Choudwar, Cuttack.
2	Employer	Chief General Manager (P&C), IDCO
3	Employer's Representative.	Divisional Head, Electrical Division, IDCO, Bhubaneswar
4	<u>Estimated Cost (In.)</u> Total	Rs.2,20,28,726.00

B. BID INFORMATION

5	Intended completion period/Time period assigned for Completion		05 (Five) calendar months
6	Last Date & time of submission of Bid		17.00 Hours of dt.13.08.2026.
7	Tender fee		
	i	Amount	Rs.11,800/-
			Instructions to be followed for online payment available in the e-Procurement portal during the processing of tender by the bidder.
8	Bid Security		
	i	Amount	Rs.2,20,287.00 (1% of Estimated Cost put to tender)
			Instructions to be followed for online payment available in the e-Procurement portal during the processing of tender by the bidder.
9	Additional Performance Security		No.62 (of DTCN)
	i	Amount	No.62 (of DTCN)
	ii	In favour of	Divisional Head, Electrical Division, IDCO, Bhubaneswar
	iii	Type of instrument	As specified in Bid document (DTCN)
10	The Financial years of last seven years		2019-20 up to 2025-2026
11	Bid validity period		180 days
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, and 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 **Chief General Manager (P&C) / Divisional Head, Electrical Division, 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 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 inonline 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 **Valid Electrical HT Contractor License issued by ELBO, Govt. of Odisha** 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) **ELIGIBLE REGISTERED HT ELECTRICAL CONTRACTORS HAVING VALID LICENSE ISSUED BY ELBO WITH EXPERIENCE IN SIMILAR NATURE OF WORK.**
- (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 up-loading his bid. He is required to up load 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 (BOQ), 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. ~~PRE-BID MEETING:~~ The Queries may be sent to cgmipc@idco.in with copy marked to banashri.rath@idco.in , rakeshkumar.sahu@idco.in**

10. AMENDMENT OF BIDDING DOCUMENTS:

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

10.2. 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).

10.3. 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

11. LANGUAGE OF THE BID:

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

12. DOCUMENTS COMPRISING THE BID:

12.1. 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**

12.2. 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

13. PROPOSAL BY THE BIDDER:

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

13.2. DELETED

~~13.3. In case of Item rate based tender, the bidder will only fill in the designated cell and put his rate (Up to two decimal Place).~~

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

13.5. 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.

13.6. 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.

13.7. 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.

13.8. **DELETED**

13.9. **DELETED**

13.10. **DELETED**

13.11. **DELETED**

13.12. **DELETED**

13.13. 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.

13.14. 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.

13.15. **FOR COMPOSITE BIDS: DELETED.**

14. CURRENCIES OF BID AND PAYMENT:

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

14.2. **VALIDITY:**

14.3. 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 Engineer-in-charge** as non-responsive.

14.4. 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.

14.5. DELETED.

15. BID SECURITY:

15.1. The Bidder shall furnish, as part of his Bid, a BID security 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 required to furnish Tender Fee through online mode. There will not be any exemption to any bidders.

15.5. DELETED

15.6. DELETED

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. DELETED.

15.7.5. DELETED.

15.7.6. DELETED.

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**, 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 their 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, if any, 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, than 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* (QUALIFICATION CRITERIA)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.

25.6.

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 15 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 contractors registered as **“Supply, Installation, Testing & Commissioning of 11kV dedicated feeder for providing power supply to Industries at Indranipatna Industrial Estate, Choudwar, Cuttack.”** at an estimated cost of **Rs.2,20,28,726.00/-** (Rupees Two Crore Twenty Lakhs Twenty Eight Thousand Seven Hundred Twenty 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 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.29.07.2026 to 17.00 Hours of dt.13.08.2026.** The last date and time of submission of Bid is as per contract data.
3. The Technical Bid documents (**Cover-I**) will be opened in online mode at **11.30 Hours of dt.14.08.2026.** After evaluation of the documents contained in Cover-I, the Cover-II containing price bids of the technically responsive bidder/s will be opened in online mode after prior intimation to the eligible bidder through e-tender portal.
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

 - (ii) The work will be supervised measured & check measured by the Divisional Head, IDCO, Electrical Division. 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 **05(Five) Calendar Months** 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 (if any) 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.2,20,287.00** has to paid online during bid submission. Bidders desirous to hire machinery or equipment are 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 Electrical HT Contractor License issued by ELBO, Govt. of Odisha, 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. DELETED

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) in form of Deposit receipt of Schedule Bank / KissanVikash Patra / Post Office Savings Bank Account/National Savings Certificate / Post Office Time Deposit Account duly pledged in favour of the **"Divisional Head, Electrical Division, 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** 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 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 to protect 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 of 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 takes 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 five years duly certified by the concerned **Engineer-in-charge/Divisional Head** indicating the satisfactory completion for similar 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** & 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 (Electrical)**. 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 **Chief General manager (P&C) / Divisional Head (Electrical)** in the manner so that the total expenditure does not exceed one per cent 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 : As Additional Performance Security shall be obtained from the selected bidder on an incremental basis for bids quoted below the estimated cost put to tender, **which shall be calculated as the calculation mentioned in the Works Department O.M. No. 173/W dated 03.01.2026.**

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 & IDCO 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 Chief General Manager (P&C) /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(P&C) /Divisional Head (Elect)** 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 **Chief General Manager (P&C) / Divisional Head (Elect)** 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-B, 3. Schedule-D, 4. Schedule-E, 5. Schedule-F, 6. Schedule-G, 7. Schedule-H, 8. Schedule-I & 8.Schedule-K along 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/IDCO 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 or IDCO facilities, 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/IDCO 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 imposing penal action as per Bid Security Declaration (Schedule-K)~~ 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. The following documents which are not submitted with the Bid will be deemed to be part of the Bid.

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 liable for rejection and ineligible.

- a. DELETED
- b. Tender Fee: to be paid **online**.
- c. Scanned copy of valid **Electrical HT Contractor License issued by ELBO, Govt. of Odisha, 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, Electrical HT Contractor License issued by ELBO, Govt. of Odisha, GST Registration Certificate and Pan card, EPF Certificate, EPF Latest Challan for verification within (5) Five days of opening of Cover-II of the tender before the Chief General manager (P&C) , Bhubaneswar as per **Clause No-1,5, 21 & 72 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)**01(One)** similar completed work costing not less than 80% **(Rs.1.76 Crore)** of the total project value in last seven financial years (2019-20 to 2025-26)/Current financial year (2026-2027) OR
 - (ii)**02(Two)** similar completed work costing not less than 50% **(Rs.1.10 Crore)** of the total project value in last seven financial years (2019-20 to 2025-26)/Current financial year (2026-2027) OR
 - (iii)**03(Three)**similar completed work costing not less than 40% **(Rs.88.11 Lakh)** of the total project value in last seven financial years (2019-20 to 2025-26)/Current financial year (2026-2027) 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 or Completion Certificate** thereof.

Year before	Multiplying factor
1	1.1
2	1.21
3	1.33
4	1.46
5	1.61
6	1.77
7	1.94

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

(Similar nature of works; Supply, installation, testing, and commissioning of electrical works for voltage levels of 11 kV and above in Government, PSU, ULB or DISCOMs[JV with government enterprises]).

h. **BID CAPACITY**

The bid capacity as qualification criteria in all live/ upcoming tenders for the value of the work above Rs.3.00 Crore shall be calculated as follows:

1. Bidders will only be qualified when their available bid capacity at the expected time of bidding is more than the total estimated cost of the work.

2. Assessed available bid capacity = $(A \times N^2 - B)$ where,

A= Maximum value of works executed in any one year during the last five years (Updated to Current price level). Rate of inflation may be taken as 10% per year (Escalation factor) which will take in to account the completed as well as works in progress.

B= Value of current price level of the existing commitments and ongoing works to be completed during the next years (Period of completion of work for which bids are invited) and

N= No. of years prescribed for completion of works for which the bids are invited.

Note: The value of the N shall be taken as 1 (one) when the period of completion of the work is less than a year and actual value of the N shall be taken when period of completion of the project is 12 (Twelve) months and more.

3. The statement showing the value of existing commitments and ongoing works as well as stipulated period of completion remaining for each of the works listed should be counter signed by the Engineer in Charge not below the rank of an Executive Engineer.

4. Following escalation factors will be used for the cost of work executed and the financial figures to bring to a common base value for works completed in India.

Year Before	Multiplying Factor
One	1.1
Two	1.21
Three	1.33

Four	1.46
Five	1.61

- ~~5. If the qualifying work is completed in the 05 (Five) year period specified above, even if it has been started earlier, the same will also be considered as meeting the qualifying requirements.~~
- ~~6. Note: In case of a Joint Venture the available Bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the works.~~
- ~~7. The Statement showing the value of existing commitments and ongoing works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in-charge not below the rank of Divisional Head or Executive Engineer.~~
- ~~8. A bidder is liable to be disqualified, even though he meets the qualifying criteria, if he, (i) Made misleading or false representations, statements and attachments submitted in proof of the qualification requirements, and/or
(ii) Record of poor performance such as abandoning the works, not properly completing the supply order, inordinate delays in completion or supply, litigation history with IDCO, or financial failures etc.
(iii) If the Tenderer deliberately gives wrong information/ submit fake, false, fabricated, forged documents in his offer. IDCO reserves the right to reject such offer/tender at any stage Or to cancel the contract if awarded and forfeit the Security Deposit and any other money due.~~
- ~~9. Escalation Factor: Following enhancement factors will be used for the cost of works executed and the financial figures to a common base value for works completed in India. Rate of inflation may be taken as 10% per year (escalation factor) which will have taken into account the completed as well as works in progress. (Applicant should indicate actual figures of costs and amounts for the works executed by them without accounting for the above mentioned factors).~~
- ~~10. In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will be applied. Instead, current market exchange rate (State Bank of India BC selling rate as on the last date of submission of the bid) will be applied for the purpose of conversion of amount in foreign currency into Indian Rupees. The information on Bid Capacity as on the date of this bid is to be furnished as per the format in Schedule-B.~~
- ~~11. Total value of work performed in the last five years are to be furnished for which certificate by Chartered Accountant is to be furnished for the F.Y.2018-2019,2019-2020,2020-2021,2021-2022 and 2022-2023~~

I. **Non submission of required information in Schedule- A, B, D, E & F, G, H, I shall be treated as non-responsive and the bid shall be summarily rejected.**

- **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, ½ of the whole of the work before ½ of the whole time allowed under the contract has elapsed, ¾ of the whole of the work before ¾ 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 **Chief General manager (P&C) / Divisional Head (Electrical)** on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the **Chief General manager (P&C) / Divisional Head (Electrical)** (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 for delay of work, delay to be completed 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 **Chief General manager (P&C) / Divisional Head (Electrical)**. 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 Chief General Manager & 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) Misbehaviour/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 entitles to payments generally as follows.

- i) 70% of the contract price shall be paid after supply of the materials .(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 to the Client).
- ii) 20% of the contract price shall be paid after installation, testing and commissioning with completion of entire work and inspection and clearance by the Statutory Authority and handing over to the Client.
- iii) Balance 10% of the contract price shall be paid after completion of Guarantee period or can be released against submission of equivalent amount of PBG.

2. Regulation of Local Authorities and Status:

- I. 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.
- II. 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.
- III. 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.
- IV. 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:

- I. 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 in all respect. Any defects noticed during this period arising out of defective materials or bad workmanship shall be rectified free of cost to the owner. 10% performance BG should be valid for 12 (twelve) months from the date of completion.

4. Other Conditions

- I. Before bidding, the bidder should be well aware of the site and quote accordingly and survey the site before bidding.
- II. Bidder will have to strictly adhere to the approved specifications whether mentioned or not, the agency should execute as per the norms, standard and specifications.
- III. The technical data sheet shall be submitted for approval from IDCO/DISCOM prior to placing order.

- IV. All all major electrical items/equipment shall be offered for Pre-Delivery Inspection before despatch. Officials from IDCO/ DISCOM 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.

- V. Electricity and water supply charges as required for construction activities should be taken care of by the successful bidder.
- VI. If any local/site/Row problem arises at site, while executing the work, same may be resolved by the successful bidder only.
- VII. In case, any point arises during quality inspection of the work by IDCO/ DISCOM representative, the bidder has to comply the same without any cost implication.
- VIII. All the specifications of equipment/item should conform to NEC or I.E. Rule or applicable relevant IS/IEC or Electrical Standard as followed in the Industry/DISCOM.
- IX. The cost of lodging, boarding and travelling expenses for conducting Pre-Delivery Inspection(PDI) at the manufacturer's premises for a minimum of two(02) inspecting officers deputed by the IDCO shall be borne by the contractor. All necessary arrangements shall be made by the contractor in advance, and no additional payment on this account shall be admissible.
- X. Valid Type Test Certificates, not older than five (5) years from the date of tender opening and issued by a recognized laboratory, shall be furnished in support of the offered equipment.
- XI. Routine Test Certificates shall be submitted for approval of the Engineer-in-Charge prior to dispatch of materials.
- XII. Factory Acceptance Test (FAT) shall be conducted at the manufacturer's works in the presence of the authorized representative of the department during PDI conforming the relevant IS/IEC applicable to the respective equipment/ device/items.
- XIII. **The Defect Liability Period (DLP)** for all equipment such as HT/LT cables, RMU, isolators, AB switches, and lightning arresters (LA) shall be 12 (Twelve) months from the date of completion/commissioning of the work.
- XIV. Manufacturer warranty certificate for all equipment shall be submitted at the time of supply.
- XV. **HT/LT Cable:** Any defect arising due to faulty laying, jointing, termination or workmanship shall be rectified by the contractor at his own cost.
- XVI. Earthing resistance shall be less than 1ohm and Earthing as per standard Norms.
- XVII. **ISD of 2 % of agreement** value shall be imposed on the contractor and the same shall be returned to the contractor after 2 months from the date of competition.
- XVIII. The provision of threshold negative bid cap (14.99%) stands abolished as per Works Department O.M. No. 173/W dated 03.01.2026 O.M.No.173/W dated 03.01.2026.
- XIX. Additional Performance Security shall be obtained from the selected bidder on an incremental basis for bids quoted below the estimated cost put to tender, which shall be calculated as the calculation mentioned in the Works Department O.M. No. 173/W dated 03.01.2026.
- XX. **Price Escalation:**

No price escalation shall be applicable for this work. The rates quoted by the bidder shall be firm and

fixed, and no claim on account of escalation in prices of materials, labour, POL, taxes, duties, or any other input shall be entertained.

XXI. EPF & ESI Compliance:

The contractor shall comply with all statutory provisions relating to Employees' Provident Fund (EPF) and Employees' State Insurance (ESI), wherever applicable. Proof of registration under EPF & ESI and regular deposit of contributions in respect of engaged workers shall be submitted as and when required by the Department.

XXII. Insurance of Workmen:

The contractor shall be solely responsible for the safety and insurance of all workmen engaged for the work. Necessary insurance coverage under the Workmen Compensation Act/Employees Compensation Act or any other applicable law shall be obtained at the contractor's cost, and valid insurance documents shall be maintained throughout the contract period.

XXIII. Third Party Liability Insurance:

The contractor shall obtain and maintain Third Party Liability Insurance at his own cost to cover any loss, damage, injury, or death caused to any third party arising out of execution of the work. The insurance policy shall remain valid for the entire contract period, and a copy of the policy shall be submitted to the Engineer-in-Charge prior to commencement of work.

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.
- p. Indian Boiler Act, 1923 and Rules and Regulations made their under.
- q. Indian Electricity Act, 1923 and Rules and Regulations made there under.
- r. Indian Factories Act, 1948 and Rules and Regulations made there under.
- s. The minimum wages Act.
- t. Women's Compensation Act.
- u. The Payment of Wages Act.
- v. The Fatal Accident Act.
- w. The Industrial Employment Act.
- x. The Employment Provident Fund Act.
- y. Indian Explosive Act 1984 the Rules and Regulations made there under.
- z. Indian Petroleum Act 1934, and Rules and Regulations made there under.
- aa. A.S.M.E. Test Codes.
- bb. AIRE Test, Codes.
- cc. American Society of Materials Testing Codes.
- dd. Standards of the Indian Standards Institution.
- ee. Indian Boiler Act, 1923 and Rules and Regulations made their under.
- ff. Indian Electricity Act, 1923 and Rules and Regulations made there under.
- gg. Indian Factories Act, 1948 and Rules and Regulations made there under.
- hh. The minimum wages Act.
- ii. Women's Compensation Act.

jj. The Payment of Wages Act.

kk. The Fatal Accident Act.

ll. The Industrial Employment Act.

mm.

he Employment Provident Fund Act.

nn. Indian Explosive Act 1984 the Rules and Regulations made there under.

oo. Indian Petroleum Act 1934, and Rules and Regulations made there under.

pp. A.S.M.E. Test Codes.

qq. AIRE Test, Codes.

rr. American Society of Materials Testing Codes.

ss. 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 ALARM 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

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
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	Code of practices for design.
	Part-I & II	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 car frame 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	:	Indranipatna, Cuttack

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 –

“Supply, Installation, Testing & Commissioning of 11kV dedicated feeder for providing power supply to Industries at Indranipatna Industrial Estate, Choudwar, Cuttack.”

Materials: -

All materials, fittings, appliances used in electrical installations shall confirm 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 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 Engineer-in-charge. The original money receipt of the purchase of materials will be verified by the supplier Engineer/ Project in Charge/ Executive Engineer, 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.

Bidders to execute the works as per approved technical Specifications/approved make and approved GTP of IDCO/TPCODL.

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 confirm 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 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

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
14. QUALITY CONTROL
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 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 in suspension 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-DipGalvanizedChannelHot-DipGalvanizedChannelHot-DipGalvanizedAngleHot-DipGalvanizedAngle
2	Relevant Standard	IS: 2062, IS:2633, IS: 2629,IS: 4759IS: 2062, IS:2633, IS:2629,IS: 4759IS: 2062, IS:2633, IS:2629, IS: 4759IS: 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 ZincCoating	705 gm/m2 705 gm/m2 705 gm/m2 705 gm/m2
10	Zinc Coating Thickness & No ofDips	100 Micron (6Dip)100 Micron (6Dip)100 Micron (6Dip)100 Micron (6Dip)
11	Chemicalcompositi on	Grade: E 250 A(As per IS: 2062)Grade: E 250 A (As per IS: 2062)Grade: E 250A (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 theequivalent 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

52

d) 50x50x6 mm:-4.5kg/m

5.1CHEMICAL 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 IS 2629.

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.

53

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 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.

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 GI NUT AND BOLT

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**
- 14. QUALITY CONTROL**
- 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 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

58

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 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	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 & IDCO. 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 & IDCO at all times when the work is in progress. Inspection by the CONCERNED DISCOMS & IDCO 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 & IDCO.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by CONCERNED DISCOMS & IDCO.
- 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 site 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 Annexure "A" Guaranteed Technical Particulars & Annexure "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.

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS
19. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS
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 direction of An intensity in horizontal	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

74

3	Standard Specification to which the material shall confirm	As per IS: 5300
4	ELECTRICAL CHARACTERISTICS	
(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	DIMENSIONS	
(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.

5.GENERAL CONSTRUCTION:

- The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
- 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.
- 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.
- 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.

MARKING: Following distinct non-erasable embossing is to be made on each Insulator to be supplied to

TPCODL under this Tender.

- "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

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 CONCERNED DISCOMS & IDCO

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 CONCERNED DISCOMS & IDCO.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by CONCERNED DISCOMS & IDCO.
- 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 site 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 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.

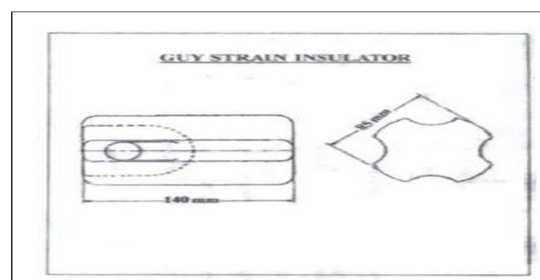
17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

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

- 77** a) Completely filled in Schedule "A" Guaranteed Technical Particulars.
- b) Work Experience details
- a) c) Type test certificates.
- b) Drawing(3sets)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 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
14. QUALITY CONTROL
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
	Earthquakes of an intensity in vertical	Equivalent to seismic acceleration of 0.15g (g

10	direction	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 ²	320 N/mm ²	320 N/mm ²
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

- a) TPCODL
- b) Manufacture's name or trademark
- c) PO No.
- 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) 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 DISCOM /IDCO representatives at all times when the work is in progress. Inspection by the DISCOM / IDCO 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 DISCOM & IDCO.

Following documents shall be sent along with material.

a) Test reports

MDCC issued by DISCOM & IDCO.

b) DISCOM Invoice in duplicate

c) Packing list

d) Drawings & catalogue

e) Guarantee / Warrantee card

f) Delivery Challan

g) Other Documents (as applicable)

10. INSPECTION AFTER RECEIPT AT STORE:

The material received at site 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.

