Open Tender Notification

For

Package – I – Supply , Supervision of Erection , Testing & Commissioning of 11KV LVRT 500 KVA & 1000 KVA under CMPDP & CAPEX Scheme

Package – II - Supply, Erection, Testing & Commissioning of Associate Material with DP Structural items for erection of LVRTs under CMPDP SCHEME on "Turnkey Contract Basis".

Tender Enquiry No.: TPCODL/P&S/ 1000000377/2023-24

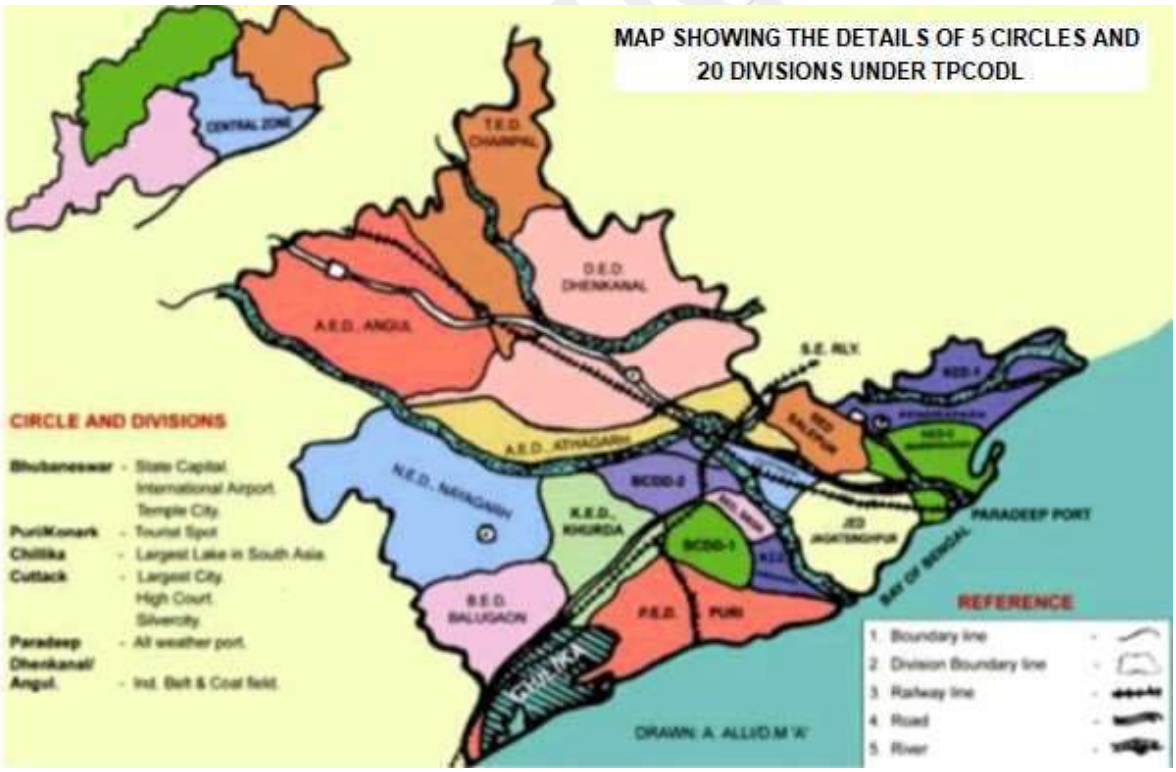
Due Date for Bid Submission: 26.05.2023 [22:00 Hrs.]