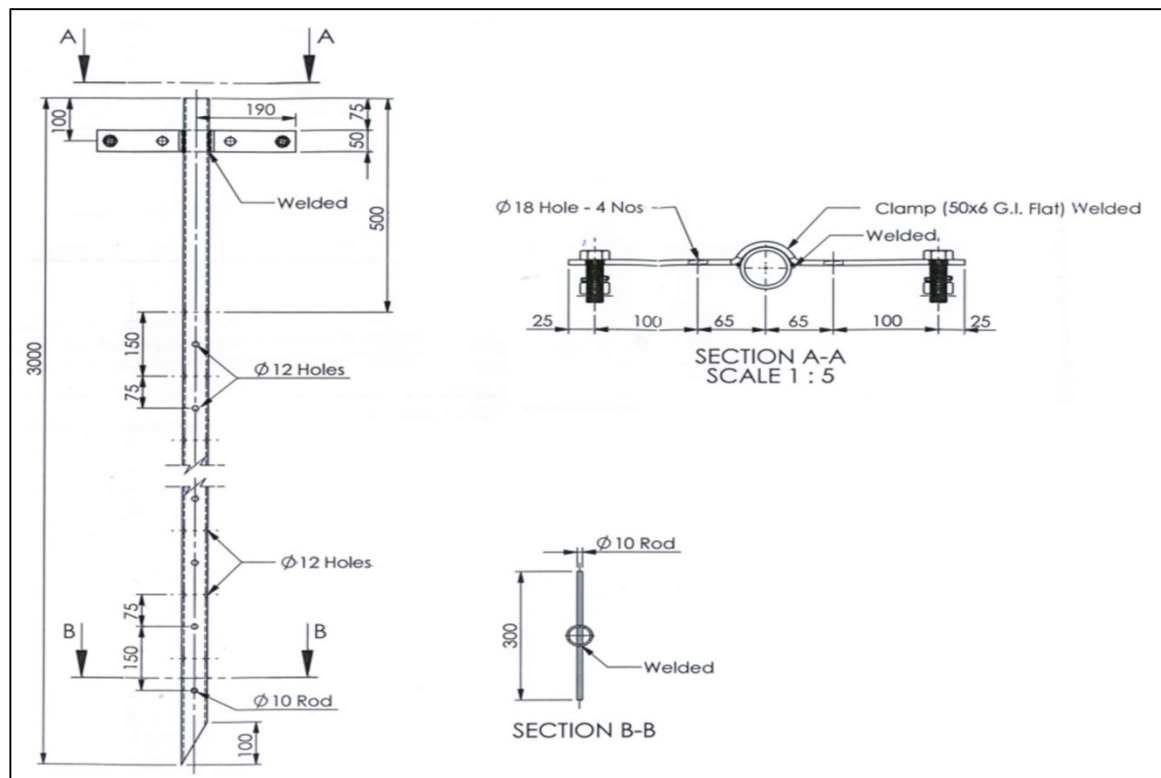
17. SPARES, ACCESSORIES AND TOOLS

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 bout



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
8. TYPE TEST CERTIFICATES
9. PRE-DISPATCH INSPECTION
10. INSPECTION AFTER RECEIPT AT STORES
11. GUARANTEE
12. PACKING
13. TENDER SAMPLE
14. QUALITY CONTROL
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 WPB pole, 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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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 (Billet with re rolling not allowed)
3	Weight in kg/m with $\pm 2.5\%$ Tolerance	30.44
4	Sectional Area (cm ²)	38.8
5	Flange slope in deg	90
6	Cutting length tolerance	100 (no negative tolerance)
7	Depth(D) of Section (mm) with ± 3.0 mm Tolerance	152
8	Width(B) of Flange (mm) with ± 0.7 mm Tolerance	160
9	Thickness of Flange (Tf) (mm) with ± 1.5 mm Tolerance	9

10	Thickness of Web (Tw) (mm) with ± 0.7 mm Tolerance	6
11	Corner Radius of fillet or root (R1) (mm)	15
12	Moment of Inertia	
a	Ixx (cm ⁴)	1673
b	Iyy (cm ⁴)	615.6
13	Radius of Gyration (cm)	
a	Rxx	6.57
b	Ryy	3.98
14	Modulus of Section Zxx (cm ³)	
a	Zyy (cm ³)	220.1
b	Zxx (cm ³)	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	Mechanical Properties	
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	Chemical properties	
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 Base plate 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.
- 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.
- 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 DISCOM representatives/IDCO at all times when the work is in progress. Inspection by the DISCOM /IDCO 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 DISCOM & IDCO.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by DISCOM/IDCO
- c) DISCOM 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 site 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 "Securitycum 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 11 kV XLPE ARMoured CABLE

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
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 armouring 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	Colours 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.

CLIMATIC 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.

3. 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 Aluminium (compacted circular)	
6	Conductor screen	Semi conducting tape and screen	
7	Insulation	XLPE	
8		Shall have three layers:	Shall have three layers:

9	Insulation screen	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

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.	

4. 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 ²	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	0.32	0.25	0.206	0.164	0.1	0.08	0.047	0.03

	deg C (Ohm/km)								
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	a) Non-conductive water swellable yarn/ tape/ combination of both shall be provided in between interstices of the conductor. 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. c) It shall not affect the electrical conductivity of the conductor.
11	Cleanliness and uniformity	a) Before stranding, the cross-section of the Aluminium conductor shall be circular, and shall have uniform smooth surface, free from sharp edges and free from any defects. b) Stranded Conductor shall be free from oil traces & aluminum dust. Conductor (after stranding) shall be super cleaned c) Traces of aluminum dust on conductor or conductor screen shall not be acceptable.
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	1st layer: Semi-conducting tape 2nd layer: Semi-conducting compound
2	Configuration	1st layer: Semi-conducting tape shall be applied over conductor with nominal thickness of 0.2 mm. 2nd layer: Semi-conducting compound screen shall be applied through triple extrusion process.
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 Ω -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) XLPE compound shall be super cleaned and procured from reputed raw material suppliers viz. Dow/Borealis/Hanwa/ Equivalent (in-line with TS) 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/convolution/ 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) 1st layer: Semi-conducting compound b) 2nd layer: Semi-conducting water swellable tape c) 3rd layer: Annealed copper tape

2	Configuration	a) 1st layer: Non-Metallic Part: Extruded Insulation semiconducting screen shall be bonded type. Resistivity shall not exceed 500 Ω-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) 2nd layer: Water Swellable tape: 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%. Core identification strip: <u>3 CORE CABLE:</u> - Each of the three core identification strips shall
---	---------------	--

S. No.	Parameter	Requirement
		be applied longitudinally beneath copper screen. Width of the colored strip shall be 7-10 mm. R, Y, B. <u>1 CORE CABLE: - NA</u> c) 3rd layer: Metallic Part: 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.
3	Raw material supplier	Semiconducting compound shall be procured from reputed raw material suppliers viz., Dow/Borealis/Hanwa / Equivalent (in-line with 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	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.	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.

Armour:

S. No.	Parameter	Requirement
1	Material	Polyvinyl chloride (PVC) ST-2 FRLSH type compound with ‘ lead naphthenate ’ additive
2	Configuration	Polyvinyl chloride (PVC) ST-2 FRLSH type compound with ‘ lead naphthenate ’ additive as ‘termite & rodent repellent’ applied by extrusion process.
3	Min. Thickness at any point of measurement	3 CORE CABLE
		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
		1 CORE CABLE
		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	PVC compound shall be procured from reputed raw material suppliers viz., Shakun, Kalpana, KLJ, DCM ShriRam. Equivalent(in-line with TS) 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	HDPE shall be procured from reputed raw material suppliers viz., Shakun, Kalpana, KLJ, SCJ Plastics, and Borealis, 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

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:

- Manufacturer's name
- Type of Cable
- Size of Cable
- Voltage Grade
- 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& IDCO
- 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, TOCODL/ TPCODL/ 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 DISCOM/IDCO. 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 DISCOM/IDCO representatives at all times when the work is in progress. Inspection by the DISCOM/IDCO 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 DISCOM/IDCO. Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by DISCOM/IDCO.
- c) DISCOM/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 site 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.

SPARES, ACCESSORIES AND TOOLS

17

Not applicable.

DRAWINGS AND DOCUMENTS:

18

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

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING FACILITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS

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:

Sl.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/TPCODL/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:

Sl.No	TECHNICAL REQUIREMENTS	200MM	160MM	125MM	110MM	75MM
1.	Nominal size or Outside diameter (mm)	200MM	160MM	125MM	110MM	75MM
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 ⁰ 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 ²	Max. 10 Mg/dm ²	Max. 10 Mg/dm ²	Max. 10 Mg/dm ²	Max.10 Mg/dm ²
16	Reversion	<= 3%	<= 3%	<= 3%	<= 3%	<= 3%
17	Hydraulic Characteristics	No sign of localizes swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localizes swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localizes swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localizes swelling, leakage or weeping (at 80°C for 48 hrs. (acceptance test) & 165 hrs.(type test))	No sign of localizes 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 Clause:6 (Marking) 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/m³.
- 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/TPCODL/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/TPCODL/TPSODL representative.

7.1 ACCEPTANCE TESTS

The following tests shall be conducted in presence of TPCODL/TPNODL/TPCODL/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/TPCODL/TPSODL.

9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the DISCOM/IDCO.. 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

by the DISCOM/IDCO. 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 DISCOM/IDCO. Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by DISCOM/IDCO.
- c) DISCOM/IDCO.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 site 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 Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and replace/rectify such 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 11 KV POLYMERIC PIN INSULATOR

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**
- 14. QUALITY CONTROL**
- 15. TESTING FACILITIES**
- 16. MANUFACTURING ACTIVITIES**
- 17. SPARES, ACCESSORIES AND TOOLS**
- 18. DRAWINGS AND DOCUMENTS**

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 11kV 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 1000 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
IS8263/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
STRIGuide1.92/1	Hydrophobicity Classification Guide
ASTMD578-05	Standard specification for glass fiber strands

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50deg C
2	Max. Daily average ambient temp	35deg C
3	Min Ambient Temperature	0deg 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	300Km/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)
----	---	---

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, 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 onlines 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 3Phase,50Hz 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 to 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: $\pm(0.04d+1.5)$ mmwhend ≤ 300 mm

$\pm(0.025d+6)$ mmwhend >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 best and 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	IEC61109
3	Material of FRP Rod	Borron free ECR
86		
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	70KV
11	Wet Power Frequency Withstand voltage	35 KV
12	Dry Lightning Impulse withstand voltage	Positive:75 KV Negative:75KV
13	Dry Lightning Impulse Flash over voltage	Positive:95 KV Negative:95KV
14	RIV at 1MHz when energized at 10KV/30KV (rms) under dry condition	<50 microvolt
15	Creepage distance(min)	320mm
16	Min Failing load/SCL(Specified cantilever Load)	5 KN
17	Dia of FRP Rod	24mm
18	Length of FRP Rod(min)	200mm
19	Dia of weather sheds	≥90 mm
20	Thickness of housing	3 mm
21	Dry arc distance(min)	165mm
22	Method of fixing sheds to housing	Injection moulding
23	Visible Discharge Voltage	9kV
24	Type of sheds	Aerodynamic
25	Dia of bottom end fitting	20 mm
26	Thread length of bottom end fitting	150mm (Min)

5. GENERAL CONSTRUCTIONS:

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

)α(Core-the internal insulating part)β(Housing-the external insulating part)χ(Metal end fittings.

5.1 CORE

It shall be a glass-fibre reinforce depoxy 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 heath 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 IEC60815 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 areas shall be free from voids.

5.3 WEATHER SHEDS

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 3Mpa 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 IS2629. 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 IS1363 (P-III) and spring washer shall be as per IS3063 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 & Trademark of the manufacturer
- b) Voltage Grade
- c) Year of manufacture
- 88**
- d) Minimum failing load in KN
- e) "TPSODL "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 Galvanizing Test

v)

--

- 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 TPSODL.

9. PREDISPATCHINSPECTION:

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

Following documents shall be sent along with material:

- a) Test reports
- b) MDCC issued by TPSODL
- c) Invoice induplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee/Warranty card

- g) Delivery Challan
- h) Other Documents (as applicable).

10. INSPECTION AFTER RECEIPT AT STORES:

The material received at 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 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 time frame, and to the entire satisfaction of the Company, failing which the Company will bear 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.

92

TECHNICAL SPECIFICATION FOR GI EARTHING COIL GENERAL TECHNICAL PARTICULARS

SL. NO.	TECHNICAL PARTICULAR	DESIRED VALUE
1	Manufacturer	To be Specified by Bidder

2	Materials of Earthing coil	G.I Wire
3	DIMENSIONS	
A	Wire Diameter	8SWG(4mm)
B	Outside Dia of Coil	50mm
C	Length of Coil	450mm
D	Free Length of G.I wire of earthing coil	2500mm
4	No of Turns of coil	115turns
5	Surface Finish	Galvanised
6	Complete weight of Earthing Set (in Kgs)	1.7Kg.(Approx.)
7	General Tolerance in Dimensions & Weight	+/-5%
8	Reference Standard	IS:2633,IS:2629,TPCO-OTH-010.

TECHNICAL SPECIFICATION FOR HT STAY (GUY) INSULATOR.

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS
19. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS
20. SCHEDULE "B" DEVIATIONS

2. 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.

3. 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:

RefIS	Description
IS5300	Porcelain Guy Strain Insulators

4. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 degC
2	Max. Daily average ambient temp	35 degC
3	Min Ambient Temperature	0 degC
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	300Km/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 (being acceleration due to gravity)

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

5. 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	ELECTRICAL CHARACTERISTICS	
(a)	Dry one minute power frequency Flashover voltage	32kV

(b)	Wet one minute power frequency Flash over voltage	15kV
(c)	Wet one minute power frequency Withstand voltage	27kV
(d)	Wet one minute power frequency Withstand voltage	13kV
5	Minimum Failing Load	88KN
6	Power Frequency Punctured withstand voltage	1.3timesofActualDryFlashover Voltage
7	DIMENSIONS	
(a)	Length	140mm
(b)	Width	85mm
(c)	Cable Hole Dia	25mm
8	Creepage Distance	57mm
9	Type of Glaze	Brown/DarkBrown
10	Weight per piece	1.1Kgapprox.

6. GENERAL CONSTRUCTION:

- The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
- The design of the insulators shall be such tha the stresses due to expansion and contraction in any part of the insulator shall not lead to its deterioration.
- The glaze shall be brown in color for insulators. The glaze shall cover the entire porcelain surface parts except those are as that serve as supports during firing.
- 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

7. MARKING:

- Following distinct non-erasable embossing is to be made on each insulator to be supplied to TPCODL under this Tender.
- "TPCODL"
- Failing Load in KN
- Manufacturer Name/Trade Mark
- Year of manufacturing

8. TESTS:

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

7.1 ACCEPTANCETESTS

- Verification of Dimensions.
- Temperature cycle test
- Mechanical strength test
- 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

9. 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., if any test report is found to be unacceptable, the same shall be carried out without any cost implication to TPCODL

10. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of TPCODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser. If the equipment is found unsatisfactory with regard to workmanship or material, the same shall be liable for rejection.

The bidder shall grant free access to the places of manufacture to TPCODL's representatives at all times while the work is in progress. Inspection by TPCODL or its authorized representatives shall not relieve the bidder of the obligation to furnish equipment in accordance with the specifications.

The material shall be dispatched only after a specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL.

The 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/Warranty card
- g) Delivery Challan
- h) Other Documents (as applicable).

11. 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.

12. GUARANTEE:

- 13.** 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 time frame, 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.

14. PACKING:

Supplier shall ensure that all material covered by this specifications 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.

15. TENDERSAMPLE:

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

16. QUALITYCONTROL:

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.

17. TESTINGFACILITIES:

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

18. MANUFACTURINGFACILITIES:

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

19. SPARES,ACCESSORIESANDTOOLS

Not applicable.

20. DRAWINGSANDDOCUMENTS:

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.

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
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
IS4759	Hot Dip Galvanizing For Fabrication
IS1852	Tolerance For Raw Material
IS2062	Manufactured from raw material as per IS 2062 grade E-250quality'A'

3. CLIMATICCONDITIONSOFTHEINSTALLATION:

1	Maximum ambient temperature	50degC
2	Max. Daily average ambient temp	35degC
3	Min Ambient Temperature	0degC
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	300Km/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 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	Anchor Rod(20mmDia):1No.	
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 IS1387(1967) and IS1363(1967)	20mm Sq. Washer 50X50X8mm
5	Anchor Plate: 1 No.	
a)	Size of the MS Anchor plate	300x300x8mm
b)	Dia of the hole made at the centre of the plate	22mm
6.(A)	Turn Buckle	
(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)	Bow with welded angle	
(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	10R
(iv)	Length and size of the GI Angle welded at the order end of the bow	200mm & 100x50x4.8mm Channel
(v)	Number of holes made in the GI Channel/ angle	3
(vi)	Dia of the holes	22mm (3 Nos.)
7	Thimble: 1 No.	
a)	Thickness of the MS Sheet used for thimble	1.5mm
b)	Size of thimble	75x22x40mm
8	Minimum strength of the welding provides on various components of Guy/Stay Sets (IS:823/1964)	4900Kg.
9	Average weight of finished stay set	14.523kg(min)/15.569kg(Max)
10	Surface Finish of stay set	Hot Dip Galvanised

11	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 RCCBASEPLATE

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 EYEBOLT

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 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.

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. TENDERSAMPLE:

Not Applicable

14. QUALITYCONTROL:

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 carryout 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. MANUFACTURINGFACILITIES:

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),7/10GI STAY WIRE(11kV)AND 7/12 GI STAY WIRE(LT)

Sl. No	TECHNICAL PARTICULARS	DESIREDVALUE		
		7/8 SWG	7/10 SWG	7/12SWG
1	Nominal Diameter	4.00mm	3.15mm	2.5mm
2	Sectional Area in sq.mm	87.92(for stranded wire)	54.52(for stranded wire)	34.35(for stranded wire)
3	Tolerance in diameter	+0.06mmto-0.03mm	+0.06mmto-0.03mm	+0.06mmto-0.03mm
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)(After stranding)	260	240	240
9	No of dips the coating is able to withstand at 18±2°C	2x1Min,1x1/2Min	2x1Min,1x1/2Min	2x1Min,1x1/2Min
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	4x Nominal 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	Chemical composition of the MS Wire used shall not exceed			
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 Trademark, ISI Mark		
		Coil no, Size, TPCODL-marking		

		Mass of coil, Length, Manufacturing month & year
--	--	--

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. TENDERS SAMPLE
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS
19. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS

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 interchange ability 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
IS2486(Part1) IS2486(Part2) IS2486(Part3)	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 1000 V. (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.
IS209	Specification of Zinc
IS6639,BS:916	Specification for Hexagonal bolts and nuts

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

	Maximum ambient temperature	50degC
	Max. Daily average ambient temp	35degC
	Min Ambient Temperature	0degC

	Maximum Humidity	95%
	Average Annual Rainfall	150cm
	Average No. of rainy days per annum	120
	Altitude above MSL not exceeding	1000m
	Wind Pressure	300Km/hr
	Earthquakes of an intensity in horizontal Direction	Equivalent to Seismic Acceleration of 0.3g
	Earthquakes of 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:

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 Zn99.95 as per IS 209.

SL.NO.	TECHNICAL PARTICULARS	DESIRED VALUE		
1	Type	B&S type		
2	Ultimate Strength	70KN (3 Bolted)	90KN (4 Bolted)	120KN (4 Bolted)
3	Suitable for conductor Size	AAAC-80Sq mm, 100Sqmm	AAAC-148Sq Mm	AAAC-232Sq 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	IS209	IS209	IS209
m)	Size of U Bolt	M16	M16	M16
7	Galvanizing	IS2633,IS 2629	IS2633,IS 2629	IS2633,IS 2629

5. GENERALCONSTRUCTIONS:

Fittings for Strain Insulators with clamp

- 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.
- 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.
- 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 30 mm.
- 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).
- 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.
- 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.

i) 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.

ii) 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.

iii) 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/m². 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. PREDISPATCHINSPECTION:

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 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. 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 specifications 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 schedules shall be furnished. The Purchaser's engineer or its nominated representatives 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

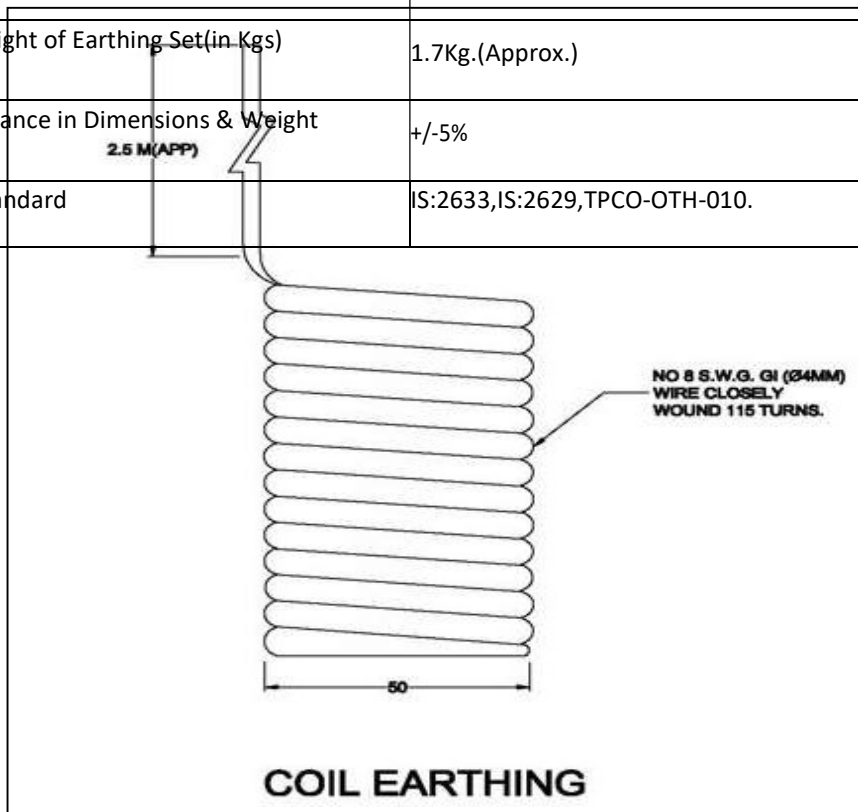
c) Type test certificates.

SL.NO.	TECHNICAL PARTICULAR	DESIRED VALUE
1	Manufacturer	To be Specified by Bidder
2	Materials of Earthing coil	G.I Wire
3	DIMENSIONS	
A	Wire Diameter	8SWG(4mm)
B	Outside Dia of Coil	50mm
C	Length of Coil	450mm
D	Free Length of G.I wire of earthing coil	2500mm
4	No of Turns of coil	115turns
5	Surface Finish	Galvanised
6	Complete weight of Earthing Set(in Kgs)	1.7Kg.(Approx.)
7	General Tolerance in Dimensions & Weight	+/-5%
8	Reference Standard	IS:2633,IS:2629,TPCO-OTH-010.

DRAWINGS

Note:-All Dimensions are in mm unless noted otherwise specified.

Technical



Specification for AAAC Cover Conductor

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**
- 14. QUALITY CONTROL**
- 15. TESTING FACILITIES**
- 16. MANUFACTURING ACTIVITIES**
- 17. SPARES, ACCESSORIES AND TOOLS**
- 18. DRAWINGS AND DOCUMENTS**
- 19. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS**
- 20. SCHEDULE "B" DEVIATIONS**

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 XLPE Cover Conductors(100Sq.mm) 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 the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Ref. IS	Description
IS398:1996(Part IV)	Specification for aluminium conductors for overhead distribution purpose
EN50397-1:2006	Covered Conductor Specification for voltage 1KV to 33KV
IS:10418	Reel and drums for bare conductors

3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50degC
2	Max. Daily average ambient temp	35degC

3	Min Ambient Temperature	0degC
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL note xceeding	1000m
8	Wind Pressure	300Km/hr
9	Earthquake so fan intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g
10	Earthquake so fan 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 300Kmph.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 XLPE covere donductor shall comply in all respect with IS:398(Part.4)/1996 with latest amendment, if any from the date of its applicability:

Sl. No.	Technical Parameters	Desired Values				
1	Name of the manufacturer	To be furnished by Bidder				
2	Applicable Standard	EN50397-1:2006,IS398-IV/1994				
3	Type of Conductor	AAAC XLPE Covered Conductor				
4	Rated Voltage/Operating voltage	12kV/11kV				
5	Nominal Cross-sectional area of conductor	55	80	100	148	232
6	Conductor					
a)	Material	Aluminium Alloy(AAAC)				
b)	Shape	Stranded Circular and Water tight				
c)	No/diameter of wire(before stranding)	7x3.15	7x3.81	7x4.26	19x3.15	19x3.94
d)	Approx. conductor diameter	9.45 mm	11.43 mm	12.78 mm	15.75mm	19.70mm

e)	Max.D.C.Resistanceat20°C	0.621 Ω/Km	0.425 Ω/Km	0.339 Ω/Km	0.229 Ω/Km	0.1471 Ω/Km
f)	Resistance Temperature co-efficient	0.004/ °C	0.004/ °C	0.004/°C	0.004/ °C	0.0004 /°C
g)	Minimum Tensile strength of conductor	16.03kN	23.41kN	29.26kN	43.50kN	68.05kN
7	Thickness and dimensions					
7.1	Conductor Screen					
a)	Material	Extruded Semi-Conducting Compound				
b)	Nominal Thickness	0.3mm	0.3mm	0.3mm	0.3mm	0.3mm
7.2	Insulation inner layer					
a)	Material	Extruded XLPE				
b)	Nominal thickness	1.2mm	1.2mm	1.2mm	1.2mm	1.2mm
7.3	Insulation Outer layer					
a)	Material	Track Resistance, UV Resistant and Erosion Resistance XLPE (Black)				
b)	Nominal thickness	1.1mm	1.1mm	1.1mm	1.1mm	1.1mm
8	Lightening Impulse withstand strength of XLPE Layer	75kV	75kV	75kV	75kV	75kV
9	Approx. Overall Diameter	15mm	16mm	18mm	21mm	25mm
10	Maximum continuous operating temperature	90°C	90°C	90°C	90°C	90°C
11	Max short circuit current,1sec(KA)	5.17kA	7.52kA	9.4kA	13.912kA	21.808kA
12	Approx. Weight	To be provided by bidder				
13	Standard Packing length	1000(+/-5%)as per PO terms				
14	Make of Raw Material	Conductor raw material shall be procured from reputed suppliers viz., BALCO/HINDALCO/NALCO/ Vedanta				

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. The minimum breaking load is calculated on nominal diameter at ultimate tensile strength of 0.309 KN/mm² for wire before stranding and 95% of the ultimate tensile strength after stranding.

5. GENERALCONSTRUCTION:

The conductors shall be constructed as per IS 398 (Part IV). The steel strands shall be uniformly grease coated as anti-corrosive agent in Dog, Coyote, Panther conductors. Neutral Lithium based Grease shall comply to IS 7623.

Lay Ratios for Aluminium Alloy Stranded Conductors

Actual Area	Stranding & wiredia.	Approx. overall dia.	Approx. mass	Calculated resistance at 20 d.c. (max.)	Approx. calculated Breaking Load	Reactance per km	Current Rating
mm.sq.	mm	mm	Kg/km	Ohm/km	kN	Ohms	Amps
55	7/3.15	9.45	149.20	0.621	16.03	0.3556	234
80	7/3.81	11.43	218.26	0.425	23.41	0.3394	270
100	7/4.26	12.78	272.86	0.339	29.26	0.3394	325

Diameter		Cross sectional area of Nominal Diameter	Mass	Minimum Breaking Load after stranding	Resistance at 20deg.c
Nom	Max				
mm	mm	Sq.mm	Kg	kN	Ohm/kM
3.15	3.18	7.793	21.04	2.29	4.290
3.81	3.85	11.40	30.78	3.34	2.938
4.26	4.30	14.25	38.48	4.18	2.345

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 of the conductor.

6. MARKING:

7. Each drum shall have the following information stenciled on it in indelible ink along with other essential data:

- a) Contract/Award letter number
- b) Name and address of consignee.
- c) Manufacturer's name and address.
- d) Drum 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 outermost layer.
- j) Gross weight of the drum after putting lagging.
- k) Average weight of the drum without lagging.
- l) ISI mark.
- m) Manufacturer Name/Trade Mark.
- n) "TPCODL".
- o) P.O. No. and Date.

8. TESTS:

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

8.1 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

8.2 ROUTINE TESTS

- i) Check for Joints
- ii) Surface Condition of the stranded conductor
- iii) All acceptance test
- iv) Check the drum

8.3 TYPE TESTS

Type Test of Finished Conductor

- i) UTS test on stranded conductor Mechanical Properties
- ii) DC resistance test on stranded conductor

9. 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 TPCODL.

10. 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/Warranty card
- g) Delivery Challan
- h) Other Documents(as applicable).

11. 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.

12. GUARANTEE:

- 13.** The 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 18 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), the bidder shall be liable to undertake to replace/rectify such defects at its own costs, within a 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 the 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. The 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.

14. 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 the conductors is 2000 Mtrs. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

15. TENDER SAMPLE:

Required

16. 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.

17. TESTING FACILITIES:

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

18. 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.

19. SPARES, ACCESSORIES AND TOOLS

Not applicable.

20. 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 11KV LIGHTENING ARRESTER(10KA)

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING FACILITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS

1. SCOPE:

This specification covers the design, manufacture, testing and supply of 12 kV, 10 kA, 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 and 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& IS15086	• Specification for Metal Oxide Gapless Lightning Arresters for alternating current System.
IS 6209	• Method of Partial Discharge Measurement.
IS 8704& IS731	• Guide for selection of creepage distance of polymeric housing insulator.
ISO48	• Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD).
IEC60721-3-2	• 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.
IS2629	• Recommended Practice for Hot-Dip Galvanizing of Iron and Steel.
IS2633	• 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 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 PARTICULARS (Class-SL, Class-II)	DESIRED VALUE
1	Installation	Outdoor
2	Reference standards (Latest Amend.)	IS3070, IEC 61109, IEC60099
3	Arrester Type and Housing	Metal Oxide Gapless Cage type with Polymeric housing
4	Normal System Voltage	11kV
5	Highest System Voltage	12kv
6	Rated Frequency	50Hz
7	Maximum Continuous Operating Voltage (M.C.O.V)	9.6 kV(rms)
8	Arrester Rating	12 kV(rms)
9	Discharge Current	
a	Nominal Discharge Current	10 kA
b	Switching impulse discharge current	0.5kA
10	Short Circuit rating	25kA

11	Voltage Withstand on Arrester Housing	
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 10 kA)	49 kV
13	Long Duration Current	
a	Peak Current	75A
b	Virtual duration of Peak T	1000T(MicroSec)
14	High Current impulse Operating Duty	65kA(Peak)
15	Creepage Distance of Arrester Housing	31mm/kV(min)or380mm (min)
16	Partial Discharge at 1.05 times M.C.O.V	<10pc
17	Energy Absorption Capacity (kJ/kV)	>=4KJ/KV
18	Repetitive charge transfer withstand (Coulombs), Qrs	>=1.0
19	Temporary over voltage (TOV)	
a	• 1 sec	15kVp
b	• 10 sec	14kVp
20	Maximum Lightning Impulse Residual Voltage with 8/20 microsecond wave	
a	• at 5 kA	35kVp
b	• at 10 kA	38kVp
c	• at 20 kA	--
21	Maximum switching current impulse residual voltage in kVp at 500 A	21kVp
22	Max. Cantilever Strength	12Kg-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	Disconnecter(optional)	
a	Disconnecter connecting lead	Insulated flexible tinned plated copper braid with lugs
b	Size of Insulated Tinned copper braid	25sq.mm
c	Length of Insulated Tinned copper braid	300 mm
31	Insulating Terminal Cap	Polyolefin
32	Material of Nuts and bolts	Stainless Steel

5. GENERALCONSTRUCTION:

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 arrestor assembly shall be hermitically sealed, leak tested and protected against ingress of moisture and shall be individually demountable. The seal shall be properly designed and tested for operation under extreme weather conditions.

Assembly:

Lighting arrestor shall be supplied along with the insulating base/mounting bracket, terminal connector, insulating terminal cap (Polyolefin) and necessary hardware. 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 12 kV, 10 kA 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 metal oxide 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 anti-contamination 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, capacitor 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.

5.1 EARTHING TERMINALS:

Earth Terminals shall be provided with Lightning arrester.

5.2 MECHANICAL STRENGTH:

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

5.3 DISCONNECTORS (OPTIONAL):

- a) Each individual unit of Lightning Arrester with disconnector shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire lifetime of the Lightning Arrester with disconnector under the specified service conditions. Disconnectors shall give the visible indication of the failed arrester. The Lightning Arrester with disconnector shall be suitable for bracket type mounting. Disconnector shall be suitable for screwing directly to LA with terminal of M10.
- b) The corresponding units of Lightning Arrester with disconnector 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 Arrester with disconnector and accessories and mounting on purchaser's support structure shall be included in the bidder's scope of supply. The mounting details for mounting the Lightning Arrester with disconnector on purchaser's support shall be given along with the bid.

5.4 MOUNTING BRACKET:

- a) The 12 kV, 10 kA Distribution class Lightning Arrester shall be fixed over a mounting bracket made of UV resistance, fire retardant DMC material.
- b) The 12 kV, 10 kA 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 metal. 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) Year/Month of Manufacture

j)Serial Number.

k)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: -

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.

7.1 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 discharges shall not exceed 10 pC.
- d) Satisfactory absence from partial discharges and contact noises 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..

7.2 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).

7.3 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, the 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/Warranty 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 the 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, the supplier shall be liable to undertake to replace/rectify such defects at his own costs, within a 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 the 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 the 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 the rain shed does not get deformed during transportation and storage.

13. TENDERSAMPLE:

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. TESTINGFACILITIES:

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

16. MANUFACTURINGFACILITIES:

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 RC line 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.

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 soft copies 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 HEAT SHRINKABLE STRAIGHT THROUGH JOINT &
TERMINATION FOR 11 KV POWER CABLE**
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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING FACILITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS
19. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS
20. SCHEDULE "B" DEVIATIONS

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.

Sl.No.	IEC/IS	Description
1	IS-13573(part2):2011	Test requirements-Cable accessories for extruded power cables (for working voltages 3.3kV and upto including 33kV)
2	IS 7098(part2):2011	Cross-linked polyethylene insulated thermoplastic sheathed cables (for working voltages from 3.3kV upto and including 33 kV)
3	IS692:1994	Paper insulated lead sheathed cables for rated voltages up to and including 33 kV
4	IEC60502:2009	Power cables with extruded insulation and their accessories for rated voltages from 1kV upto 30 kV
5	ASTMD-2303	Standard Test Methods for Liquid Contaminant, Inclined-plane tracking and Erosion of insulating materials
6	ASTMD-2671	Standard Test Methods for Heat Shrinkable Tubing
7	ENATS09-13:1981	High Voltage Heat Shrinkable Components for use with HV solid type cables upto and including 33 kV
8	IEC61238(part1):2003	Test methods and requirements-Compression and mechanical connectors for power cables for rated voltages up to 30 kV
9	IS8308:2003	Compression type tubular in-line connectors for Aluminium conductors of insulated cables
10	IS8309:2003	Compression type tubular terminal ends for Aluminium conductors of insulated cables
11	IS2633:1986	Method for testing of uniformity of zinc coating
12	IS4826:1979	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	IEC60216part2	Determination of thermal endurance properties of electrical insulating materials
17	IEC60216part8	Instructions for calculating thermal endurance characteristics using simplified procedures

3. CLIMATIC CONDITIONS:

1	Maximum ambient temperature	50deg C
2	Max.Daily average ambient temp	35deg C
3	Min Ambient Temperature	0deg 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	300Km/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)

TPSODL service area has heavy saline condition along the coast and High cyclonic Intensity winds with speed upto 300Kmph.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. 11kV XLPE Insulated Underground Cables as per IS7098-2:11kV('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) 3CX70sq.mm.A2XCWY/A2XFY
 - ii) 3CX95sq.mm.A2XCWY/A2XFY
 - iii) 3CX120sq.mm.A2XCWY/A2XFY
 - iv) 3CX150sq.mm.A2XCWY/A2XFY
 - v) 3CX185sq.mm.A2XCWY/A2XFY
 - vi) 3CX240sq.mm.A2XCWY/A2XFY
 - vii) 3CX300sq.mm.A2XCWY/A2XFY
 - viii) 3CX400sq.mm.A2XCWY/A2XFY
 - ix) 1CX400sq.mm.A2XCWaY
 - x) 1CX630sq.mm.A2XCWaY
 - xi) 1CX1000sq.mm.A2XCWaY

xii) HTAB-55/95/150sq.mm.-StraightThroughJointing/OutdoorJointing

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

- a) A2XCY-(Aluminium stranded compacted conductor,XLPE insulation,copper tape screen,PVCsheath)
- b) A2XC2Y-(Aluminium stranded compacted conductor,XLPE insulation,copper tape screen,HDPE sheath)
- c) A2XWaY-(Aluminium stranded compacted conductor,XLPE insulation,Aluminium wire screen,PVCsheath)
 - 3CX95sq.mm.A2XCY/A2XC2Y/A2XWaY
 - 3CX150sq.mm.A2XCY/A2XC2Y/A2XWaY
 - 1CX55sq.mm.A2XCY/A2XC2Y/A2XWaY
 - 1CX95sq.mm.A2XCY/A2XC2Y/A2XWaY
 - 1CX150sq.mm.A2XCY/A2XC2Y/A2XWaY

X. PILCAInsulatedCablesasperIS692:11kV,('E)BeltedAPLST

(Alstrandedsectorshaped,paperinsulated,leadsheath,steeltapesheath).

- i) 3CX150sq.mm.BeltedAPLST
- ii) 3CX240sq.mm.BeltedAPLST
- iii) 3CX300sq.mm.BeltedAPLST

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, 3CX185,3CX240sq.mm.XLPE Insulated cable	Indoor termination
	Outdoor termination
	Straight through joint
3CX300sq.mm.XLPEinsulated cable	Indoor termination
	Outdoor termination
	Straight through joint
3CX400sq.mm.XLPE Insulated cable	Indoor termination
	Indoor termination with Tinned coated mechanical lugs 300-400mm ² (for RMUs)
	Outdoor termination
	Straight through joint with 300-400mm ² mechanical connector

3CX185,3CX240sq.mmXLPE Insulated cable	Outdoor termination with Compression Lug
1CX400&1CX630sq.mm.XLPE Insulated cable	Indoor termination
	Indoor termination with tinned coated mechanical lug (forRMUs)
	Straight through joint with Mechanical Lug
1CX1000sq.mm.XLPE insulated cable	Indoor termination
	Outdoor termination joint
	Straight through joint
1CX55sq.mm.XLPE insulated cable	Outdoor termination joint
	Straight through joint
1CX95sq.mm.XLPE insulated cable	Outdoor termination joint
	Straight through joint
1CX150sq.mm.XLPE insulated cable	Outdoor termination joint
	Straight through joint
PILCAtoXLPE transition joints	Screened Transition joint 3CX185-400sq.mm.XLPE insulated cable WITH 3CX150-300sq.mm.PILCA insulated cable sector shaped (with mechanical connector)
Straight through joints between XLPE insulated cables	i) 3CX185-400sq.mm.XLPE (with mechanical connector) ii) 3CX150-300sq.mm.XLPE insulated cable (with compression reducer ferrule)
3CX300sq.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 ² with extra- large(440-450mm 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 TPSODL specification, ENATS09-13,IEC60502andIS 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):

SI.No.	Parameter	Units	Requirement
1	Max.Withstand System Voltage	kV	12
2	Partial Discharge at 1.73U _o	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 1CX150sq.mm.HTABC:14.2kA 1CX95sq.mm.HTABC:9kA
6	Storage Temperature Range	°C	-10°Cto+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	0.6or60%(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	10KV/mm(Minimum)

7	Tensile Strength	10N/mm ² (Minimum)and(8N/mm ² foranti-tracking)
8	Ultimate Elongation	200%(Minimum)
9	Heat Shock	No splitting,cracking,dripping or flowing after 30minutes at 200°C Min. (For stress control tube:30Minutes at 250°CMin.)
10	Low Temperature Flexibility	No cracking after 4hrs.at minus-20°CMax.
11	Volume Resistivity	1x10 ¹⁰ Ohm-meter(Minimum) (For stress control,tubeVR: 1x10 ⁷ Ohm-metermin.)
12	Tracking resistance	No tracking,erosion to top surface or flame failure after 1hr @ 2.5KV
		1hr@2.7KV 1Hr@3.0KV 20min@3.25KV
13	Flame Retardant (Applicable only for Anti trackingTubes/sleeves)	After1-minute burn:Burn torcharred length 250mmmax.

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

SI.No.	Parameter	Specifiedlimit
1	Visual Examination	Free from protrusions,pinholes,cracks,nicks and other visible defects.
2	Wall thickness Ratio	0.6or60%(Minimum at any two points of measurements)
3	Internal diameter of tube after full recovery	Shall not be higher than as specified inapproved BOM /GTP.
4	Longitudinal change	25%Max.
5	Dielectric Strength	10KV/mm(Minimum)
6	Tensile Strength	8N/mm ² (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 4hrs.@minus-20°CMax.
10	Volume Resistivity	1x10 ¹⁰ Ohm-meter(Minimum)

11	Flame Retardant(For anti-tracking moulded components)	After 1-minute burn: Burn torch 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 11kV,

Three core and single core aluminium conductor, XLPE insulated (in line with TPSODL Specification for underground and AB cable, IS 7098-part 2, and IS 13573 Part 2 & 3).

Length of 11KV terminations (from bottom of break out to center of lug hole) shall be:

- | | |
|-------------------------|---------|
| i) HTABC | -450mm |
| ii) 1 core cable/D&O/D | -550 mm |
| iii) 3 core cable/D&O/D | -800 mm |

Sl.No.	Components	Requirement
1	Compression Lugs/ Tinned coated Mechanical Lugs	<u>Compression Lugs:</u> - Material: Aluminium - All Aluminum lugs with anti-corrosive paste shall belong barrel type as per IS 8309: 2003. - Dimensions shall be as annexure-I of this specification. - 1000mm² Aluminum lugs shall be without palm hole. <u>Mechanical Lugs:</u> - Tinned coated Aluminium - As per IEC 61238(part 1):2003. - Dimensions shall be as annexure-of this specification.
2	Lug Seal, Anti-tracking tube, weather sheds, Stress control tube	- Heat Shrinkable - Fire resistant and weather resistant as per ENATS 09- 13- for lug seals, weather sheds and Anti-tracking tubes
3	Mastic tape	D) Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant. E) Volume resistivity of mastic shall not be less than Volume resistivity of insulating tube as specified in ENA TS 09-13.
4	Heat Shrink Breakout	- Fire resistant and weather resistant as per ENATS 09- 13. - Adhesive coated Break outs shall be provided on outer sheath of the cable to prevent water ingress.

5	Tinned coated copper braid	- Shall be completely insulated by adhesive coated fire retardant and weather resistant HStube/sleeve upto copper lug. - Fire resistant and weather resistant as per ENATS09- 13. - Size and leng this as follows: -25mm2x500mmx1Runfor95,120&150mm2 cables. Additionally1no.95mm2 Allong barrel lugs with sealing sleeves/mastic shall be provided for armor backfold earth
		Bonding in Aluminum armored 150mm2HTABC. - 50mm2X600mmX1Runforabove150mm2&upto 400 mm2 cables. - 70mm2X500mmX1Runfor630mm2&1000mm2 cables. Additionally 3nos.X150mm2 Al lugs with sealing sleeves/ mastic for armor back fold earth bonding.
6	Tinned coated copper braid as a Leakage Current Collector	- Leakage current collector tinned copper braid - 1RX7mm2X150mm per core shall be provided for terminations.
7	Tinned copper wire mesh	- Minimum 2.5mm² tinned copper mesh shall be provided on armour circumference beneath the copper braid. - Length of copper wire mesh shall be provided in BOM submission.
8	Sub-kit components	- Tapes,Mastic,GI back-up rings,Worm Drive clip/ Jubilee clip of stainless steel,adhesive cloth,cleaning solvents and other necessary items. - Compatible Supporting ring with SS jubilee clips shall be provided to connect tinned copper braids. - Soldering on copper screen is not acceptable. - Roll spring shall be provided for screen connections. - Plumb earthing on PILCA side is unacceptable. Constant pressureroll spring should be used for same.
9	Submission of BO Mand instruction sheet	- 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. - *Note:BOM shall be approved by TPSODL authorized official at the time of pre-bid.

Components of Straight Through jointing kit:

S.No.	Components	Requirement
1	Heat Shrinkable insulating tube/Sleeve	- Surface of material: shall be smooth and free from protrusion, voids and nicks. - Recovered thickness: Recovered thickness of insulation tubes over ferrule or connector circumference shall not be less than 4.32mm at any point of measurement. - Wall thickness ratio(before recovery)of all sleeves/tubes shall not be less than 60%at any two points of measurement.
2	Ferrules/Mechanical Connectors	- Material: 99% Electrolytic grade Aluminium with Anti-corrosive paste - Shape: As per IS 8308 - Dimensions as per Annexure-I of this Specification - Conductivity of ferrules/mechanical connectors shall be as per IS 8309: 2003/ IEC 61238(part1). - Conductivity of Aluminium shall be min. 60% of IACS.
3	Mastic Tape	e) Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant. f) Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENATS09-13.
4	Tinned coated copper braid for GI armour continuity /Ferrules for Aluminium armour continuity	Tinned coated copper braid for Glarmour continuity: Uniformly tinned coated Copper braid shall be provided for armour continuity. - Wraptinned copper wire mesh with 50% overlap around the joint area and continue 25mm over the copper screen on both sides. Bind the copper wire mesh on copper screen. - Uniformly tinned coated copper braid shall be provided for armor continuity. Length of tinned copper braid shall be as per approved BOM. - Size of tinned copper braid shall be: 50mm x 1mm for 150-400sq.mm. three core cables. Ferrules for Aluminium armour continuity: - In single core cables, 1CX400, 1CX630 and 1CX1000sq.mm., Aluminium armor continuity shall be done using 2nos. long barrel type of size 150sq.mm. and 185sq.mm. ferrules respectively. - In Aluminium armored HTABC, 1CX95sq.mm. and 1CX150sq.mm., armor continuity shall be done using 2nos. 50sq.mm. ferrules. - In Corrugated Armored Tin Copper Braid is required - For Copper screened HTABC, continuity of armour shall be through 2.5 sq.mm. copper wire mesh.