TP Central Odisha Distribution Limited
(A Tata Power & Odisha Government joint venture)
Purchase department
2nd Floor, IDCO Towers, Janpath, Bhubaneswar-751022

PREAMBLE

TP Central Odisha Distribution Limited (TPCODL) is a joint venture between Tata Power and the Government of Odisha with the majority stake being held by Tata Power Company (51%). TPCODL is a state electricity distribution utility with sole rights to distribution of electricity in the Central Zone in Odisha covering the distribution circles of Bhubaneswar, Cuttack, Paradeep and Dhenkanal in accordance with the Electricity Act. Tata Power Company has successfully won the bid to own the license for the distribution and retail supply of electricity in Odisha's five circles constituting Central Electricity Supply Utility of Odisha (CESU). It came into operation with effect from 01.06.2020. TPCODLserves a population of 1.36 Crore with Customer Base of 26 Lakh and a vast Distribution Area of 29, 354 Sq. Km. The primary business activity includes purchase of power from GRIDCO Ltd at BSP rate and distribute to consumers. The field structure has been presented below:

Circle Office (Five Nos.) → Division Office (20 Nos.) → Sub-Division Office(77 Nos.) → Section Office (251 Nos.)



Name of 20 Electrical Distribution Divisions are as follows:

1. Bhubaneswar City Distribution Division-I (BCDD-I)
2. Bhubaneswar City Distribution Division-II (BCDD-II)
3. Bhubaneswar Electrical Division (BED)
4. Nimapada Electrical Division, Nimapada (NED)
5. Khurda Electrical Division, Khurda (KED)
6. Balugaon Electrical Division, Balugaon(BEDB)
7. Nayagarh Electrical Division, Nayagarh (NYED)
8. Puri Electrical Division, Puri (PED)
9. City Distribution Division-I, Cuttack (CDD-I)
10. City Distribution Division-II, Cuttack (CDD-II)
11. Cuttack Electrical Division, Cuttack (CED)
12. Athagarh Electrical Division, Athagarh (AED)
13. Salipur Electrical Division, Salipur (SED)
14. Dhenkanal Electrical Division, Dhenkanal (DED)
15. Talcher Electrical Division, Chainpal (TED)
16. Angul Electrical Division, Angul (ANED)
17. Kendrapara Electrical Division, Kendrapara (KED-I)
18. Kendrapara Electrical Division, Marshaghai (KED-II)
19. Jagatsinghpur Electrical Division, Jagatsinghpur(JED)
20. Paradeep Electrical Division, Paradeep (PDP)

INFORMATION TO THE BIDDERS TO PARTICIPATE IN E-TENDER SYSTEM OF TPCODL

-: Steps for E-tender submission:-

Bids are to be submitted only through online e-procurement platform, ARIBA. Any other form of bid submission will not be accepted. Online Link for submission of bid through ARIBA will be sent only after confirmation of payment of tender fee from bidder.

Step 1:

The bidder can get primary information about the tender from the Newspaper advertisement / TPCODL website **<www.tpcentralodisha.com>** and can download the tender document from the above website.

Step 2:

Non-Refundable Tender Participation Fee, as indicated in tender document, to be submitted before last date of tender fee payment, in the form of direct deposit/NEFT/RTGS in the following bank account.

Account Name: TP Central Odisha Distribution Limited
Bank Name: State Bank of India,
IDCO Towers, Bhubaneswar
Bank Account No. : 10835304915
IFSC Code : SBIN0007891

Step 3:

Eligible and Interested bidder to send an email to TPCODL attaching duly signed and stamped letter on Bidder's letterhead, with following details, expressing their intend to bid against above tender:

Sl No	Description	Bidder's Response
i)	Tender Enquiry No. / Package	
ii)	Description of materials / Works Tendered	
iii)	**Package to be Participated for all scope**	
iv)	Name and address of the bidding company	
v)	Name of the authorized contact person	
vi)	Contact No. authorized person	
vii)	E-mail Id of the where online ARIBA link to be mailed.	
viii)	Tender Fee details (Amount / NEFT-RTGS UTR No / Date), Ref	
ix)	GST No. of bidder	

E-mail has to be sent to package owner Malaya Ranjan Roul <**Malaya.Roul@tpcentralodisha.com**> with copy to <sudhakar.behera@tpcentralodisha.com> before "Last date and time for payment of Tender Participation Fee".

Step 4:

On receipt of the document as mentioned in Step 3 above and after due verification of the same, ARIBA link for participation in the tender will be sent to bidder's mail address from ARIBA system.

Step 5:

In this mail there will be an online link as **Click Here** to participate in the tender**.**

Step 6: Click **"Click Here"** to access this event.