5	Tinned copper wire mesh	- Uniformly tinned coated copper mesh shall be provided for screen continuity. - Minimum 2.5mm² tinned copper mesh shall be provided on both sides of armour circumference beneath the copper braid. - Length of copper wire mesh shall be provided in BOM submission.
6	GI wire mesh/ Copper wire mesh	- Mechanical protection shall be provided in Glarmored cables by means of heavily zinc coated GI mesh as per IS4826. - In 1C Aluminium armored cables, for mechanical protection, copper wire mesh shall be provided.
7	Breakouts	- Adhesive coated Breakouts shall be provided on outer sheath at both sides on the cable top revent watering res.
8	Wrap around insulating tube/Sleeve as outer Most tube	- Material: cross-linked polyolefin (Heat Shrinkable) as a waterproof seal. - 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 water-tight bond between the sleeve and the cable). - Stainless steel channel shall be provided along the wrap around to close the sleeve during installation. - Excellent mechanical and corrosion protection, and atmospheric sealing. - High split resistance. - *Note: Over lapping of wrap around sleeve is not acceptable. - Additionally, adhesive coated sleeve approx. 300mm length shall be provided at ferrule joint area beneath the wrap around sleeve.
9	Sub-kit Components	- Tapes, Mastic, GI back-uprings, /Jubilee clip of stainless steel, adhesive cloth, cleaning solvents and other necessary items. - Compatible support rings (Aluminium for single core and GI for three core cables) with four nos. SS jubliclips shall be provided to connect tinned copper braid. - For copper screen bonding, roll spring shall be provided. - Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring shall be provided for earthing continuity.
10	Submission of BOM and instruction sheet	- 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. - *Note: BOM shall be approved by TPSODL authorized official at the time of pre-bid.

6. MARKING:

Following details shall be printed on the box:

- Manufacturer's name
- Month & Year of manufacturing
- Voltage Grade
- Property of TPSODL

- e. Materialcode
- f. PO No.

HS Sleeves/tubes and breakout components shall beem bossed 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 report along with the offer:

7.1 ACCEPTANCE TESTS:

Test	Clause No.	ReferenceStandard
Visual inspection	3.15	ENA-TS09-13
Physical verification of kit contents and dimensions	As per TPSODL approved BOM	
Electric Strengthtest	3.4	ENA-TS09-13
Ultimate Elongationtests	3.12	ENA-TS09-13
Tensile Strength	3.12	ENA-TS09-13
Volume Resistivity	3.16	ENA-TS09-13
Wall thickness ratio	3.3	ENA-TS09-13
Expanded and recovered diameters	3.3	ENA-TS09-13
Longitudinal change after recovery	3.3	ENA-TS09-13
Heat shock test	3.7.1/3.7.2	ENA-TS09-13
Low temperature flexibility	4.5	ENA-TS09-13
Insulation buildup thickness after shrink on Ferrule	8.1	IS10810-6
Flame retardant test on anti-tracking tubes and anti-tracking moulded components and earth braid protective tube after shrink on man drill for terminations	3.5.1/ 3.5.2	ENA-TS09-13
Area measurement of tinned copper braids (Area of one wire x no.of wires x no.of carriers)	As per TPSODL specification / approved BOM	
Conductivity test on ferrules/connectors/lugs	8.3	IS 8309
Uniformity of zinc coating on GI mesh	4.1	IS2633

ROUTINE TESTS:

Test	Clause No.	ReferenceStandard
Visual inspection of tubing and moulded components for free from pinholes,cracks, nicks, protrusion and other defects	3.15	ENA-TS09-13
Dimension check	As per TPSODL approved BOM	
Electric Strength	3.4	ENA-TS09-13
Ultimate Elongation	3.12	ENA-TS09-13
Tensile Strength	3.12	ENA-TS09-13
Volume Resistivity	3.16	ENA-TS09-13
Wall thickness ratio	3.3	ENA-TS09-13
Expanded and recovered diameters of tubes	3.3	ENA-TS09-13

TYPE TESTS:**(i).Terminations & Straight Through joints**

Test	Clause No.	Reference Standard
Conductor resistance with Ferrule/Lugs/Mechanical connectors	4.1	IS13573(Part-2)
AC Voltage withstand Test(Air)	4.2	IS13573(Part-2)
AC Voltage withstand test (under wet conditions)(for out door termination only)	4.2	IS13573(Part-2)
Partial Discharge	7.0	IS13573(Part-2)
Impulse voltagetest	6	IS13573(Part-2)
Heat Cycle test in air and water	9.1and9.2	IS13573(Part-2)
Thermal Short Circuit Test for Screen	10	IS13573(Part-2)
Thermal Short Circuit Test for Conductor	11	IS13573(Part-2)
DC Voltage Withstand	5	IS13573(Part-2)
Dynamic short circuit test	12	IS13573(Part-2)
Thermal Endurance test	IEC60216part2&8	
Salt fog test(Only for Outdoor terminations only)	13	IS13573(Part-2)

(II).Kit Components

a) For Tubing and Moulded Components

Test	Clause No.	ReferenceStandard
Corrosion Resistance	3.1	ENA-TS09-13
Density	3.2	ENA-TS09-13
Dimensions	3.3	ENA-TS09-13
Electric Strength	3.4	ENA-TS09-13
Flame Retardance	3.5	ENA-TS09-13
Heat Shock	3.7	ENA-TS09-13
Low temperature flexibility	3.8	ENA-TS09-13
Relative Permittivity	3.9	ENA-TS09-13
Tensile strength and Ultimate elongation	3.12	ENA-TS09-13
Thermal Ageing	3.13	ENA-TS09-13
Tracking Resistance	3.14	ENA-TS09-13
Visual Examination	3.15	ENA-TS09-13
Volume Resistivity	3.16	ENA-TS09-13
Water Absorption	3.17	ENA-TS09-13

b) For Compression Lugs, Compression Ferrules and Mechanical connectors

Test	Clause No.	ReferenceStandard
Conductivity test	8.3	asperIS8309/IEC61238, 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 5years 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 TPSODL.

9 PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPSODL
- c) TPSODL Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee/Warranty card
- g) Delivery Challan
- h) Other Documents (as applicable).

10 INSPECTION AFTER RECEIPT AT STORE:

The material received at 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 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 TPSODL upto 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 TPSODL, failing which TPSODL 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 TPSODL.

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 TPSODL).

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

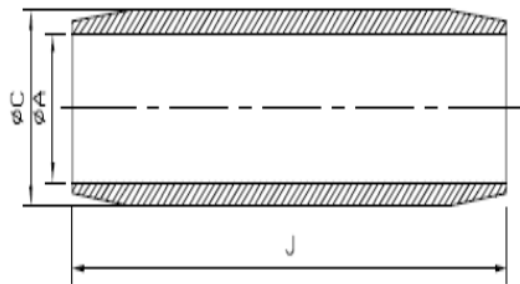
18. DRAWINGS AND DOCUMENTS:

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

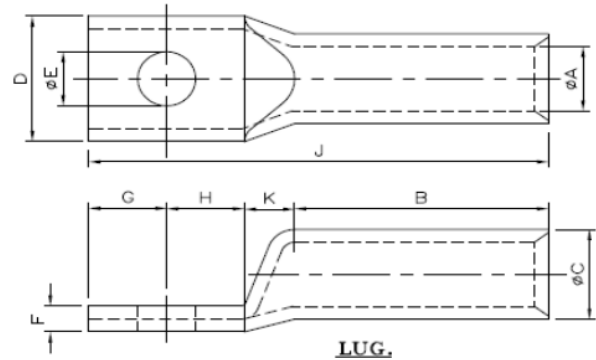
- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 Set of Hard Copy & Soft Copy PDF File containing complete information about manufacturing.

Annexure- Dimensions Ferrules & Lugs HT

Dimensional details of Aluminum ferrules for HT AL circular stranded compacted XLPE cables			
Cable Size in MM ²	ϕA (mm) +0.3mm	ϕC (mm) +0.3 mm	J (mm) ± 3 mm
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 ²	ϕE (mm) ± 0.1 mm in centre of palm	ϕA (mm) +0.5mm	ϕC (mm) +0.5 mm	D (mm) ± 1.5 mm	F (mm) ± 0.5 mm	B ± 3.0 mm	J (mm) ± 5 mm
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

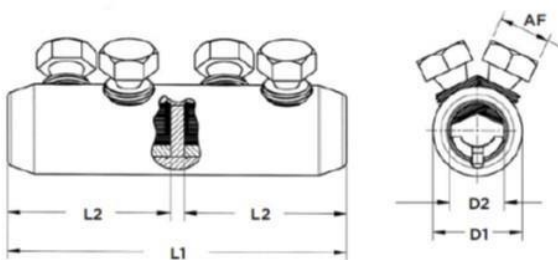


For remaining cable sizes, dimensions of Ferrules & Lugs shall be as per IS.

Annexure- Dimensions Mechanical connectors & Mechanical Lugs

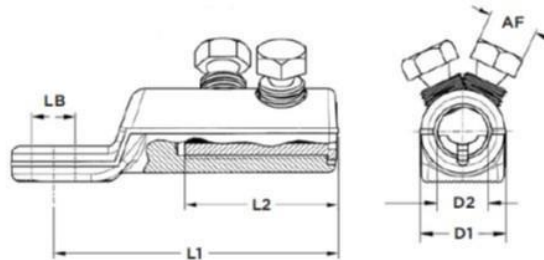
Aluminium Mechanical connectors

Cable Size in MM ²	$\phi D1$ (mm)	$\phi D2$ (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 ²	ϕLB (mm)	$\phi D1$ (mm)	$\phi D2$ (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 of Center rotating, Double Break Type Isolator-33KV(1250Amp)&11KV(630 Amp)

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
14. QUALITY CONTROL
15. TESTING FACILITIES
16. MANUFACTURING ACTIVITIES
17. SPARES, ACCESSORIES AND TOOLS
18. DRAWINGS AND DOCUMENTS
19. SAMPLE DRAWINGS
20. SCHEDULE "A" GUARANTEED TECHNICAL PARTICULARS

c) **SCOPE**

Scope covers design, manufacture, assembly, inspection, testing at manufacturer's works, supply and delivery of 33kV 1250 & 11KV 630A Horizontal Operated, Center rotating, Double Break type gang-operated air-break alternating current Isolator (with and without earth switch), with Insulators, Terminal Connectors, auxiliary contact switches, position indicating device, base frames, operating mechanism box, control cabinet, arcing horns (wherever necessary) etc. and other devices whether specifically mentioned here in or not, but required for efficient and trouble free operation.

d) **APPLICABLE STANDARDS**

Isolators covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of following relevant Indian Standards and shall conform other regulations of local statutory authorities:

IS:9921(Part1-V) : Alternating current Disconnecter (Isolators) and Earthing
Switches for voltages above 1000V

IS:2544: : Porcelain post insulators for systems with nominal voltages greater than 1000V

IS:2147 : Degree of protection provided by enclosures for low
Voltage switchgear and control gear

IS:4691 : Degree of protection provided by enclosure for rotating
Electrical machinery

IS:2629: : Recommended practice for hot dip galvanizing of iron &
steel

IS:4759 : Hot-dip zinc coatings on structural steel and other allied
products

IS:2633 : Method of testing weight, thickness & uniformity

IS:1573 : Electroplated coatings of zinc on iron & steel

IS:6735 : Fasteners-Spring lock washers for screws with cylindrical
heads

IS:2016 : Plain washers

IS:1771 : Electroplated coatings of silver and silver alloys for general
Engineering purposes

IEC62271 : High voltage switchgear and control gear

IEC60129 : Alternating Current Disconnectors and Earthing switches

e) **SERVICE CONDITIONS**

1	Maximum ambient temperature	50degC
2	Max. Daily average ambient temp	35degC
3	Min Ambient Temperature	0degC
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)

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 insuspension during the dry months and is subjected to fog in cold months.

f) **GUARANTEED TECHNICAL REQUIREMENTS**

The equipment covered in this specification shall meet the technical requirements listed below. The isolator must be Double Break, center pole rotating type

Sl. No	Type	33KV	11KV
1	Mainswitch	Double break, Centre post rotating, gangoperated	
2	Service	Outdoor	
3	Applicable standard	IS:9921/IEC-129/IEC-62271-102	
4	Pole	3polegang operator	
5	Rated voltage nominal/Maximum	33/36kV	11/12kV
6	Rated Frequency	50 Hz-5%to+3%	
7	System earthing	Solidlyearthed	
8	Temperature rise	Asperrelevant IS/IECpublication	
9	Insulation level impulse withstand voltage		
	a)Across Isolating distance	195kVpeak	85kVpeak

	b)To earth & between poles	170kVpeak	75kVpeak
10	1minute power frequency withstand voltage		
	a)Across Isolating distance	80kVpeak	32kVpeak
	b)To earth &between poles	70kVpeak	28kVpeak
11	Rated current in Amp	1250	630
12	Short time current for 3 sec	25kA	26.3kA
13	Rated Peak withstand Current	62.5KAp	66KAp
13	Operating mechanism	Isolator: Motorised&Manual	Isolator: Motorised &Manual
		Earth Switch:Manual	Earth Switch:Manual
14	Auxiliary voltage		
	a) Control & Interlock	48DC (80%to 110%)	
	b)For Heater Lamp and Socket	1ph 240V	
15	Safe duration of overload		
	a)150%of rated current	5 minute	
	b)120% of rated current	30 minute	
16	Minimum creepage distance of support and Rotating insulator	25mm/KV	
17	Mounting structure	UprightonG.Istructure	
18	Terminal connector type	Bimetallic clampZebra	Bimetallic clampPanther
19	Control	Local/Remote	
20	Auxiliary Contact		
	Main Isolator	6 NO /6NC	
	Earth Switch	4 NO /4NC	
	Control Voltage and Current Rating of Contacts	48 +/-10%V 10ADC	
21	Cantilever Strength Support	700Kg	
22	Current Density of Copper	1.75 Amp/Sqmm	
23	Control Cabinet		

	Thickness of sheet Metal	3mm	
	Enclosure Protection	IP55	
	Paint	50-0 Microns inside & 70-80 Microns Outside Powder Coated shade 631 as per IS-5	
	Material of the Box	Stainless Steel	
24	Material of Moving and Fixed Contact	Copper Silver Plated (min 25 microns)	
25	Operating Rod Earthing with flexible copper braid of suitable length	25X6sqmm	25X6sqmm
26	The moving arm and current carrying contacts/joints to be covered in box type arrangement	Required	Required
27	Interlock		
	Mechanical	Castel Key Interlock	Castel Key Interlock
	Electrical	Solenoid	Solenoid
28	Mounting Condition	On Galvanised Steel Structure	
29	Type of Support Insulator	Solid Core Porcelain post insulator	
30	Minimum Clearance in Air (mm)		
	When switch is closed		
	(a) Between adjacent Pole of different Phases (Centre-Centre)	1500	900
	(b) Between Live Parts and Earth	508	254
	When switch is open		
	Between Poles of the same Phase (Centre to Centre)	440	300
	Between adjacent poles of different phases (Centre-Centre)	1500	900
31	Minimum Height of Insulator Stack (mm)	508	254

5 GENERAL CONSTRUCTION

General Arrangement

Type:

Center Rotating, outdoor, gang operated type, with blades rotating in horizontal plane

Base Frame:

All ferrous parts shall be hot dipped galvanized steel structure. Size of base channel shall be 100 mm X 50mm.

Insulators:

3nos,porcelain post insulators per phase(Total nos.9) with creepage length as per GTP.

Gang operated rods:

Galvanized steel rods connected to common operating mechanism.

Gang operated links shall be so designed that all phases shall make and break simultaneously.

Mounting arrangement:

Vertical and Horizontal Mounting: Isolator (with conductive terminals, main contacts, gang-operated operating rod, and insulators) shall be suitable for mounting on galvanized steelstructure. Also provision for standing of maintenance personnel shall be provided along withmountingstructure.

Limiting pins/Stopper arrangement: Adjustable limiting pins shall be provided to limit over travel of moving post.

Stopper arrangement shall be provided for controlling of opening of isolator main blades for all the three phases.All the interlocks shall have lock nut with bush arrangement type provision.

Accidental prevention design/ Dead center interlocking: Isolators shall be constructed such that it cannot be dislodged by gravity, wind pressure, vibrations, shocks, accidental touching,breaking of the connecting rods of the operating mechanism, or open under influence of shortcircuit.

Hardware items:**Nuts,bolts&washers:**

Shall be hot dip galvanized.Sufficient length of bolts shall be provided for current carrying parts

Teflon washer:

Shall be provided between operating rod & arrangement of tandem & coupling pipes.

Spring washer .:

Phosphorus bronze spring washers shall be used in current carrying parts

Contacts (male and female):

Material :All non-ferrous current carrying parts/ contacts shall be of high conductivity, corrosion resistance, hard-drawn electrolytic copper or copper alloy of proper thickness and contact area with current density of 1.75A per sq.mm.(max.) with silver plating at the contacts.

Contacts:

a) Heavy duty, self-aligning, high pressure and self-cleaning type high pressure contacts. Thecontacts shall' wipe the contact surface during opening and closing without causing any abrasion on the contact surface.

c) All contacts shall be replaceable at site

d) Contact resistance- 50micro-ohms,and upto permissible limit as definedin1S:9921(part-IV)

e) All movable parts shall be shunted by flexible copper conductor of specified cross-section and capacity

f) All contact blades of moving arms should have proper contact on the main current carrying rod.

g) The fixed and moving contacts shall be able to carry the rated current continuously and the maximum fault current as per GTP for 3seconds without any appreciable rise in temperature.

FC spring:

Material: The springs shall be made of durable and non rusting type stainless steel.

Vibration and Impact:

The blades shall be self-latching in the closed position or provided with a safety latch to prevent maloperation due to impact gravity, vibration, wind pressure, electromagnetic forces or shocks.

Temperature Rise Limit:

The contacts and other current carrying parts shall be so designed that their temperature rise under different operating conditions shall not exceed the value specified in IS:99241.

Corona & RIV Corona avoidance:

Corona and Radio interference Voltages Shall be avoided by eliminating sharp edges, points or loose metal fittings on energized parts.

The design shall be such that it is free from visible corona discharge in both closed and open positions.

Terminal Connectors:**Material:**

High conductivity electrolytic grade copper.

The live parts shall be so designed that as far as possible, sharp points, edges and other corona producing surface are eliminated.

Weight withstand capacity:

The terminal connectors shall be designed to withstand load due to dead weight of Aluminium tube/ACSR conductor connected to it and alignment of the isolator main blade shall not be disturbed..

Suitable for Conductor sizes:

Zebra/Panther conductor. To be finalised during detailed engineering.

Current Carrying Capacity:

Terminal pad (moving arm and contact joints) shall be capable of carrying the rated continuous current as well as short circuit current as specified in GTP without exceeding temperature specified for the main blades.

Insulator:**Conformance:**

Shall conform to IS:2544 and/or IEC-168

Material:

Porcelain

Glazing: Shall be uniform glazed of brown colour free from blisters, burns and other defects which may affect the mechanical and dielectric quality of the insulators.

Type:

Shall be solid core type, homogeneous, free from cavities, tough and impervious to moisture.

End fittings:

All ferrous parts shall be of high grade cast steel or malleable steel with smooth surface and shall be hot dip

Galvanized. The porcelain and metal parts shall be assembled in such a manner that any thermal expansion difference between the metal and the porcelain part throughout the range of temperature variation should not create any space and undue internal stresses which may affect the electrical or mechanical strength and rigidity.

Bearings:

Type:

Shall be ball or roller type and shall be protected from weather by means of housing arrangement /covers and grease retainers.

All bearings shall be-sealed type such that no lubrication or maintenance is required.

The design and construction of various bearings shall comply all the features required to withstand climatic condition specified, to ensure effective operation even after long period of unoperatability of isolators.

Manual Operating Mechanism:Control Cabinet of Isolator or Earth Switch:

Housing/Enclosure:

Material:Stainless steel

Degreeofprotection:IP55

Housing/Enclosure Sloping rain hood shall be provided to cover all sides.Thicknessofsheet:min.3 mm.

The cabinet shall be suitable for mounting on support structure.

Earthing terminals:

2 Nos.M12size

Gland plates:

Control cabinet shall be provided with removable gland plate at the bottom of the box with doublecompressiontype brass cable glands shall be provided with each operating mechanism for connection of cables.

Internal wiring:

Size of wire:2.5sq.mm.

Material: Copper stranded conductor, 1100Vgrade

Hinges:

Hinges on the door of the box shall be concealed. Hinged door shall be provided with pad locking arrangement.

TOM (Top Operating mechanism)

Shall be provided with nylon nut and check nut

Auxiliary Switches:

(i) Each isolator shall be provided with a mechanically driven auxiliary switch with all necessarycontacts for control, indication and interlocking purposes with 6 NO and 6 NC contacts and 4 NOandNCcontacts for earth switch.

(ii) All isolator and earthing switches shall be provided with auxiliary switches suitable for 48VDC

(iii) Mechanically coupled auxiliary contacts shall not slip during smooth operation of the isolator.

(iv) Remote status monitoring & electrical interlocking:

The contacts of the auxiliary switches shall be used for remote indication of open or close position in the control panel as well as for electrical interlock with other equipments.

Terminal Block andwiring:

(i) All auxiliary switches, interlocks and other terminals shall be wired up to 'terminal block' housed in the mechanism box.

(ii) The spare contacts shall also be brought out on to the terminal block. The terminal block shall have at-

least 20% extra terminals.

(iii) It shall be possible to change normally open contacts into normally closed contacts and vice-versa at site if required.

(iv) Stud type terminals of EI max or equivalent make of 1100 V grade having washers, nuts & checknuts shall be provided for terminating the control cables /wire.

Indicator:

Indication of isolator opening & closing shall be provided with direction

Fuse for DC supply:

Fuses for control supply shall be provided

Castile key Provision: Shall be provided

Fixing bracket : Of MSHDG shall be provided on the top of the mechanism box

Operating pipe: Shall be min. of 40 NB dia. GI pipe

Tandem pipe:

3 mm thick
Outer dia — 34
mm Inner dia ~ 28 mm

Flange:

With 14 holes

Gasket:

EPDM rubber/ Neoprene gaskets shall be provided on all 4 sides at front between hinged door and cabinet.

Space heater:

Space Heater thermostatically controlled, suitable for single phase 240 V AC supply shall be provided to prevent condensation. A switch and fuse/link shall be provided in the operating mechanism.

Switch and Plug:

One 230V combined 5A/15A AC plug with socket and arrangement switch shall be provided.

Lamp arrangement:

Switch, HRC fuse and holder suitable for a 240 V LED lamp shall be provided in manually operated mechanism box with protective fixture.

Cubicle illumination lamp with door switch shall be provided.

Limit switches:

Limit switch shall be separate from auxiliary switch.

Limit switch for control shall be fitted on the isolator shaft within the cabinet to sense the open and close positions of the isolators and earth switches. Limit switches shall be of reputed make.