Step 7:

If bidder is bidding first time for TPCODL through ARIBA site then please "Sign UP" by creating User Name and password as mentioned in Sign Up page. Please follow the process, as mentioned in the Sign Up page, during creation of User Name and password. Also a simple one-page registration screen will open for first time user. All * mark mandatory field to be filled in.

Those who are already having User Name and password for accessing TPCODL events, they can LOGIN using same User Name and password.

If bidder has got User name and password for their other customer, same will not be applicable for TPCODL.

Step 8: You will be able to see the RFQ

Step 9: After review and downloading of all documents click on **"Review Pre-requisites**"

Step 10: Review and accept **"Bidder Agreement".**

Step 11: You can see attached pdf tender document against clause no 1.1.1 (Introduction).

Step 12: Vendor has to attach pdf version of technical bid in clause no. 2.1 and 2.2. In this field do not attach any price document.

Price schedule is attached in clause no.3.2. Same has to be downloaded and price and tax details to be filled in as per the format given, print to be taken in vendor's letter head and signature and seal to be made by authorised person. PDF version of this price bid to be attached in clause 3.2 For Price Bid put all the unit price and taxes and duties in provided field. Put "0" (ZERO) in not applicable field.

Step 13: After successfully putting Techno commercial offer and price part then click on "**Submit Entire Response"**

CONTENTS OF THE ENQUIRY

1.0 Event Information

1.1 Scope of work

Open Tenders are invited through the e-tender bidding process in TPCODL ariba portal from interested Bidders for entering into a Contract for following Packages, which includes:

Package- I: (i) Supply of Line voltage regulator Transformer (7/11 KV) of ratings mentioned below under **CM PDP scheme** & **TPCODL Capex scheme** to be Supplied by Transformer manufacturer.

(ii) The LVRT of 1 MVA & 500 KVA (7/11 KV) for **CM PDP Scheme** & **TPCODL Capex scheme** to be Delivered at Central stores of TPCODL.

(iii) The Transformer Manufacturer shall take the responsibility of supervision of Erection, Testing & Commissioning which will be carried out by the Contractor engaged by TPCODL. He will be responsible for successful Testing & charging of Transformer.

(iv) The Bidder has to quote for line items A or B or Both has to pay Same EMD & tender fees as mentioned below.

Package- II: Other Materials Required for Installation of 11kV LVRT with accessories as per technical Specification and scope of work under **CM PDP Scheme in Turnkey basis** to be executed through EPC Contractor which include**s LVRT transportation from TPCODL Stores , Erection, successful Testing & Charging of LVRT Installation.(LVRT Shall be free issue for this package)**

Note: Bidder can quote for either one or both the packages shall submit EMD & Tender fees accordingly.

Tender Enquiry No	Package	Work Description	Qty.	EMD * cost (Rs.)	**Tender Participation Fee (Rs.)	Last Date and Time for payment of Tender Participation Fee
TPCODL/P&S/ 1000000377/ 2023-24	Package- I (A)	Supply , supervision of erection , testing &commissioning of 1 MVA, (7/11KV) LVRT under **CM PDP Scheme**	20 Nos.	**5 lakhs**	5000/-	18.05.2023
		Supply , supervision of erection , testing &commissioning of 1 MVA, (7/11KV) LVRT under **Capex work of TPCODL**	08 Nos.			
	Package- I (B)	Supply , supervision of erection , testing &commissioning of 500 KVA, (7/11KV) LVRT under **Capex work of TPCODL**	05 Nos.			
	Package- II	Supply, Erection, Testing & Commissioning of Materials Required for Construction of 11kV LVRT (Include LVRT transportation , Erection, successful Testing & Charging of LVRT Installation System) with all other accessories, as per technical specification and scope of work under **CM PDP Scheme in Turnkey basis (LVRT shall be free issue for this**	20 Nos.			

		package)				

* EMD is exempted for MSMEs registered in the State of Odisha for both the Individual packages

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

For details of MSME norms, pls refer "Annexure VII-a".