Push button:

Local/Remote selector switch:

A set of open/close push buttons shall be provided on the control cabinet of the isolator to permit its operation through local or remote. Provision shall be made in the control cabinet to disconnect power supply to prevent local/remote power operation.

Operating handle:

Length shall be 180 mm. The operating rods and pipe shall be rigid enough to maintain control under adverse conditions to withstand all torsional and bending stresses arising from operation.

Safety feature:

Isolators shall be self-locking in open and closed positions

Provision for motor Operation:

Shall be provided

Rotating parts:

- iii) All rotating parts shall be provided with grease packed roller or ball bearings in sealed housings designed to prevent ingress of moisture, dirt or other foreign material.
- iv) Bearing pressure shall be kept low to ensure long life and ease of operations.
- v) Bearings used shall be permanently lubricated and no further lubrication will be required for complete lifespan.

Reduction Gear mechanism:

The disconnect may be required to operate after considerably long idle intervals. Special care shall be taken for selection of material for gear and lubrication of gears to meet this requirement. The gears shall be made out of aluminium bronze or forged material and suitably chosen (rustfree) to avoid bending/jamming on operation after a prolonged nonoperation and lubricated for life with graphite or better quality non-draining and non-hardening type grease. Wherever necessary automatic relieving mechanism - shall be provided. Complete details of components, material, grade, self-lubricating arrangement, grade of lubricants, details of jig, fixtures and devices used for quality check shall be furnished by bidder in this offer.

Earth Switch (wherever required):**Material:**

Earth switch material shall be silverplated copper of electrolytic grade. Spring in female contact: Stainless steel

Mechanical Interlock with isolator:

Earth switch shall form an integral part of each pole of the isolator. Each earth switch shall be mechanically interlocked with its own main switch to prevent closure of the earth blades when the main blades are closed and vice versa,

Common earth connection:

Multiple flexible tinned copper strips 1mm thick shall be suitably attached to the earthing connector for common earth connection

Gang Operation:

Three phase operation shall be conducted via gang operation. Earth switch shall be provided with gang operated operating rod mechanism mechanically connected to Earth Control Cabinet

Hot dip galvanization:

The entire ferrous control mechanism shall be hot dip galvanized and design and material shall match in quality with that of the main isolators

Auxiliary contacts :4

NO +4 NC

Interlock**Mechanical interlock with circuit breaker:**

Provision for mechanical interlock (castle key type) shall be incorporated for interlocking with associated circuit breaker. The key shall be released only when the isolator is fully closed or fully opened.

Inter locking to be compatible with LOTO arrangement.

Electrical interlocking between isolator and circuit breaker:

Sufficient quantity of locks, identical to the one fitted on the isolator, shall be supplied for fixing on the circuit breaker. Exact type and quantity shall be finalized during Tender check. In addition, an electrical interlock also shall be provided.

Mechanical Interlocking of Isolator with EarthSwitch:

Earth switches for the line isolators shall be so designed to provide mechanical interlocking to prevent closure of earth switch blades when the isolator is in closed position. Interlocking to be compatible with LOTO arrangement.

All interlocks shall be designed to prevent mal-operation. Failure of supply to any electrical interlocks shall not permit mal operation.

Electrical interlocking of Isolator with Earth Switch:

Electrical interlock shall be through a solenoid operated by AC 110V/230V. Necessary relays shall be provided to attain interlock.

Counter balance spring:

Counter balance springs, cushions etc., shall be provided to prevent impact at the end of travel both on opening and closing of the isolator. The springs shall be made of durable and non-rusting type alloy.

Performance Requirement:

During the course of normal operation, it is likely that the isolator may be left in the open/closed position for long periods of time. They shall be designed to operate satisfactorily even after being kept in one position for long period,

The isolator shall be capable of breaking the magnetizing current of associated power transformer.

Earthing Pads:

8 Each pole of the isolator shall be provided with 2 nos. earthing pads of noncorrosive material at opposite ends and brazed at the base.

9 Flexible tinned copper braid of adequate size shall be provided for connecting operating handles, earthing switches for the earthing system.

Temperature rise:

The temperature rise of any part of the isolator and associated equipment shall not exceed the maximum permissible temperature rise values as stipulated in the applicable standard of latest issue corresponding to ambient temperature.

Special Requirements:

- All joints in link mechanism exposed directly to external environment should not require any periodic lubrication and shall not create jamming which can result into loss of setting of complete isolator or deformation in links and levers.
- Provision of continuous adjustment/alignment of insulator should be provided to compensate permitted tolerances of insulator and structure or base frame assembly. Adjustment/alignment using shim washers are not allowed.
- Bottom bearing assembly of base frame shall be sealed such that there cannot be ingress of dust/dirt water etc. Whole assembly shall be lubricated for lifelong service.
- Terminal head of isolator arms where conductor will be terminated shall be strong and robust. It should have 360 degree freedom of rotation and should have built-in cover to eliminate deposition of dust or foreign-

particles.

- Isolators and Operating mechanisms should not require periodic maintenance for any periodic lubrication/adjustments in linkages, bearings, bush-pins, hinges. Bidder shall enclose test reports for additional extended mechanical endurance test, which justifies that there are no undue wear & tear and loss of adjustment after large number of operations.

- Link mechanism shall have 'Dead center interlocking' to prevent any change in end position of disconnect or due to external forces on the arm (e.g. Earthquake, Short line fault, Wind etc.) even when the drive is decoupled from disconnect.

Duty Requirement:

Isolator and Earth Switch in their closed position shall be capable of withstanding dynamic and thermal effect of maximum short circuit current of the system. They shall be so constructed such that they do not get open under influence of shortcircuit current.

Completeness of Supply:

Any fittings, accessories or apparatus which may not have been mentioned in this specification but which are necessary for efficient operation / performance shall be deemed to be included in the contract.

e) NAMEPLATE AND MARKING

Following details shall be suitably embossed on a stainless steel name plate fixed on the operating mechanism box:

- Name of manufacturer
- Property of TPSODL
- PO No.
- Month/Year of manufacture
- Type of Isolator
- Rated Voltage
- Rated Normal Current
- Serial No.
- Weight
- Rated insulation level
- Short time current for 3sec
- l) Operating mechanism type

m) DC Control voltage

n) Guarantee period

o) Frequency

TESTS:

All Routine, Acceptance & Type tests shall be carried out in accordance with relevant IS/IEC. All Routine and Acceptance tests shall be witnessed by TPSODL authorized representative. All the components should also be type tested as per the relevant standards.

Following tests shall be necessarily conducted on the Isolator:

ROUTINE TESTS:

- a) Power Frequency test on Control and Auxiliary circuit
- b) Voltage control tests on auxiliary circuit
- c) Operation Tests
- d) Measurement of resistance of main circuit.

- e) Mechanical Operating Tests.
- f) Galvanizing Measurement.
- g) Tinning Thickness Measurement.

ACCEPTANCE TESTS:

- a) Verify the Insulation level, including withstand tests at Power frequency voltages on auxiliary equipments.
- b) Voltage tests on auxiliary circuit
- c) Operation Tests
- d). Measurement of resistance of main circuit
- e) Visual checks
- f) Dimensional checks
- g) Alignment check of post insulator check
- h) Galvanization test
- i) Mechanical operation test

Type Tests for Isolator:

- a) Lightning impulse voltage test(Dry)
- b) Power frequency voltage withstand test(Dry)
- c) Power-frequency voltage withstand test(Wet)
- d) Short time withstand current test
- e) Peak withstand current test
- f) Temperature rise test
- g) Measurement of contact resistance
- h) Short time withstand current test for Earth Switch
- i) Peak withstand current for Earth Switch
- j) Satisfactory Operation & Mechanical endurance test

Types Tests for Insulator:

- a) Visual check
- b) Dimensional check
- c) Visible discharge test
- d) 50% lightning impulse voltage flash over test
- e) Lightning impulse voltage withstand test-
- f) Power frequency voltage flashover test(dry)
- g) Power frequency voltage withstand test(dry)
- h) Power frequency voltage flashover test(wet)
- i) Power frequency voltage withstand test(wet)
- j) RIN test at 4MHz
- k) Temperature cycle test
- i) Mechanical strength test
- m) Porosity test
- n) Galvanizing test
- o) Artificial pollution test by salt fog method

8.0 TYPE TEST CERTIFICATES:

Bidder shall submit Type test Certificates for the tests as mentioned above. All the tests should have been conducted during the period not exceeding five years from the date of opening the bid and at CPRI/ERDA accredited lab as per the relevant standards.

In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPSODL.

PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material:

- a) Test reports
- b) MDCC issued by TPSODL
- c) Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee/ Warranty card
- g) Delivery Challan
- h) Other Documents (as applicable).

10.0 INSPECTION AFTER RECEIPT AT STORES:

The material received at TPSODL site/store shall 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 Projects department.

11.0 GUARANTEE:

Supplier 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 36 months from the date of commissioning or 42 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 TPSODL, failing which TPSODL shall be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus TPSODL own charges (@ 20% of expenses incurred), from the supplier or from the " Security cum Performance Deposit" as the case may be.

12.0 PACKING:

The equipment shall be packed in crates suitable for vertical/horizontal transport, as the case may be and suitable to withstand bundling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc., shall be provided. Any material found short inside the packing cases shall be supplied by Supplier without any extra cost.

Each consignment shall be accompanied by a detailed packing, list containing the following information:-

- a) Name of the consignee.
- b) Details of consignment.
- c) Destination.
- d) Total weight of consignment.
- e) Handling and unpacking instructions.
- f) Bill of material indicating contents of each package.

The supplier shall ensure that the packing list and bill of material are approved by the purchaser before dispatch.

13.0 TENDER SAMPLE: NA

14.0 QUALITY CONTROL:

The Bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPSODL shall reserve the sole rights for the type test of a random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the Bid, the complete Lot shall be rejected.

The Purchaser's engineer or its nominated representative shall have free access to the Bidder's works to carry out inspections.

15.0 MINIMUM TESTING FACILITIES:

Bidder shall have adequate in house testing facilities for carrying out the following test at the factory.

- a. Power frequency voltage test
- b. Voltage tests on auxiliary circuit
- c. Operation Tests
- d. Measurement of resistance of main circuit.
- e. Temperature rise test
- f. Mechanical endurance test.

16.0 Manufacturing Activities:

The successful Bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

17.0 SPARES, ACCESSORIES AND TOOLS:

The bidder shall submit a recommended list of maintenance spares, tools and accessories for smooth and trouble free operation of the isolator.

The bidder, if at any time changes the design of the isolator or discontinues manufacturing of the isolator, shall provide opportunity to TPSODL for purchase of spares for future use so as to ensure smooth & trouble free functioning of the isolators before such change in design or discontinuing of manufacturing activity. The bidder shall arrange for service engineer for proper alignment at the time of erection and testing of isolators.

Drawings and Documents:

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

- a) Completely filled in Technical Particulars
- b) Bill of material
- c) Fault Calculations for Corrugated Aluminum Sheath.
- d) Type Test certificates.
- e) Detailed dimensional cross-sectional drawing of the cable
- f) Experience List

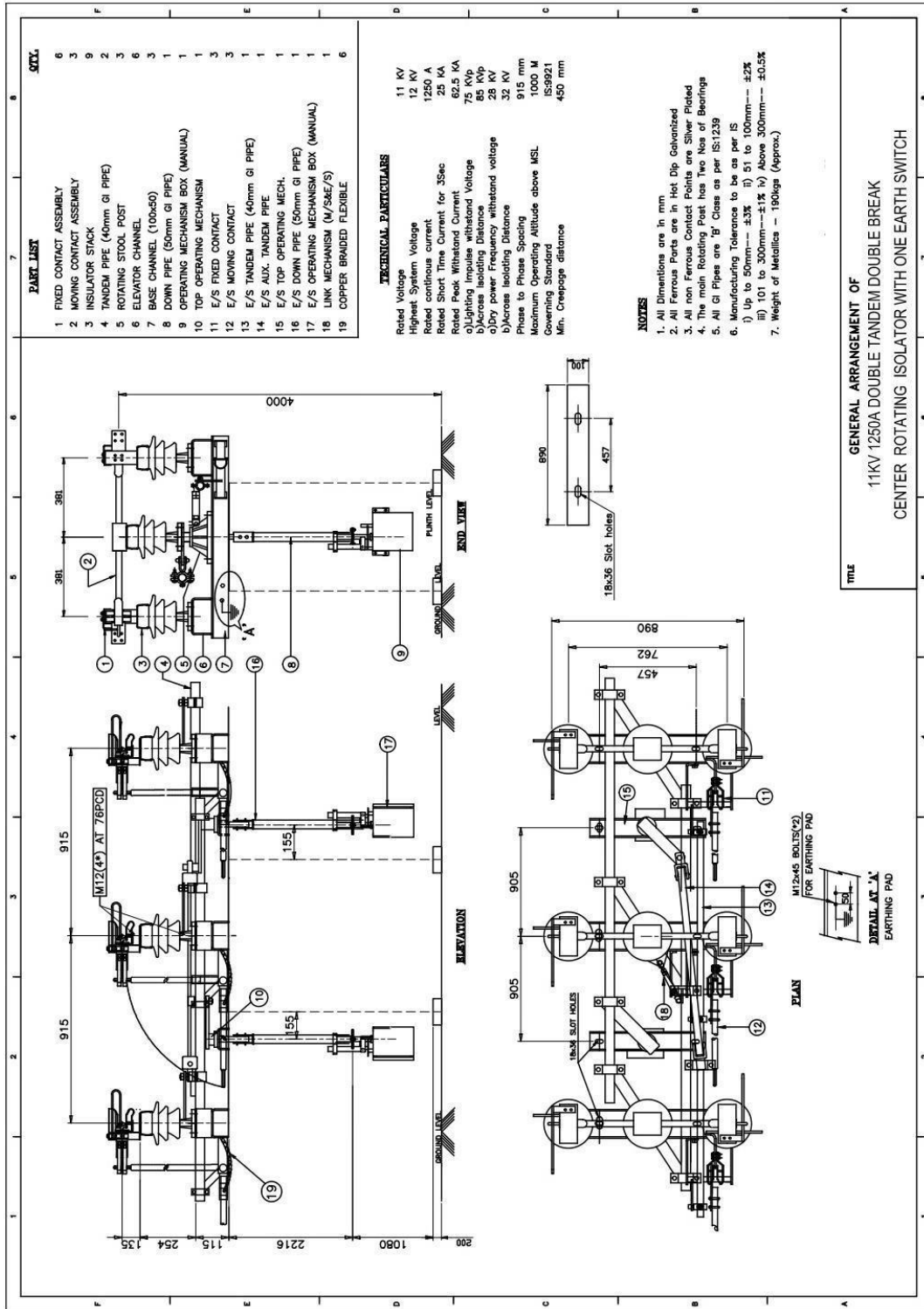
After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be used to produce suitable for reproduction, before the dispatch of the equipment. Soft copy of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser.

Following drawings/documents shall be submitted by the bidder for Purchaser's approval.

S.No.	Description	For Approval	For Review Information	Final Submission
1	Technical Particulars	√		√
2	General Arrangement drawings	√		√
3	Terminal and connection Drawing	√		√
4	Drawing showing Mechanical Interlock sb/tline & Earth Switch and Wiring diagram	√		√
5	Manual/catalogue		√	
6	Installation/Commissioning Manuals		√	
7	Instruction for use		√	
8	Transport/Shipping dimension drawing		√	
9	QA & QC Plan	√		√
10	Routine,Acceptance and TypeTest Certificates	√		√
11	Sectional view & descriptive details for blades,contacts,arms,contactpressure,contact support bearing,housing of bearing,balancing of heights, phase coupling pipes, baseplate,operating shaft,guides swivel joints, operating mechanism & its component etc.	√	√	√

All the documents & drawings shall be in English language.

Instruction Manuals: Bidder shall furnish two soft copies and four (4) hard copies 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

11kV Ring Main Unit(RMU)

Central Engineering Services

TPC-M/TPDDL/TPCODL/TPNODL/TPWODL/TPSODL/TPADL

CONTENTS

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

1. SCOPE:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply (including unloading at site/store) and performance of 11 kV Ring Main Units with all accessories and necessary training for trouble free & efficient performance.

It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform to practices consistent with sound environmental management and local statues. It is also expected that equipment shall comply in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to the User, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble-free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

2. APPLICABLE STANDARDS:

Standards	HV switchgear and controlgear - AC Metal Enclosed switchgear and controlgear for voltages above 1 kV and upto and including 52 Kv.
IEC62271-200:2021	Alternating-current circuit-breakers
IEC62271-100:2021/Cor2:2022	Cold Rolled Low Carbon Steel Sheets and Strips.
IS513	High-voltage switchgear and control-gear - Part 1: Common specifications for alternating current switchgear and control-gear
IEC 62271-1:2017/AMD1:2021	HV switchgear and control gear - Alternating current disconnecter and earthing switches
IEC62271-102:2022	High-voltage switchgear and control-gear - Part 103: Alternating current switches for rated voltages above 1 kV upto and including 52 kV
IEC62271-103:2021	Degrees of protection provided by enclosures (IP Code)
IEC60529	Degrees of protection provided by enclosures for electrical equipment against mechanical impacts (IK Code)
IEC62262	High-voltage test techniques part-1 to 3
IEC60060	Low-voltage switchgear and control-gear assemblies - Part 1: General rules
IEC 61439-1	Electrical relays – Part 3: Single input energizing quantity measuring relays with dependent or independent time.
IEC60255-3	Current Transformers
IEC61869-2/IS 2705	Specification of technical grade Sulphur hexafluoride (SF6) for use in electrical equipment
IEC60376	High-voltage switchgear and control-gear - Part 213: Voltage detecting and indicating system
IEC62271-213:2021	High-voltage switchgear and control-gear - Part 215: Phase comparator used with VDIS
IEC62271-215:2021	Cable accessories for extruded power cable for Working Voltages from 3.3 kV up to and Including 33 kV.
IS13573-2	HV switchgear and control gear - AC Metal Enclosed switchgear and control gear for voltages above 1 kV and upto and including 52 Kv.

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION OF RMU:

1	☐ Maximum ambient temperature	43deg.C
2	☐ Max. Daily average ambient temp	35deg.C
3	☐ Min Ambient Temperature	07deg.C
4	☐ Maximum Relative Humidity	100%
5	☐ Minimum Relative Humidity	40%
6	☐ Average No. of thunderstorm days	50annum
7	☐ Average Annual Rainfall	2380mm
8	☐ Average No. of rainy days per annum	120daysmax.
9	☐ Rainy months	JunetoOct.
10	☐ Altitude above MSL not exceeding	1000meters
11	☐ Wind Pressure	ZoneV(maximumrecorded300Kmph)
12	☐ Earthquakes of an intensity in horizontal direction	equivalenttoseismicaccelerationof0.3g
13	☐ Earthquakes of an intensity in vertical direction	equivalenttoseismicaccelerationof0.15g(g being acceleration due to gravity)

TPCODL/TPNODL/TPSODL/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 and dust in suspension during the dry months and is subjected to fog in cold months.

Note: Climatic Condition will be considered as per respective TPDISCOM TPC-Mumbai/TPDDL/TPCODL/TPNODL/TPSODL/TPWODL.

4. GENERAL TECHNICAL REQUIREMENTS OF RMU:

Sr. no.	Description	Requirement
1	Application	11kV, Threephase-Threewire
2	Rated Voltage	12kV
3	Service Voltage	11kV
4	System Frequency	50Hz
5	Internal Arc rating	IACAFL or better/IACAFLR or better for Outdoor RMU
6	Internal Arc test	20kAfor1Sec.
7	Lightning Impulse Withstand Voltage	75kVPeak
8	Power Frequency Withstand voltage	28kV rms
9	Rated current of incomer load break switch	630 A
10	Rated current of Circuit-breaker	630 A
11	Rated Short time Current withstand	21kAfor3 sec
12	Rated Short circuit making current	50kA

13	☐ Number of operations at rated short circuit current on line switches, earthing switches, CB	5close
14	☐ Opening time of breaker (max.) without relay time	2.5cycle
15	☐ Closing time of breaker (max.) without relay time	3cycle
16	☐ Breaker Duty Cycle	O-3min-CO-3min-CO
17	☐ Rated cable charging interrupting current of incomer -- Load Break Switch	10A
18	☐ Rated cable charging breaking current of breaker	25A
19	☐ Insulating medium	SF6
20	☐ Interrupting medium	Vacuum - for CB and SF6 for LBS and earth switch
21	☐ Temperature Rise	Maximum permissible temperature rise for busbar shall not be 65°C at an ambient temperature not exceeding 40°C, as per IEC 62271-1. However, the temperature rises for accessible enclosures and covers shall not exceed 30K and in case, they are not required to be touched during normal operation, the limit shall be raised by 10K.
22	☐ Cable compartment	Front opening cable compartment for all feeders
23	☐ Motorization	Normal RMU should have provision for Motor fixation in LBS compartment.
24	☐ Interlock	Motorized and Smart RMU shall have Motorized LBS and CB compartment.

RMU CONFIGURATIONS

RMU Category (Normal, Motorized or Smart)

1. Normal

1/2/3/4/5way

+Outdoor(Indoor for special case only)

+LBS(No to be specified on tender)+VCB(Nos to be specified in tender)

+FPI in each LBS

+Non-Extensible

2. Motorized

1/2/3/4/5way

+Outdoor(Indoor for special case only)

+LBS(No to be specified on tender)+VCB(Nos to be specified in tender)

+FPI in each LBS

+Non-Extensible

3. Smart

1/2/3/4/5way

+Outdoor(Indoor for special case only)

+LBS(No to be specified on tender)+VCB(Nos to be specified in tender)

+FPI in each LBS

+Non-Extensible

5. GENERAL CONSTRUCTION FOR RMU

MAIN TANK

The switchgear and bus bar shall be contained in a stainless-steel tank filled with SF6 gas and the outer body shall be made of GI high tensile steel/CRCA 2 mm thick with thick gland plates as per IS 513. (Enclosure Material GI/CRCA to be finalized during detailed engineering)

The tank shall have SS sheet of 2.5 mm thickness minimum (or as per type tested design of bidder with undertaking on letter head) and meet the "sealed pressure system" criteria in accordance with the IEC 62271-200. This is a system for which no handling/refilling of gas shall be required throughout the expected operating life, i.e. 30 years. Sealed pressure systems are completely assembled, filled and tested in the factory.

The maximum leakage rate of SF6 gas shall be lower than 0.1% of the total initial mass of SF6 gas per annum from main tank. The filling pressure for the switchgear shall be just above the atmospheric pressure so as to prevent the tendency to leak. SF6 gas used for the filling of the RMU shall be in accordance with IEC 376.

It is mandatory to fit an absorption material in the tank to absorb the moisture from the SF6 gas and to regenerate the SF6 gas following arc interruption. The degree of protection for RMU tank (Indoor/Outdoor) shall be IP 67.