This work is to enhancing the voltage level at downstream radial network where severe low voltage were found. LVRT scope of work also reduce the line losses due to reduction of load currents.

The circle wise no of 1 MVA (7/11KV) LVRT scope under **CM PDP** as defined below:

Name of Circle	Qty.
Circle-I , Bhubaneswar	2 nos.
Circle-II, Bhubaneswar	3 nos.
Paradeep circle	9 nos.
Dhenkanal circle	6 nos.

Note: Tender Fee is inclusive of GST.

1.2 Availability of Tender Documents

Please Refer “Procedure to participate in the e-Tender”.

1.3 Calendar of Events

(a)	Date of availability of tender documents from TPCODL Website	From 10.05.2023
(b)	Date by which Interested and Eligible Bidder to pay Tender Fee and confirm participation as mentioned in “Procedure to Participate in Tender”	**18.05.2023, 17:00 Hrs**
(c)	Last Date of receipt of pre-bid queries, if any	20.05.2023
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	23.05.2023
(e)	Last date and time of submission of Bids through AIBA E-Tender Portal	**26.05.2023 up to 22.00 Hrs**

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

*For further details of Tenders, please visit Vendor Zone on TPCODL website **https://www.tpcentralodisha.com.** Future communication/corrigendum to tender documents, if any, shall be available on website. The authority reserves the right to accept or reject any or whole of the offers without assigning any reason thereof.*

1.4 Mandatory documents required along with the Bid

1.4.1 EMD of requisite value and validity. In case of BG, original required to submit.
1.4.2 Tender Fee of requisite value.
1.4.3 Price Bid as per the Price Schedule mentioned in Annexure-I (BOQ).
1.4.4 Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document.
1.4.5 Duly filled, signed and stamped all required Annexure.

1.4.6 Proper authorization letter/ Power of Attorney to sign the tender on the behalf of bidder.
1.4.7 Bank certificate towards Liquid Assets.
1.4.8. Notary Affidavits of Bidders as per qualifying requirement in hard copy.

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

1.5 Deviation from Tender

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

1.6 Right of Acceptance/ Rejection

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

As mention above

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

1.7 Qualification Criteria

1.7.1 TECHNICAL REQUIREMENT :

Package – I :

The bidder should be a manufacturer having own manufacturing & testing facility of Transformers. In this regard, he has to submit the documents in support of his claim. The bidders shall supply own manufactured LVRT for this projects.

i. Bidder must be a BEE Certified OEM of Transformer of same or, Higher Ratings with manufacturing facility / assembly in India. TPCODL reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.

ii. The bidder should have In-house routine and acceptance testing facilities for all acceptance Test as per relevant IS/IEC. Self-undertaking to be submitted in this regard.

The bidder must have Supplied 500 KVA , 11KV LVRT/Transformer or Higher or similar capacity having OLTC arrangements as envisaged in this tender to any utility/companies for a total value of **Rs. 5.00 cr. in last five years** which includes & meet the following criteria:

a. Have executed One single order of Rs. 3 Cr. during last 5 financial years.
or
b. Have executed Two orders of Rs. 1.5 Cr. (each) during last 5 financial years.
or
c. Have executed five orders of Rs. 0.75 Cr. (each) during last 5 financial years.

The Bidder must upload copies of the relevant Purchase Orders along with Completion Certificate in proof of successful Supplied and Performance Certificates duly signed by the competent authority of

the Client in proof of successful operation of the above quantum of works from any Discoms/utility/reputed companies in India. The works experience schedule shall be as per proforma given here under.

Package- I : Supply Experience Schedule

Purchase Order Ref.				Transformer supplied/ Commissioned		
Sl. No.	FY	Name of the Client	Purchase Order Ref (No. & Date)	Qty (No. of Transformers / LVRTs	Date of Complete supplied	Documents provided in proof of having completed the supply and/or of successful operation as the case may be. (As Attachment)

Supporting documents in favour of the above mentioned requirement shall have to be submitted/ uploaded by the Bidder as an attachment to the e-tender folder. Failure to furnish/upload any or all information as required as a part of Bid document in all respect will be at the Bidder's risk and may result in rejection of the Bid.