The RMU shall be complete with all connection and all current carrying components shall be of copper inside tank. The copper bus bar shall have a continuous current carrying capacity of 630 A. The bus bar shall be fully encapsulated by SF6 gas inside the steel tank.

The tank shall have separate SF6 refilling valve and the filling pressure must be mentioned near the valve. And the refilling valve should be marked properly.

If same valve is used for pressure indicator or remote communication, then the procedure to refill to be mentioned near the NRV with permanent sticker.

The SF6 tank shall be completely enclosed in the enclosure such way that any rodent entry on top or side of tank is deterred.

All configurations should be in one tank without any coupling/joint on main Busbar.

Tank explosion vent shall be at the bottom.

GENERALDETAILS

The mimic board shall be provided with IP2X/IP3X degree of protection for Indoor RMUs and protection for Outdoor RMUs shall be minimum IP54 (Main door closed). Cable compartment shall be IP54.

The RMU shall be suitable for mounting on plinth with trench below and shall have base frame on sides with mounting bolt accessibility from outside of RMU. The mounting bolts provision shall be min. M12 bolts on all four sides. The mounting bolts and nuts shall be of hot dip galvanized to avoid rusting. The provision for cabling shall be through base plate from bottom of RMU through trench below. The RMU shall be designed so that the position of the different devices is visible to the operator on the front face plate with permanent type indicators.

The RMU shall be identified by visible font sized permanent painting (UV resistant and durability to be maintained throughout the full operational life of the RMU) which clearly indicates the functional units and their operation directions etc. The ON or OFF shall be marked as words and only I/O labelling shall not suffice.

The RMU shall be designed to be tamper proof to prevent access to all live parts during operation without the use of special tools.

The earth bus bar shall be covered if passing through the cable chamber and enclosed in an enclosure housing to prevent theft/tampering. Only extension outside enclosures shall open for access.

There shall be continuity between the metallic parts of the RMU and cables so that there is no electric field pattern in the surrounding air, thereby ensuring the safety of people. The enclosure and cable compartment and tank shall be connected to common earthing.

All parts of main circuit to which access is required or provided shall be capable of being earthed prior to becoming accessible. This does not apply to removable parts which become accessible after being separated from the switchgear and controlgear. The cables shall be earthed by an earth switch with short-circuit making capacity in compliance with IEC 62271-102.

The LBS/CB shall not be closed in case Earth Switch is closed. The earth switch shall be fitted with its own operating mechanism and manual closing shall be driven by a fast-acting mechanism, independent of operator action. Mechanical interlocking systems shall prevent access to the operating shaft to avoid all operator errors such as closing the earth switch when the Load break switch is closed or when cable is charged.

All panel covers shall be provided with anti-vandal screw bolts so that opening of panel covers is only possible with special tools, which shall be provided by the Bidder as mandatory spare/tool.

The default design of cable compartment shall be 1 run 3C x 400 sq.mm 11 kV or 1 run 3 nos. 1C x 630 sq.mm 11 kV UG or 1 run 3 nos. 1C x 185 sq.mm 11 kV UG, XLPE, armoured. However, actual size of cable to be decided during tendering/detailed Engineering.

The circuit breakers, Load break switches and earthing switches shall have pad lock provision & can be locked in the open or closed position by 1 to 3 padlocks 6 to 8 mm in diameter.

Anticorrosive fasteners & components to be provided on switchgear.

The main busbar current density shall be less than 2.7 A/sq.mm.

The cable gland plate shall have split type design having two parts for removal of cable with termination. For Single core cable aluminum Gland to be used.

The vacuum interrupter shall withstand 10⁻⁷ milli-bar Vacuum Pressure ensuring high quality vacuum for interruption and shall have Copper Chromium Arcing Contacts. The interrupter manufacturing unit shall have shall be single Shot brazing and have high First pass Yield. (Shall be part of Bidders own vendor evaluation criteria)

For each terminals bolt should be provided with Cup or Belleville Washer and flat washers. (Note - The cut spring washers are not accepted)

The CT secondary wires & Trip coil wires shall not have any joint in-between CT & TB or relay.

INTERNAL ARCTESTING

Any accidental over pressure inside the sealed chamber tank shall be limited by the opening of a pressure limiting device provided at the bottom part of the tank. Gas shall be released to the bottom without affecting cables and termination of the RMU with partition between cable chamber such way that gas releases away from the operator. Bidder shall provide type test report to prove compliance to the 'Internal fault IAC- A FL minimum for indoor and A-FLR for outdoor with bottom release' as per IEC 62271-200 on main tank and cable chambers.

An anti-reflex mechanism on the operating lever shall prevent any attempts to reopen immediately after closing of the switch or earth switch. All manual operations shall be carried out on the front of the RMU. In case of SF₆ gas leakage from gas tank or any kind of repair should be done at site or replacement of complete RMU to be done free of cost within guarantee period.

INCOMER LOAD BREAK SWITCHES (LBS)

Load break switches shall be maintenance-free. The position of the contacts and earthing contacts shall be clearly visible on the front of the RMU. The position indicator shall provide positive contact indication in

accordance with IEC 60265-1. In addition, manufacturer shall prove reliability of indication in accordance with the standard. The switches shall be of the "increased operating frequency" in accordance with IEC 60265-1. There should be provision that the LBS earth switch operation should be independent of DC supply availability.

The LBS shall have at least 3 positions, open-disconnected, closed, and earth (with making capacity) and shall be constructed in such a way that natural interlocking prevents unauthorized operations.

The disconnecter should have the maximum 200 micro-ohm contact resistance.

Earthing of the cable shall be either through a three positions switch of a separate snap action type or Earth Switch having fault making capacity.

The switches shall be fully mounted and inspected in the factory. For Normal RMU Provision for future motorization of LBS and CB should be kept in configuration while designing RMU. For Motorized and Smart RMU motor to be provided for LBS and CB operation.

The load break switch and earthing switch operating mechanism shall have mechanical endurance of at least 1000 (M0) operations. The type test reports to be submitted along with Bid.

Load break switch shall have mechanical switch operation counter and should be visible on front in horizontal alignment.

Load break switch shall have mechanical switch operation counter and should be visible on front in horizontal alignment.

The Load break switch should have minimum spare 3NO+3NC auxiliary contacts, additionally for TPDDL, 4 NO + 4 NC contacts are required for isolator as spare. Earth Switch shall have 1 NO + 1 NC auxiliary contacts, additionally for TPDDL, 1 NO + 1 NC contacts are required for Earth as spare.

The load break switch shall be compatible for manual & remote operation without any modification of the operating mechanism and without de-energizing the RMU. The LBS shall be fitted with an electrical operating mechanism and can remotely open-disconnected, closed and earthed from a reserved location.

CIRCUIT BREAKER FOR TRANSFORMER /LOCAL FEEDER CONTROL

The circuit breakers/interrupter shall be of the maintenance free.

The circuit breakers shall have at least 2 positions: Open-disconnected and closed and shall be constructed in such a way that natural interlocks prevent all unauthorized operations.

In view of safety each VCB shall be assisted with disconnecter having 3 positions, open-disconnected, closed, and earth (having fault making capacity) and shall be constructed in such a way that natural interlocking prevents unauthorized operations.

They shall be fully mounted and inspected in the factory.

Breaker contact resistance should be ≤ 50 micro-ohms. The various circuit contact resistance should comply with provisions in IEC 62271-200.

The breaker should have minimum spare 4NO+4NC auxiliary contacts. Additionally, for TPDDL, 4NO+4NC contacts are required for breaker as Spare.

An operating mechanism can be used to manually close and open the circuit breaker with single push on pushbuttons. It shall be fitted with a local system for manual tripping by an integrated push button. There will be no mechanical automatic re-closing.

The circuit breaker compartment shall have three current transformers, an electronic self-powered relay, a Series & a Shunt trip coil for CB tripping.

CT shall be mounted on cables. The mounting arrangement shall be flexible to move to & fro, up and down based on site condition of cable terminations etc. The mounting arrangement shall ensure that the CT should not reach less than 300mm from live part of bushing. The CT mounting

shall be fixed at position while dispatch such that the cable entry, the bushing terminal bolt, and CT core hole are co-axial.

Fixing bracket to be provided for fixing CT on particular position without touching termination cores. Bolting arrangement to be provided for fixing CT on the mounting bracket.

In any mounting the CT shall be mounted in such a way that the secondary connection shall be accessible and visible from front side after opening cable compartment door.

Breaker shall have mechanical endurance of at least 10000 (M2) operations. Relevant type test reports to be submitted along with bid.

Breaker operation counter should be provided and should be visible on front in horizontal alignment.

In control cabinet the Terminal block shall have AC input wiring provision and MCB provision for incoming of LT AC supply.

The relay auxiliary power, communication ports and other required ports should be wired upon the TB. The breaker should have one series trip coil and one shunt trip coil.

The shunt trip coil shall be of 230V AC/24V DC along with charger and complete wiring up to trip coil through DC MCB and MCB arrangement for AC charger.

Protection relay:

- Electronic self-powered target latched by battery or capacitive unit.
- There shall be Conformal Coating on relay PCB.
- The protection relaying shall have following features:

Phase Protection: With Definite time/ IDMT element having standard characteristics of Standard Inverse, Very inverse, Extremely Inverse (as per IEC 255-3) or Fuse Characteristics.

Earth Fault Protection: With Definite time or IDMT element having standard characteristics of Standard Inverse, Very inverse, Extremely Inverse as per IEC 255-3 standard.

The CTs of 2.5VA, 5P10 Class shall be employed. CT ratio shall be 60 to 400/1 (Further CT ratio (with at least two primary current rating) to be finalized during detailed engineering).

The preferable make of relay are ABB, Ashida, Schneider, Siemens make self-powered relay.

The terminal protectors to be supplied with the 11 KV RMU by the vendor along with the cable termination bolt for termination 185 Sq.mm 11kV 1C cable in breaker & 300 Sq. mm 11kV 3C for isolator compartment.

The make of the vacuum bottles shall be same as that of the Type tested design.

BUSHINGS AND CABLE TERMINATIONS

Bushing should be of Epoxy resin. Each cable compartment shall be provided with three bushings of adequate sizes to terminate the incoming and outgoing cables. The termination bolt shall be stainless steel and M16 size.

The bushings shall be conveniently located for proper bend so as to allow easy working and termination of cables. The cable termination shall be done with Heat shrinkable / Push ON termination method so that adequate clearances are maintained between phases & cable shall be held by HDPE/Nylon (fire retardant) cleat. The Sizes of incoming and outgoing cable shall be as per clause no. 5.2.10.

Bidder should provide bimetallic washer for connection between Copper bushing stud and Aluminium Lug. Necessary spring and flat washers to be provided on each terminal. The bimetallic washer shall be suitable HDG M12 bolt for supply and 630A rating in all compartments with minimum thickness of 2mm and sufficiently cover the complete copper bushing stud. The bidder can alternately offer tinned copper surface of bushing then bimetallic washer not required.

The Terminal bolt shall have arrangement for fixing the cable test rod through cable boot opening. Cable boot should have opening for test rod insertion.

Cable boot shall be FR grade. Further, if clearance between bushing and body is less than 65mm then touch free terminations may be specified. If Min. clearance in-between phase to phase bushings (center to center) < 95mm, screened boots shall be provided.

The bolt tightening pressure must be written inside each cable chamber with permanent sticker.

Cable boot for cable terminations should be as per IS 13573-2. Boot should be easy to install.

The cable compartment must be without any holes or gaps and properly vermin proofed before inspection.

The cable compartment doors shall have interlocks such that doors can be opened only with earth switch in closed position.

Termination boots shall be as per type tested design. And should have a proper opening to facilitate the testing. The opening in boot shall be covered by means of removable protection cap.

All cable compartments shall have front door opening. The cable cover door shall be pad lockable and shall be Tamper and Arc proof. The circuit breaker and earth switch shall be lockable in the open or closed positions by 1 to 3 padlocks.

In outdoor RMU the doors should have padlock provision and cable door shall have interlock so that it shall not be opened by external forces. Also, it shall not be possible to operate the load break switch / isolator or breaker from outside once door closed. This is required to prevent pilferage.

Locking provision of cable compartment door to be provided in case of any switch/CB is at earth position to avoid pilferage.

EARTHING:

The RMU outdoor metal clad switchgear enclosure, load Break Switch, VCB, SF6 tank etc. shall be equipped with a copper earth bus throughout all compartments and securely fixed along the base of the RMU with cover.

The extension of this earth bus shall be taken out minimum 50mm outside the enclosure on both sides for fixing of the outside GI earth flat of 50mm width. The extension coming out of enclosure shall be properly sealed such a way to ensure vermin proofing of the cable compartment.

The size of tinned copper earth bus-bar should be Min. 105 sq.mm inside the enclosure to withstand short time current carrying capacity as per IEC. Earth Bus Bar shall be tinned copper and thickness of tinning to be 10 µm (minimum).

Two nos. body earthing bolts of M12 X 70mm to be provide on the extended bus-bar.

The mother earth needs to be extended upto 250mm periphery of cable entry hole so that the cable termination earthing can be connected easily to the main mother earth with 12mm bolt and washers. This arrangement needs to be provided in each compartment of RMU.

The main tank must be connected to mother earth at least two positions with proper contact.

In outdoor type compact design bidders should ensure the earthing from mother earth is provided inside the cable compartment for earthing of the cable terminations.

Bidder to ensured that the earth bus shall be single conductor/bus suitable for taking specified fault current and both main earthing are interconnected by earth bus and not through tank or enclosure.

If bolts are provided as current carrying path then the bolt material shall be brass and size shall be suitable to carry specified fault current.

Two nos. body earthing bolts of M12 X 70mm to be provide on the extended bus-bar. Bolts must be hot dipped galvanized.

VOLTAGE INDICATOR LAMPS AND PHASE COMPARATORS

Each compartment of RMU shall be equipped with a fixed type voltage indicator lamps having dip ports for insertion of phase comparators or line tester to check the phase sequence or presence of charge in cable. This is to be fixed on the front face plate to indicate presence of voltage in the cables. The capacitive dividers will supply low voltage power to the indicator lamps. Three inlets can be used to check the synchronization of phases with phase comparator or another device. These devices shall be following IEC 62271-206:2011 standard. The VPIS without dip ports are not accepted.

All the VIPS installed on compartments shall have auxiliary contacts wired up to the terminal block of respective compartment which shall be further used for remote status indication at SCADA.

There should be electrical interlock of cable presence indicator and operation of earth switch in RMU incomer cable compartment of LBS.

In smart RMU this shall have to be programmed for SCADA communication.

This feedback should be used to operate the interlock for earth switch such that earth switch shall not operate when back end of cable is live.

FRONT COVER

The front cover shall provide a clear mimic diagram that indicates the different functions. This shall be permanent in nature throughout the useful life of the RMU.

The position indicators shall give a true reflection of the position of the main contacts. Position Indicators shall be clearly visible to the operator.

The lever operating direction shall be clearly indicated in the mimic diagram.

The bidder shall provide a operating sequence process on each compartment with permanent type arrangements. So that all data shall be self-explanatory.

The mimic plate or cover should be separate for each module/feeder of the RMU in view of safety. In case of any work to be done on mechanism of any one feeder then operation staff shall have only access to particular feeder via opening feeder mimic plate or cover plate.

The mimic shall have clear Words for "CLOSE/OPEN/EARTH" at each desired place.

All status indicators shall be marked visible font sized permanent painting (UV resistant and durability to be maintained throughout the full operational life of the RMU) as Earth ON/OFF, Disconnecter/LBS ON/OFF, CB ON/OFF.

All operating ports shall have marking like spring charging provision, three position disconnecter port and Shutter operator for interlocking, Operation allowed along with arrow indication and labeled as earth operation or disconnecter operation.

For better clarity of earthing related operations shutters and ports shall be painted in yellow background such way that the persons should get clear indication that if operating in yellow region means he is performing earthing related operation.

The Direction of operation shall be clock wise for any close operation and counter clock wise for any open operation of disconnecter/LBS and earth switch.

There shall be one label for SF6 gas pressure indicator and a clear message must be fixed near pressure indicator that region of safe operation and Alert message stating 'If GAS pressure not OK. Do not operate any switchgear and report to OEM (name) customer care/engineer in charge' this message should be clearly visible in front with suitable background and shall be with permanent marked.

For gas pressure indication a dial type manometer to be provided with will show actual pressure.

Gas pressure detector shall have SCADA compatible contacts and wired up on TB with labelling. This should give low gas pressure alarm to the SCADA.

In case of smart RMU the FRTU should be programmed such that in case of low GAS pressure the remote switch operation should be blocked.

All the other accessories and boxes shall be properly labelled with permanent marking/printing such way that the product is self-explanatory for user. Nomenclature to be provided along with symbols.

FAULTPASSAGEINDICATORS

Fault Passage Indicators shall be installed on the Ring Main Unit. Offered FPI shall give Fault Detection status with direction. These devices shall be electronic devices with dual energy source – with self-powered inbuilt battery and with provision of 24V DC aux supply. It must be connected to Single 3 phase Split Core CTs for O/C. These shall be provided with bright LEDs/flag Indicators, which shall be clearly visible in the daytime. These shall have the following resetting facilities:

- a. Manual reset

b. Resetting after a set time duration

c. Electrically reset from remote with at least 2-spare potential free contacts.

d. Resetting on restoration of LV

The unit shall have Short Circuit adjustable to different settings with separate Current transformer.

They shall be fully field-programmable and shall have at least and 5 settings for Phase fault or over current.

The preferred range is – O/C setting range 200-1000A.

The default setting shall be and 300A for overcurrent. This shall be ensured before inspection call in each RMU.

It shall be possible to Test these indicators at site thru “Test” push button. The Fault Passage Indicators shall also be provided with a SCADA output contact.

The process of fixing the FPI shall be fixed on the wall of the incomer LBS cable compartment along with pictorial view.

FPI connecting wires should be properly dressed and covered in insulated sleeve and tied to the side walls with help of cable ties. If sticking type arrangement is provide, then it must be with good quality permanent adhesive from reputed makes like 3M and should not come out with force of 10kN.

These shall confirm to the following standards:

REMOTE CONTROL OF THE RMU:

LV Box at top(accessible from front side only)

A. For non-motorized RMU:

- a) Future provision for motorization to be kept on each feeder of each RMU.
- b) For future requirement of remote operation of the RMU line switches shall be possible using motors fitted to the operating mechanism for both line switch and circuit-breaker functions as and when required. All the necessary accessories shall be supplied separately to stores based on PO placed on quotation provided in this tender.
- c) The fitting of the motors to the mechanism must not in any way impede or interfere with the manual operation of the switches. An auxiliary contact to prevent motorized operation of the mechanism while the operating handle is inserted into the operating point shall also be provided

B. Formotorized RMU-

The motors to be fitted in LBS and CB sections. The fitting of the motors to the mechanism must not in any way impede or interfere with the manual operation of the switches. An auxiliary contact to prevent motorized operation of the mechanism while the operating handle is inserted into the operating point shall also be provided. & shall have option to provide auxiliary PT having 1000VA burden for power supply to the FRTU, relay and DC battery charger.

- The On/Off Push button of LBS and VCB shall be illuminated type with inbuilt LED indicating presence of electrical supply.
- Both the LBS should be wired up for auto changeover scheme. And CB to be wired up for Auto-recloser Scheme/feature.
- The CB mechanism should be suitable for auto reclosing after 10 second dead time.
- 1 No. Surge Protection Device to be provided for the relay communication ports for protection from external surge.
- 1 No. Surge Protection Device to be provided for FRTU.

Harting plug arrangement to be provided on each feeder of RMU. All the pins not used in harting plugs needs to be provided separately as spare. Preferred communication protocol for FRTU shall IEC-60870-5-104.

All Close-Open coils/signaling contacts shall be rated for 24V DC. Following signaling contacts are essential for remote operation of RMU:

- A) Aux. contact for Line Isolator (Status)
- B) Aux. contact for all earthing switch (Status)
- C) Aux. contact for Breaker (Status)
- D) Aux. contact for FPI indication with direction
- E) Aux. contact for Protection trip (Breaker module)
- F) Aux. Contact for Low Gas Pressure
- G) Open/close status of the front cover of RMU, control panel and cable chamber door

4 Nos. spare relay tripping NO, NC contacts to be provided. Flag Indications on RMU when tripped should be on shunt trip. A provision for physical disconnection of motor supply (like fuse) of line isolator must be provided in RMU unit itself. (A flag is required for series and shunt coil actuation).

There should be hating plug arrangement for individual Isolator as well as breaker motor connections, which will be fitted on the RMU body itself. Also the PCB of motor should be covered by anti-tracking agent. There should be relay with timer instead of only relay, which is used in the latching circuit.

20% spare TB plug shall be required. All spare I/O points of FRTU should be wired up to hating TB plug.

Suitable unlatching system to be provided to prevent mal operation of motor in case of any latched command/ non-executed command at RMU (case like fuse failure etc.)

The separator between terminals to be provided to avoid any tracking etc.

One lamp with door open sensor to be provided in LT cabinet and 6/16 Amps switch and plug socket to be provided. The chamber shall have space heater at suitable location away from wires. The cable chamber shall have space heater at suitable locations.

Signal requirement for field RTU (which shall be mounted near RTU) is attached (refer Annexure-1).

A. For Smart RMU:

a) The smart RMU shall be motorized in LBS and CB also. This shall also have FRTU of the User approved make and approved models viz. Siemens, ABB/Hitachi, Schneider, Ashida etc. (updated list shall be shared during pre-bid meeting) & shall have auxiliary PT having 1000VA burden for power supply to the FRTU, relay and DC battery charger.

b) The On/Off Push button of LBS and VCB shall be Illuminated type with inbuilt LED indicating presence of electrical supply. The FRTU shall be of approved make and model along with any license key (if required) for programming and logic development at any site at any time.

c) The wiring diagram drawing should be fixed inside the compartment preferably at back side of door.

d) Any TB should not be mounted on base plate of RMU.

e) The battery terminal & other live terminals should be protected with insulating medium covering to avoid any direct accidental contact.

f) One Single pole MCB required for all DI signals and one single pole MCB required for DO positive supply.

g) 1 No. Surge Protection Device to be provided for the relay communication ports for protection from external surge. 1 No. Surge Protection Device to be provided for FRTU.

h) Provision for taking out antenna to be kept in FRTU cabinet and space for fixing modem (preferably 5G fallback to 2G) to be kept in cabinet.

i) Both the LBS should be wired up for auto changeover scheme. And CB to be wired up for Auto-recloser Scheme/feature.

j) The CB mechanism should be suitable for auto reclosing after 10 second dead time.

k) Local/Remote switch & Auto/Manual Switch should be provided on the FRTU Chamber.

l) One lamp with door open sensor to be provided in FRTU cabinet and switch and socket to be provided.

m) The chamber shall have space heater in combination with thermostat at suitable location away from wires/Hygrostat is preferred for Aux PT chamber especially for coastal area.

n) Group marking & labeling to be done for all TB.

Hating plug arrangement to be provided on each feeder of RMU. All the pins not used in hating plugs needs to be provided separately as spare. Preferred communication protocol for FRTU shall IEC-60870-5-104.

All Close-Open coils/signaling contacts shall be rated for 24V DC. Following signaling contacts are essential for remote operation of RMU:

- A) Aux. contact for Line Isolator (Status)
- B) Aux. contact for all earthing switch (Status)
- C) Aux. contact for Breaker (Status)
- D) Aux. contact for FPI indication with direction
- E) Aux. contact for Protection trip (Breaker module)
- F) Aux. Contact for Low Gas Pressure
- G) Open/close status of the front cover of RMU, control panel and cable chamber door

4 Nos. spare relay tripping NO, NC contacts to be provided. Flag Indications on RMU when tripped should be on shunt trip. A provision for physical disconnection of motor supply (like fuse) of line isolator must be provided in RMU unit itself. (A flag is required for series and shunt coil actuation).

There should be hating plug arrangement for individual Isolator as well as breaker motor connections, which will be fitted on the RMU body itself. Also the PCB of motor should be covered by anti-tracking agent. There should be relay with timer instead of only relay, which is used in the latching circuit.

20% spare TB plug shall be required. All spare I/O points of FRTU should be wired up to hating TB plug.

Suitable unlatching system to be provided to prevent mal operation of motor in case of any latched command/ non-executed command at RMU (case like fuse failure etc.)

The separator between terminals to be provided to avoid any tracking etc.

One lamp with door open sensor to be provided in LT cabinet and 6/16 Amp switch and plug socket to be provided. The chamber shall have space heater at suitable location away from wires. The cable chamber shall have space heater at suitable locations.

Signal requirement for field RTU (which shall be mounted near RTU) is attached (refer Annexure-1).

1. **Technical Details of motors**(For motorized and smart RMU only)

- a. Operating Voltage 24 VDC
- b. Max. power rating 240 Watts
- c. Max current drawn 9 Amp ($\pm 10\%$)
- d. Operating time 4-8 seconds
- e. Power Supply Motor shall be suitable for 24 VDC
- f. Motor Torque shall be higher than Mechanism Torque and be more than sufficient.
- g. The motor shall be protected against overloading and abnormal temperature rise, with an indication mechanism in place.

2. **Technical details of Auxiliary PT(2core)**For smart RMU only

- a. Voltage ratio - 11000/3 □ 240V, 3 □ 240V
- b. Power frequency withstand: 28kV
- c. Impulse withstand: 75kVp
- d. Voltage factor 1.2 continuous and 1.9 for 8 hours
- e. Burden - 1000VA each

- f. Accuracy - 6P/6P
- g. Type tested design (test report from OEM)
- h. Offered make

3. The FRTU offered model and make

Preferred make and model for the FRTU (However it will be finalised during detailed engineering)

- a. ABB/Hitachi Make FRTU with Model No – RTU540, RTU 530
 - b. Siemens Make FRTU with Model No – A8021
 - c. Schneider Make FRTU with Model No – T300
 - d. WAGO Make FRTU with Model no - 750-8212
 - e. For any other OEM – Please provide details during detailed engineering and subject to approval of concern DISCOM.
- 4. The bus bar connecting to Aux. PT should have 11kV insulation sleeve.
 - 5. THE HT compartment and FRTU compartment shall have separate door for safety.
 - 6. The Aux. PT shall have HT fuse protection (Bidder to mention make and rating of fuse offered).
 - 7. The Aux. PT compartment cover shall have interlock so as to avoid opening when bus is charged for safety, applicable for the FRTU and PT placed having common enclosure.
 - 8. Model of Modem for communication of data to be mentioned. Approved make of modem are ABB Viola & Robustel R2010.

*Any new model is required to undergo evaluation through a field trial for a minimum duration of 3 months.

- 4. In the scope of bidder testing, commissioning and integration of signals through FRTU upto ADMS is included. Bidder to comply.

FOR ALL TYPE OF RMU

1	Protection against theft	Design of RMU shall be tamper & arc proof. Anti-vandal screws shall be provided. Cable covers shall be pad lockable. All live parts and internal parts etc. shall be covered with antitheft covers.
2	Doors	Hinged doors shall be provided for outdoor type RMU. The hinges for the doors need to be riveted and shall not have any access from outside. Bolted hinges shall not be acceptable.
3	Voltage indicator box shall be fixed type - This device shall be following IEC 62271-206:2011 standard only	Capacitive dividers type which will supply low voltage to power the lamps AND 3 inlets can be used to check phase sequence or presence of voltage in cable.
4	Cable cleats (full circle)	Nylon (Fire Retardant)
5	Bushing suitability for cable termination types	Bushing should be suitable for Heat & Cold shrink terminations. The termination should RMU compatibility kit.
6	The cable compartment suitability shall be	It will be finalized during detailed engineering.
7	The cable compartment	Suitable for cable sizes:
8	Size of bimetallic washer in all compartments	a. 11kV 3C X 630 sq.mm/3C x 400 sq.mm having dia of 100mm in all compartment and
9	Height of bushing terminal from base plate in each cable compartment.	Minimum 800mm from base plate to bushing bolt center for proper termination space.
10	The cable compartment box length for easy termination of armored cables.	One FPI for each LBS.
11	Fault passage indicator (SCADA compatible)	To be provided.

12	List of Type test of product	To be attached for each model & type offered with test report number and date.
13	Availability of spares	Assurance by bidder for 25 years, list of spares as mentioned in specification to be provide along with RMU lot.
14	VPIS electric interlock	The VPIS shall have electrical interlock with earth switch such that only earth when cable not charged.
15	VPIS with Aux. contact	In all compartments.
16	Breaker operation counter	To be provided.
17	LBS operation counter	To be provided.
18	Direction of operation (Close - clockwise Open - counter clock wise)	LBS – ON/off ES - Open/close
19	Auxiliary contacts (total and spare)	CB disconnecter - ON/off
20	Control cable entry provision	CB earth switch - Open/close
21	DC Shunt trip coil (24V)	a. LBS
22	Double pole AC MCB of suitable rating to be considered in battery i/c and polarized DC MCB of suitable rating to be considered for individual LBS, CB Section as well as common DC output.	b. Earth Switch
22	MCB for LT AC incomer and TB connection of all CT, Aux switches and relay wiring in separate control cabinet.	c. CB

23	RMU Cable Boot/ terminal protector to be provided in each compartment for each phase.	Bidder to mention offered a. Make b. Model c. Material of boot d. Test report and datasheet showing suitability e. Confirmation from bidder that same boot was used during type testing of RMU. f. Impulse voltage rating of boot
24	On the extensible bushings of each phase the 11kV insulation to be provided.	Bidder to comply for the same.
25	Cable boot/ terminal protector should be suitable for 400 sq.mm cables with flat lugs square end 400 sq.mm.	Bidder to comply for the same.
26	All auxiliary contact, relay LT Supply contact, relay DI/DO contact, provision for communication device in a control compartment.	Separate compartment to be provided for Terminal block of all auxiliary contacts wired up.
27	In each cable compartment each bushing shall have temperature sensors.	The temperature data should be shown on one common display unit and shall be communicated to SCADA in motorised and Smart RMU.
28	Total height of the indoor RMU should be <1900mm.	Bidder to accommodate without compromising other requirements.
29	Terminal bolt material and bolt length & washers offered.	The terminal bolt shall be M16 and of stainless steel. The offered length to be mentioned along with washer details.
30	Battery Capacity and Preferable battery make.	26Ah at least for RMU part only.
31	SMPS make and Rating.	Battery capacity and type should be 2x12V Maintenance free.
32	Battery Charger Isolation voltage and auto boost mode.	Preferable Make: Exide, Amararaja, HBL etc.

PAINT

All paint shall be applied on clean and dry surfaces under suitable atmospheric conditions by seven tank process and powder coating. The overall paint thickness shall be 70 to 125 microns. (will be decided by user at the time of issuance of tender as per site requirement). The paint Type text here shall not scale off or crinkle or be removed by abrasion during normal handling. The enclosure of the RMU shall be painted with shade Dark Gray, i.e., BS381 CorRAL7032. Sufficient quantity of touch-up paint shall be furnished for application at site.

SLD AND CONFIGURATION

SLD to be provided by the bidder during bidding stage for reference

CONTROL CABINET

Control cabinet with a terminal block (TB) located at convenient accessible location so as to wire all inputs & outputs (IOs) up to the terminal block (TB). All the cable secondary wiring should be rooted through marshalling box separately for relay, CT etc.

The wiring of the relay to be done on the TB for its terminals along with communication terminals.

All terminals wired shall have proper identification ferrules and the identification marking provided on TB.

Control cabinet shall have control cable entry arrangement on both sides of the RMU top control cabinet with proper grommet such that the opening are sealed in normal installations when not used for our door extension box arrangement to be provided any other arrangement to be explained in drawing during tender.

NAMEPLATE&MARKING:-

All the components and operating devices of the RMU shall be provided with durable and legible nameplates containing all technical parameters. Nameplates shall be suitably embossed with "PO no. with date", "PROPERTY OF Tata Power-Mumbai/TPDDL/TPCODL/TPNODL/TPWODL/TPSODL" & "CODE NUMBER" along with the following information. A Danger plate of appropriate size shall also be provided on the enclosure.

- a) Manufacturer's Name
- b) Month and year of supply
- c) PO Number
- d) Type/Model
- e) Rated Voltage
- f) Rated current
- g) Service voltage
- h) System Frequency
- i) Rated Short time withstand current for 1 sec
- j) Rated Impulse withstand Voltage
- k) Degree of Protection
- l) Type Designation or Serial no.
- m) Year and month of manufacture.
- n) Applicable Rated values
- o) Mass of unit
- p) SF6 gas filling pressure.
- q) Warranty period

The sr. no. and year of manufacturing shall be painted in black color with yellow background ON SIDE.

TESTS FOR RMU

All the Routine and acceptance tests shall be carried out in accordance with the relevant IS/IEC standards. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components within the RMU enclosure shall have been tested for Routine/acceptance and Type tests as per the relevant standards. All Type tests as per latest IS/IEC shall have been carried out on the RMU as a whole as per relevant IS/IEC. Following tests shall be necessarily conducted on the equipment and its components as specified in IEC 62271-200:

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

TYPE TESTS

Sr. No.	Sts stipulated as per Tender Spec.	Applicable standard	Acceptance Clause as per IS /IEC
1	PF withstand voltage test & Lightning Impulse voltage withstand test for Switches	IEC62271-103	CI6.20 of IEC62271-103, CI 7.2.7.2 & 7.2.7.3 of IEC62271-1
2	PF withstand voltage test & Lightning Impulse voltage withstand test for CB	IEC62271-200	CI6.2.6.1 & 6.2.6.2- IEC62271-200
3	Measurement of contact resistance & Temperature rise test LBS & CB combined unit (if individual then two separate reports required)	IEC62271-200	CI6.4 & CI6.5 of IEC 62271-200
4	Short Time current and Peak current withstand tests Main Circuit	IEC62271-200	CI6.6a & b-IEC 62271-200
5	Short Time current and Peak current withstand tests Earthing Circuit	IEC62271-200	CI6.6a & b-IEC 62271-200
6	Short Circuit Breaking current tests LBS	IEC62271-103	CI6.101, Table 3 of IEC62271-103
7	Short Circuit Making current test on LBS	IEC62271-103	CI6.101.1.2, Table 3 of IEC 62271-103
8	Short Circuit Making test on Earth Switch	IEC62271-102	CI7.101 of IEC62271-102
9	Short circuit making & Breaking tests on CB – three phase fault	IEC62271-100	CI6.112.1 of IEC62271-100
10	Single Phase test on CB	IEC62271-100	CI6.108 of IEC62271-100
11	Double Earth Fault test on CB	IEC62271-100	CI6.108 of IEC62271-100
12	Mechanical operation tests on LBS	IEC62271-200	CI6.102.2-IEC62271-200
13	Mechanical operation tests on CB	IEC62271-200	CI6.102.2-IEC62271-200
14	Mechanical Endurance tests on LBS	IEC62271-103	CI6.102.2-IEC62271-103
15	Mechanical Endurance tests on CB	IEC62271-100	CI6.101.2.4 of IEC62271-100
16	Mechanical Endurance tests on DS	IEC62271-102	CI7.102.3 of IEC62271-102
17	Partial Discharge test on CB & LBS	IEC62271-200	Annex BB, Procedure B of IEC 62271-200
18	Pressure withstand test of gas filled compartment/Tank	IEC62271-200	CI6.103.1 of IEC62271-200
19	IP67 of Gas compartment/Tank	IEC62271-200	CI6.7.1 of IEC62271-200

20	IP54foroutdoorRMU	IEC62271-200 &IEC- 60529	CI6.7.1ofIEC62271-200
21	IA Con Cable Compartment	IEC62271-200	CI6.106IEC62271-200
22	IA Con Gas Compartment	IEC62271-200	CI6.106IEC62271-200
23	Cable charging current breaking test	IEC62271-100	CI6.102,6.105ofIEC62271-100
24	Capacitive current switching test	IEC62271-100	CI6.111ofIEC62271-100

Note: The bidder can submit the test report with combination of above listed tests. The test of CB & LBS to be done on combined unit. If bidder submits individual unit CB/LBS tests then both units test detailed test reports are to be submitted.

ROUTINE TESTS

Following routine tests are to be done on 100% of the lot quantity:

1. Power Frequency Withstand Test.
 2. Dimensional & Visual Checks.
 3. Operational & Interlock Tests of breaker & isolator switches.
 4. Helium leakage detection test in vacuum chamber.
 5. SF-6 leakage test.
 6. HV withstand test across isolator distance.
 7. HV withstand test of control and auxiliary circuits.
 8. Voltage Indication Tests on VPIS.
 9. Breaker Contact Resistance Test.
 10. Total Trip Time Check Test through Current Injection in primary.
 11. IR Value.
 12. For other components, as per applicability, the RTC as per relevant IS/IEC from Original Equipment Manufacturer (OEM) shall be required:
1. Cable Boots.
 2. Routine test report of the Relay.
 3. CT.
 4. Motor.

ACCEPTANCETESTS

The test mentioned in ITP attached as annexure-3 to this document shall be carried out as acceptance test on random samples. Minimum 10%units(or minimum 2RMUiflotsizeissmall) of the lot shall be selected for acceptance test shall be selected for testing from each offered lot.

Sr. No.	Tests details	Applicable standard	Acceptance Criteria
---------	---------------	---------------------	---------------------

1	PF withstand voltage test on LBS and CB combined with switches closed position.	IEC62271-103&IEC62271-200	CI6.20fIEC62271-103,CI 7.2.7.2&7.2.7.3ofIEC62271-1 CI6.2.6.1&6.2.6.2-IEC62271-200 Should withstand 28kV for 1 minute
2	HV withstand test across isolator distance with opened contact of VCB.	IEC62271-200	Should withstand 28kV for 1minute
3	Voltage Indication Tests on VPIS.	-	VPIS indication should lit up when voltage applied in all phases
4	Measurement of contact resistance on LBS & CB combined with all switches in closed condition.	IEC62271-200	CI 6.4 & CI 6.5 of IEC 62271-200. Total resistance limit shall be maximum 350 micro ohm with busbar & switches closed.
5	Dimensional & Visual Checks.	-	As per approved drawing and technical compliance document for tender.
6	Operational & Interlock Tests of breaker & isolator switches.	As per specification	All interlock shall operate without fail in any operation.
7	Leak Detection Test at bushing terminals after RMU assembly.	IEC62271-1 clause8.5	For gas-filled systems tested in factory, the probing test using a sniffing device to be done. The sensitivity of the sniffing device shall be at least 10-8 Pa × m ³ /s.
8	HV withstand test of control and auxiliary circuits of motorised and Smart RMU.		Should withstand 2kV for one minute.
9	Insulation resistance test.		With open contacts and closed contacts of switches. Should be in Giga-ohms.
10	Other components, as per applicability, the RTC as per relevant IS/IEC from Original Equipment Manufacturer (OEM) to be shared for: Cable boot Relay CT Motor		OEM reports as per IS and IEC.
11	Relay testing - Relay testing should be done with primary injection kit on installed relay.		Total tripping time with relay & without relay (Without relay shall be done at trip coil directly) timing shall be within specified in specification.

Bidder should have all the requisite testing equipment's to carry out routine and acceptance test mentioned in ITP and following set up to be arranged for RMU relay testing:

- a. Facility for primary current injection up to 1000 amp.
- b. Facility to check total trip timing of breaker along with breaker main contacts through primary current injection.

8.0 TYPE TEST CERTIFICATE

The Bidder shall furnish the type test certificates of the 11kV RMU of same design as offered in bid for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA or reputed International Laboratory like PHEL, KEMA, IPH, etc. as per the relevant standards of IS and IEC.

Type tests shall have been conducted in certified Test laboratories during the period not exceeding 10 years from the date of opening the bid. In case if type test conducted beyond 10 years then bidder to certify on letter head of parent OEM that no design change & no manufacturing plant change occurred from type tested product.

In the event of any discrepancy in the test reports, i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to the user.

9.0 PRE-DISPATCH INSPECTION

Equipment shall be subject to inspection by a duly authorized representative of the user. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Supplier shall grant free access to the places of manufacture to the respective user's representatives at all times when the work is in progress. Inspection by the User or its authorized representatives shall not relieve the supplier 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 the User.

Following documents shall be sent along with material:

- a) Routine Test reports
- b) MDCC issued by the user
- c) Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee/Warranty card
- g) Delivery Challan
- h) Installation and maintenance Manual soft copy for FPI, Relay, RMU
- i) Other Documents (as applicable)

10.0 INSPECTION AFTER RECEIPT AT STORE

The material received at the User defined store/location 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.

If any deviation or anomaly is observed at this stage, the same needs to be rectified by bidder at bidder's own cost at the earliest.

11.0 GUARANTEE

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

In case of GP failure, BA shall report at site within 48 hours from intimation and arrange for rectification of fault within a mutually agreed time. In case rectification at site is not possible, then alternative arrangement (replacement) to be made by BA within 15 days of intimation of failure.

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.

1. PACKING

Bidder shall ensure that all equipment 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 packing should be in such manner that during storage the RMU and its components should not be damaged.

No single use plastic to be used in packing material. Packing should be done with environment friendly recyclable materials.

13.0 TENDERSAMPLE

Not applicable. Bidder to mention offered model number or type in GTP along with GA drawing during tender for each variant.

14.0 TRAINING

The bidder shall arrange to provide the installation and operating training at our offices as and when required for better installation and usage of the product.

It is preferred that the service engineer present during installation shall be arranged to provide the operation training of RMU to the staff during installation and inform about the critical points. In addition to this, for new bidder, new product or change in design, the bidder has to provide minimum one training session at each District office of Discom (for TPDDL and TPC-Mumbai)/one training session at concern circle office of Discom (for TPCODL/TPNODL/TPSODL/TPWODL).

In addition to above, bidder to share Digital/Video based training module for safe operation of RMU in pen drive.

15.0 QUALITYCONTROL

The bidder shall submit with the offer, 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 after finishing, bought out items and fully assembled component and equipment including drives. 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 or its nominated representative engineer shall have free access to the manufacturer/sub-supplier's works to carry out inspections.

To ensure proper operation of RMU, the bidder shall provide onsite training of the user teams as and when required. To ensure quality of installations, bidder shall provide supervision support during impartation.

Bidder shall conduct root cause and defect analysis of the failed unit and submit the root cause analysis report within two months of reporting of failure.

13.0 TESTINGFACILITIES

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

The bidder shall have in-house helium gas leakage detection system and all RMU main tank shall be checked for any leakages.

14.0 MANUFACTURINGACTIVITIES

CAT-A/CAT-B (Commented with manufacturing clearance) is necessary for the start of manufacturing activities of the equipment.

15.0 SPARES,ACCESSORIES&SPECIALTOOLS/GAUGES

Bidder shall give an assurance that spare parts and consumable items will continue to be available through the life of the equipment which shall be 25 years minimum. However, the User shall be intimated with a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacturing of any component used in this equipment.

Bidder shall provide following spares as commissioning spares along with RMU.

SL. No.	Name of Spare Parts	Required spares with above 80 No. of RMU	Required spares with above 20 No. up to 80 No. of RMU	Required spares up to 20 No. of RMU
1	Breaker Mechanism	4No's	3No's	1No's
2	Isolator Mechanism	4No's	3No's	1No's
3	Trip Coil	5No's	3No's	2No's
4	CT (All types)	6Sets(1Set=3Nos.)	4Set	2Set(1Set=3Nos.)
5	Bolt (For cable connection)	5Sets(1Set=3Nos.)	3Set	2Set(1Set=3Nos.)
6	"L" Key (All Size)	2Sets	1Set	1Set
7	VPIS	10	6	2
8	Manometer	8	6	2
9	24V DC Motor for Isolator	8	6	2
10	RMU PCB Card with Contactors	6	4	2
11	FPI CT	6Set(1Set=3Nos)	4Set	2Set
12	For Schneider FBX RMU: Control Card for Isolator Function Motorization	12	8	4

The mandatory items with each RMU are as below:

1. Operating Handle.
2. Cable bushing (if replaceable).
3. FPI.
4. Push button (On, Off both).
5. Washer (SS).
6. Anti-vandal screw, cable boot.
7. Cable Connecting bolts with washers.
8. Cable boots for 11kV.

16.0 DRAWINGS&DOCUMENTS

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

- a) Completely filled in Technical Particulars
- b) Any deviation sheet or No deviation
- c) General description of the equipment and all components including brochures.
- d) General arrangement for RMU
- e) SLD of each feeder
- f) Arc path drawing of all variants offered
- g) Foundation plan
- h) Experience List
- i) All set of Type test certificates for offered design each variant

Drawings/documents to be submitted for approval after the award of the contract are as under:

Sl. No.	Description	For Approval	For Review/ Information	Final Submission
1	General Technical Particulars (GTP)	✓		✓
2	General Arrangement drawings	✓		✓
3	Schematic Diagram of MIMIC with ON/OFF and all front labelling	✓		✓
4	Bill of materials	✓		✓
5	Arc path drawing for each variant	✓	✓	✓
6	SLD of complete RMU and feeders	✓	✓	✓
7	Control wiring diagram and arrangement in control cubicle	✓	✓	✓
8	Cable compartment internal dimension drawing and one drawing stating standard boots arrangement and cable earthing arrangement with cable	✓	✓	✓
9	CT mounting arrangement drawing with details of fixing and frame movement etc.	✓		✓
10	Foundation Plan/Drawing	✓	✓	✓
11	Installation & Maintenance Instructions and manual			✓
12	QA & QC Plan	✓		✓
13	Test Certificates	✓	✓	✓

All the documents & drawings shall be in English language.

After the receipt of the order, the successful bidder will be required to furnish all detailed drawings of components for approval.

Instruction Manuals: Bidder shall furnish soft copies manuals of RMU, FPI, Relay (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

20.0 GENERAL TECHNICAL PARTICULARS FOR RMU

S.N.	Description	As specified(Options defined in specs)	As furnished by Bidder
1.0	RMU Category	3Way - 1CB&2LBSor3LBS y - 2CB&2LBSor4LBS 4Way - 3CB&2LBS y 5Way y	
2.0	RMU application	Indoor or Outdoor as mentioned in tender	
3.0	Offered Model nos. and OEM type	3Way(NE,I/DorO/D) 4Way(NE,I/DorO/D) 5Way(NE,I/DorO/D)	
4.0	Dielectric medium	SF6	
5.0	Interrupting medium	Vacuum-forCB SF6forLBSandearthswitch	
6.0	System Frequency	50Hz	
7.0	Rated Voltage	12kV	
8.0	Service Voltage	11kV	
9.0	Rated current - Line Switches	630 A	
10.0	Rated Current - CB and LBS	630Aforalltype	
11.0	Rated Short time current withstand	21kAfor3sfor11 kV	
12.0	Rated Short time Making capacity	50KA	
13.0	Rated cable charging interrupting current of incomer load break switch	10 A	
14.0	Rated load interrupting line current	630 A	
15.0	Rated cable charging breaking current of breaker	25 A	
16.0	No. of operations at rated short circuit current on line switches, earthing switches should be E2	LBS-5close ES-5close The ESinlinewithCB	
17.0	Opening time of breaker (max.) Without relay time	2.5cycle	
18.0	Closing time of breaker (max.)	3cycle	
19.0	Breaker Duty Cycle	O-3min-CO-3min-CO	
20.0	Mechanical endurance for Isolator & Earth Switch	Min1000(M0)Operations	
	Mechanical endurance for Circuit Breaker	Min10000(M2)Operations	
21.0	Electrical operations of at rated current LBS/Disconnecter Earth Switch	To be provided by bidder	

22.0	Temp rise above ambient of +40 deg.	+40DegC.(Type Tested as per IEC and complying to requirements)	
23.0	Min Gas pressure in bar	To be provided by bidder based on type tested design	
24.0	SF6 Gas pressure manometer with indicating bars/scale to measure the actual gas pressure (indirect method RF Setc. not accepted)	Dial type Manometer to be provided for gas pressure indication Contacts to be provided and wires up on the TB for SCADA communication of gas status	
25.0	Enclosure	The RMU metal parts shall be greater than 2mm thickness high tensile steel/CRCA. The overall paint thickness shall be not less than 70 microns.	
26.0	Guaranteed SF6 leakage per annum	Less than 0.1% from main tank	
27.0	Degree of protection	IP67 for the tank and IP2X for the front cover/mimic board and IP54 (Main door closed) for Outdoor RMUs. IP54 for cable compartment	
28.0	Internal Arc rating	IAC AFL or better/IAC AFLR or better for Outdoor RMU	
29.0	Internal Arc test	20kA for 1 Sec for 11 kV	
30.0	Lightning Impulse withstand Voltage	75 kVp	
31.0	Power Frequency withstand voltage	28 kV rms	
32.0	SF6 Tank design	Hermetically/robotically sealed unpainted stainless-steel enclosure with SF6 Gas. Sealed pressure system by Laser welding so that no refilling of gas is required for 30 years. No gas work at site. Complete body shall be tamper proof to prevent access to live parts. No gaskets shall be used. No bolts shall be provided.	
32.1	Tank material and grade of SS304 and welding	Should be of SS 304 and non-corrosive, offered grade of SS to be mentioned. The welding shall be such that there shall be no corrosion of welding for useful life of equipment.	
33.0	Earth bus bars	In enclosure to prevent tampering.	
34.0	Material & size of earth busbar	Copper earth bus-bar should be Min. 105 sq.mm	
35.0	Earthing of main CCT Cables shall be earthed with earth switch with S/C making capacity as per IEC 129. Closing shall be possible only when Isolator is open.	To be provided by bidder.	

36.0	Incomer Load Break Switch: Shall be SF6 insulated with least maintenance. Shall have at least 3 positions, Open, Close & Earth with natural interlocks. Fitting of motor at site shall be possible & shall have mechanical interlock.	To be provided by bidder	
37.0	Circuit Breakers: With VCB interrupter and SF6 insulated bus with minimum maintenance and shall have at least 2 positions i.e. Open & Close, Manual operation & fitting of motor at site shall be possible if required. In view of safety each VCB shall be assisted with disconnecter having 3 positions, open-disconnected, closed, and earth (having fault making capacity) and shall be constructed in such a way that natural interlocking prevents unauthorized operations.	To be provided by bidder as per specs.	
38.0	Electrical interlock for live cable presence indicator and operation of earth switch in RMU incomer cable compartment of LBS	To be provided by bidder	
39.0	Make of self-powered Relay & offered model	Ashidamake,241S-AM-760-09-01-28-01-00-10	
40.0	Paint thickness	Minimum 70microns	
41.0	The cable compartment doors shall have interlocks such that doors can be opened only with earth switch in closed position.	To be provided by bidder	
42.0	Protection against theft	Design of RMU shall be tamper & arc proof. Anti-vandal screws shall be provided. Cable covers shall be pad lockable. All live parts and internal parts etc. shall be covered with anti-theft covers.	
43.0	Doors	Hinged Main doors shall be provided for outdoor type RMU. The hinges for the doors need to be riveted and shall not have any access from outside. Bolted hinges shall not be acceptable.	

44.0	Voltage indicator box shall be fixed type-This device shall be in compliance with IEC 62271-206:2011 standard only	Capacitive dividers type which will supply low voltage to power the lamps AND 3 inlets can be used to check phase sequence or presence Of voltage in cable	
45.0	Cable cleats (full circle)	HDPE/Nylon (Fire Retardant)	
46.0	Cable compartment suitability shall be	Suitable for cable sizes as per tender document In the isolators compartment 11kV, 3C X 630sq. mm/400Sqmm/300mm and in breaker compartment 11kV, 1CX185 sq. mm,/ 3C X 300 Sq. mm. (To be finalized during detailed engineering)	
47.0	The cable compartment	All cable compartments shall be bottom entry and front opening type only	
48.0	Size of bimetallic washer in all compartments	Must be suitable for M12 for TPC bolt and bushing sizes with min. 2mm thick.	
49.0	Height of bushing terminal from base plate	Minimum 900mm for proper termination space for 11 KV	
50.0	Fault passage indicator	One per RMU in all LBS compartments	
51.0	Operating handle	To be provided by bidder as a part of RMU with each RMU and to be placed on front or On door	
52.0	Non removable MIMIC Diagram on Front of panel	To be provided by bidder with detailed descriptions as mentioned in specs. And earth switch marking background shall be Green for TPC, Mumbai background. As per annexure-2	
53.0	Main Busbar Material	Copper	
53.1	Busbar Cross Section	Copper earth bus-bar should be Min. 105 sq. mm	
54.0	Opening & Closing times with relay	125ms maximum	
55.0	Current Transformer for CB compartment	Shall be epoxy resin casted and mounted on cables. The CTs around the cable shall be supported on the sheet steel bracket and should be fixed with bolts. The mounting frame should be moveable up and down or to and fro but shall be fixed at co-axial position with base plate holes and bushing terminal bolts. 200/1,5P10	
56.0	Motorization and SCADA Compatibility	To be provided by bidder	
57.0	Guarantee	As per specification	
58.0	Dimension (LxWxH) (mm x mm x mm)	To be provided by bidder	
59.0	Total weight	To be provided by bidder	

60.0	Paint	Light Gray shade RAL 7032	
61.0	Type test of product	To be provided by bidder as per specification	
62.0	Availability of spares	Assurance by bidder for 25 years, list of spares as mentioned in specification to be provided along with RMU lot.	
63.0	VPIS auxiliary contact	The VPIS shall have auxiliary contacts such that it can be configured with SCADA for remote status indication of cable charged. The auxiliary contact to be wired up in TB.	
63.1	VPIS	In all compartments	
64.0	Breaker operation counter	To be provided by bidder	
65.0	LBS operation counter	To be provided by bidder	
66.0	Moisture absorption material in SF6 tank	Bidder should provide the detail of the moisture absorption material.	
68.0	Making of earthing operations	All earth operation to be marked with green background and permanent in nature.	
69.0	Auxiliary contacts (total numbers and spare numbers)	LBS Earth Switch CB CB Disconnecter CB earth switch	
70.0	Control cable entry provision	To be provided	
71.0	Shunt trip coil 24V DC/230V AC	230V AC/24V DC shunt trip coil to be provided. Trip coils to be wired up on TB.	
72.0	MCB for LT AC incomer and TB connection of all CT, Aux switches and relay wiring	To be provided	
74.0	RMU Cable Boot/terminal protector for 11KV RMU		
a	Terminal protector	Insulating Boots	
b	System voltage	12kV	
c	AC High voltage	28kVFor1min	
d	Impulse withstand voltage	75kV	
e	Bushing Diameter	To be provided by bidder	
f	Bushing Types	To be mentioned by bidder	
g	Cable cross section suitability	Bidder to provide complying to specs.	
h	Dimensions of cable protector	Suitable for cables & bushing in specs. (offered size to be provided by bidder)	
i	Material of the component	To be specified by bidder	
75	Type test reports	Bidders to provide detailed list of tests conducted at lab name, conducted dates, report number Along with full reports.	

For motorized RMU			
1	SCADA Compatibility-Remote operation of RMU shall be possible by using motors fitted to operating mechanism of isolators & CB etc.	To be provided	
2	Harting Plug arrangement for individual isolator as well as breaker motor connections, which will be fitted on RMU Body itself.	To be provided	
3	Details of I/O	As per Annexure-IO list of this specs	
4	System to prevent mal operation in case of latch command	Bidder to provide inbuilt system to prevent any maloperation in case of latch command at RMU in case of Any fuse failure or DC fail situation	
5	Technical Details of motors		
a	Operating Voltage	24VDC	
b	Max.power rating	240Watts	
c	Max current drawn	9Amp($\pm 10\%$)	
d	Operating time	4-8seconds	
e	There shall be provision of 230VAC(Maximum 5Amp current)&24VDC		

21.0 SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

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

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

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

Seal of the Company:

Designation Signature

ANNEXURE-1

SIGNALLISTFORAUTOMATION

Description	Analog Inputs (AI)					Status(DI)		
Type	Amp. Loading- R ph	Amp. Loading- Y ph	Amp. Loading- B ph	Phase Voltage	Power Factor	Switch Close	Switch Open	Reset Element
RMU Switch *	0	0	0	0	0	1	1	
Breakers *	1	1	1	1	0	0	0	
FPI	0	0	0	0	0		1	1
PressureGauge (manometer)	0	0	0	0	0		1	
VPIS	0	0	0	0	0	1	1	

FRTUSIGNAL LIST

Description	Analog Inputs(AI)				
Type	Amp.Loading- R ph	Amp.Loading- Y ph	Amp. Loading- B ph	Phase Voltage	Power Factor
RMU Switch *	0	0	0	0	0
Breakers *	1	1	1	1	0
FPI *	0	0	0	0	0

Description	Status(DI)		
Type	Switch close	Switch Open	Reset Element
RMU Switch	1	1	
Breakers	0	0	
FPI		1	1
Pressure Gauge (manometer)		1	
VPIS	1	1	

Note: 0 indicates functionality not required for that element, 1 indicates functionality required for that element.

*Denotes the nos of switches/Breakers in RMU based on the type of RMU (3W, 4W).

Additional IOs

RMU switch Control Command
Earth Sw.1Status Input
EarthSw.2StatusInput
FPIReset
FRTULocal/RemotePosition

FRTUDoorOpen
FRTUBatteryChargerFaulty
FRTUBatteryFaulty
FRTUSwitchgear SupplyOff
FRTUAuxSupply Off
FRTUFault
Relay operation
CBOFFstatus
CBONstatus
CBON/OFFCommand

ANNEXTURE-2

The reference sample MIMICused for earthing color identifications.



ANNEXTURE-3

Inspection Test Plan

Sr. No.	Sts stipulated as per Tender Spec.	Applicable standard	Acceptance Clause as per IS/IEC
1	PF withstand voltage test on LBS and CB combined with switches closed position	EC62271-103&IEC 62271-200	CI6.20f IEC62271-103, CI7.2.7.2&7.2.7.3 of IEC62271-1 CI6.2.6.1&6.2.6.2-IEC62271-200 Should withstand 28kV for 1 minute
2	HV withstand test across isolator distance with opened contact of VCB	IEC62271-200	Should withstand 28 kV for 1 minute
3	Voltage Indication Tests on VPIS	-	VPIS indication should lit up when voltage applied
4	Measurement of contact resistance on LBS & CB combined with closed switch condition	IEC62271-200	CI 6.4 & CI 6.5 of IEC 62271-200
5	Dimensional & Visual Checks	-	As per approved drawing and technical compliance document for tender
6	Operational & Interlock Tests of breaker & isolator switches	As per specification	All interlock shall operate without fail in any one operation.
7	Leak Detection Test at bushing terminals after RMU assembly	IEC62271-1 clause 8.5	For gas-filled systems tested in factory, the probing test using a sniffing device to be done. The sensitivity of the sniffing device shall be at least 10^{-8} Pa $\times$ m ³ /s.
8	HV withstand test of control and auxiliary circuits.		Should withstand 2 kV for one minute.
9	Insulation resistance test		With open contacts and closed contacts of switches. With be in Giga-ohms.
10	Other components ,as per applicability , the RTC as per relevant IS/IEC from Original Equipment manufacturer (OEM) to be shared for Cable boot Relay CT motor		OEM reports as per IS and IEC.
11	Relay testing- Relay testing should be done with primary injection kit on installed relay.		Total tripping time with relay & without relay (Without relay shall be done at trip coil directly). Timing shall be within specified in specification.

Major Equipment/Items approved Vendor List		
Sl. No	Description of Equipment or Material	Name of Vendor
1	TRANSFORMER	VOLTAMP/OTPL/ALFA/OEU/SCHNEIDER
2	INDOOR/OUTDOOR SWITCHGEAR Panel with VCB, CT. IVT. Busbar	For AIS-Siemens/ABB/CGL/Schneider/For GIS-Siemens/ABB/Schneider
3	VCB(Outdoor)	Siemens/ABB/CGL/Schneider/BHEL/CG Power
4	CT(Outdoor)	CGL / Vishal Transformers & Switch Gears Ltd / KAPCO Electric / Akanksha/Tushar Trans equipment pvt.Ltd/perfect sales/savior transformers/Schneider/ABB
5	PT(Outdoor)	CGL / Vishal Transformers & Switch Gears Ltd / KAPCO Electric / Akanksha/Tushar Trans equipment pvt.Ltd/perfect sales/savior transformers/Schneider/ABB/BHEL
6	SURGE ARRESTOR/LIGHTNING ARRESTER	New Aquaria/Orange Power/Oblum/Raychem
7	RELAYS	ABB/Siemens/Schneider
8	CONTROL & RELAY PANEL	Control & Relay Panel shall be as per the specification by using above make Relays, at Item-7.(Siemens/ABB/Ultima switchgear/Stelmec/ OHM Energy)
9	ISOLATORS/AB Switch & HG Fuse	Switchgear & Structurals/Ultima Switch Gears/Ruma isolator company/S & S Power switchgear/Panchkari Kayal
10	48 Volt VRLA BATTERY (12Volt x 4nos.)	EX IDE/AMARARAJA
11	48 Volt BATTERY CHARGER With DCDB	Chloride Power System Services(previously CALDYNE)/AMARARAJA/Masstech/EXIDE
12	PVC INSULATED POWER AND CONTROL CABLES	KEI/ GEMSCAB/ZENIUM/Ravi Cables/Dynamic / Havels/Polycab
13	STATION TRANSFORMER(BEE STANDARD)	VOLTAMP/ OTPL/ ALFA/ OEU/ SCHNEIDER
14	RSJOIST/WPB/H-Pole	Manufacturer-TATA/SAIL/RINL/Jindal Steel & Power Supplier-Dharam Industries/Reliable sponge/Supreme Industries/Vijay transmission pvt. Ltd./Utkal Galvanizer/ M/s Seastika Steel & Allied products pvt. Ltd.
15	CHANNEL & ANGLES. GI Flat	Manufacturer-TATA/SAIL/RINL/Jindal Steel & Power Supplier-Dharam Industries/Reliable sponge/Supreme Industries/Vijay transmission/Utkal

		Galvanizer
16	CONDUCTOR	APAR/Lumino/laserpower/Mahavir
17	COVERED CONDUCTOR	APAR/Raychem/KEI/Laser
18	DISC INSULATORS/SOLIDCORE POST INSULATORS / PIN INSULATORS(33&11kV)	Adinath Industries/Scenario Powertech pvt Ltd/Prime Insulators Hindustan Chemicals, Khurja / Rashtriya Electricals & Engineering
19	HARDWARE FITTINGS	Jainco Transmission Ltd/Industrial Forging Industries Pvt Ltd/KSE Electricals
19	CLAMPS/CONNECTORS	Exalt Engineering Industries/Rahul electricals/JAINCO Transmission Ltd/Industrial Forging
20	GI BOLTS & NUTS	NEXO / MAHESWARI (P) FASTENERS & BRIGHT PVT LTD / Techman India / Ravi Engineers / Precision Fasterns Ltd/ AV Forgings / Garg Fastners/ Agarwal Fasteners, Maharastra/ Sterling Bolts Pvt Ltd, Kolkata / Vindhyavasini Enterprises Pvt. Ltd.
21	CEMENT OPC/ PSC ACC / ULTRATECH / DALMIA (KONARK) / Ultratech	CEMENT OPC/ PSC ACC / ULTRATECH / DALMIA (KONARK) / Ultratech
22	STEEL SAIL / TATA / RINL / Jindal Steel & Power	STEEL SAIL / TATA / RINL / Jindal Steel & Power
23	GI PIPE for Earthing	TATA/JINDAL
24	HDPE Pipe Lingaraj Pipes, Khurda / Hari Udyog Pvt. Ltd, Balasore / ValentinaPipes, Bhubaneswar / Utkarsh Pipes, Kolkata/Magnum Pipes	HDPE Pipe Lingaraj Pipes, Khurda / Hari Udyog Pvt. Ltd, Balasore / Valentina Pipes, Bhubaneswar / Utkarsh Pipes, Kolkata/Magnum Pipes
24	RTU, SCADA	Alstom / Siemens / Schneider /GE / Synergy / ABB
25	CABLE JOINTKIT	Raychem/3M
26	XLPE HT CABLE, LT XLPE Cable	As Per the Make mentioned
27	GI Earth wire	Aaarti Steels Ltd / Ratlam Wires Pvt Ltd / Kataria Wires Pvt Ltd / RK Wire Product Ltd / GK Winding wires/ M/s Kartika Wires (P) Ltd./ Jainco Transmission Ltd/ Industrial forging / Ambica Dhatu Pvt. Ltd

28	TMU	ABB/SEL/A-ebarle
29	RMU	ABB/ Scheider Electric Infrastructure/Siemens/ M/s Partha Electrical/M/s Lucy Electric India
Minor Equipment/Material		
29	MULTI-FUNCTION Meters	Secure Meters Pvt Ltd / Schneider / Accord Electro / Genus / L&G
30	Energy Meter	Secure Meters Pvt Ltd/Schneider/GENUS/L&T/HPL
31	INSULATION RESISTANCE TESTER	MEGGER/FLUKE
32	AIRCONDITIONER	CARRIER/BLUESTAR/VOLTAS/LLOYD/HITACHI
33	MCB	L&T/ABB/SIEMENS/HAVELLS/Schneider/Legrand/CGL/C&S Electric
34	ACB/MCCB	L&T/ABB/SIEMENS/HAVELLS/Schneider/Legrand/CGL/C&S Electric
35	ACDB/CONSOLEBOX/BMK/MLDB /ELDB	Technocrat/United Engineers Pvt Ltd./Ultima Switchgears Ltd./Arun Enterprises
36	PVCWIRES	L&T/FINOLEX/ANCHOR/HAVELLS/Polycab/RRKabel
37	SWITCHES	ANCHOR/CONA/HAVELLS/Schneider/GRABTREE
38	LIGHTING FIXTURES	PHILIPS/BAJAJ/HAVELLS/Syska
40	FIRE FIGHTING EQUIPMENT	CEASEFIRE/M/s Safex Services Ltd
41	GI Earth Wire	Aaarti Steels Ltd / Ratlam Wires Pvt Ltd / Kataria Wires Pvt Ltd / / RK Wire Product Ltd / GK wires/ M/s Kartika Wires (P) Ltd. / Ambica Dhatu Pvt. Ltd.
42	Ceiling Fan	Usha/Bajaj Crompton/Havells
43	Exhaust Fan	Khaitan/Almonard/Bajaj/Crompton/Havells

-Sd-

Chief General Manager (P&C)

Tenderer(s) is/are required to submit the information in the following Schedules

SCHEDULE - A

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:-

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:

1. The above information is to be certified by the Engineer in Charge / Employer not below the rank of Executive Engineer of Govt. or PSU only.

(MANDATORY)

2. Use individual sheet (Schedule-D format as given above) to fill work experience for each Certificate issuing Authority (Engineer in Charge / Employer not below the rank of Executive Engineer of Govt. or PSU only)

Signature of the Tenderer

Date.....

SCHEDULE – E

INFORMATION REGARDING CURRENT LITIGATION, DEBARRING EXPELLING OF TENDERER OR ABANDONMENT OF WORK BY THE TENDERER

- | | | | |
|----|----|--|----------|
| 1. | a) | Is the tenderer currently involved in any litigation relating to the works. | Yes / No |
| | b) | If yes: give details: | |
| 2. | | Has the tenderer or any of its constituent partners been debarred/ expelled by any agency in India during the last 7 years. | Yes / No |
| 3. | a) | Has the tenderer or any of its constituent partners failed to perform on any contract work in India during the last 7 years. | Yes / No |
| | 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 the Tenderer

Date.....

SCHEDULE – F

(To be notarised)

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 five 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:

SCHEDULE - G**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.

Sl. No.	Name of Engineering personnel appointed for supervising contractor's work with address	Qualification	Date of Appointment	Monthly emolument	Whether full time engagement and continuous	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
1	2	3	4	5	6	7

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.

SCHEDULE – I**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:-

-Sd-**Chief General Manager (P&C)**