Package – II :

This bid is open to any EPC / Turnkey Contractor domicile in India independently, who meets the following Technical qualifying requirement;

The bidder must have executed multiply projects having similar scope of job as envisaged in this tender including Engineering, Supply, Erection , Testing & Commissioning on Turnkey basis in any utility/companies for a total value of **Rs. 5.00 cr. in last five years** which include and meet the following criteria:

a. Have executed One single order of Rs. 3 Cr. during last 5 financial years.
or
b. Have executed Two orders of Rs. 1.5 Cr. (each) during last 5 financial years.
or
c. Have executed four orders of Rs. 0.75 Cr. (each) during last 5 financial years.

The Bidder must upload copies of the relevant Work Orders along with Handing Over and Taking Over Certificate or Client certified copies of Completion Certificate in proof of successful execution of Works and Performance Certificates duly signed by the competent authority of the Client in proof of successful operation of the above quantum of works from any Discoms/utility/reputed companies in India. The works experience schedule shall be as per proforma given here under.

Work Experience Schedule

Work Order Ref.				Sub-Stations/Lines Installed, Erected & Commissioned		
Sl. No.	FY	Name of the Client	Work Order Ref (No. & Date)	Qty (No. of Sub Stations/ Kms. of Lines) Installed/ Erected	Date of Completion of Commissioning	Documents provided in proof of having completed the works and/or of successful operation as the case may be. (As Attachment)

Supporting documents in favour of the above mentioned requirement shall have to be submitted/ uploaded by the Bidder as an attachment to the e-tender folder. Failure to furnish/upload any or all information as required as a part of Bid document in all respect will be at the Bidder's risk and may result in rejection of the Bid.

1.7.2 BIDDER'S FINANCIAL QUALIFICATION for Package- I & Package- II :

1. MINIMUM AVERAGE ANNUAL TURNOVER:

The bidder should have average annual turnover of **Rs. 5.00 Crores** in the three financial years i.e. (FY 19-20, FY 20-21 & FY 21-22). Audited balance sheet, profit and loss account and auditors report from the statutory auditors of the company are required.

For MAAT, the bidder has to furnish the certificate from the Chartered Accountant (CA) certifying the Annual Turnover of the company only based on audited accounts of the last Three Financial Years.

2. LIQUID ASSETS AND ACCESS TO CREDIT FACILITY:

Bidder shall be financially sound and stable. The **liquid assets (Cash at Bank & Fixed Deposit) and Unutilized credit facility (both Fund & Non Fund based)** available from bank(s) duly certified by the Bank(s) within one Month prior to the date of Tender opening, should **not be less than Rs. 1 Crores**.

1.7.3 BIDDER'S PERFORMANCE QUALIFICATION:

1. The bidders or Holding / Associate / Subsidiary Companies or its any group company who have earlier failed to execute even any order of the TPCODL / Odisha Discom/ Govt. Of Odisha /Govt. funded Project or who stand currently debarred / blacklisted by TPCODL / Govt. Of Odisha/any other Distribution / Transmission / Generation Utility in India shall not be eligible to participate in this tender.

2. The bidder should not have any pending litigation with TPCODL with regard to any project or related activity. The Bid furnished by the bidder shall not be eligible for consideration if it is not accompanied by the Affidavit. Further, the Bid/LOA/LOI shall be liable for outright rejection/ cancellation at any stage if any information contrary to the affidavit is detected.

3. The bidder must not been declared Insolvent or referred to National Company Law Tribunal (NCLT) under the Insolvency and Bankruptcy Code (IBC), 2016. In such case the bid shall also be rejected. In this respect one undertaking from the bidder that they are not declared as Insolvent or referred to NCLT under IBC shall be submitted along with the bid. Non-disclosure of this fact by

the bidder will lead to rejection of the bid or termination of the contract with forfeiture of EMD/CPBG.

Note:

The bidder should certify/ declare the same in unequivocal terms by way of an affidavit duly sworn before a Notary. Failure to furnish/upload any or all information as required as a part of Bid document in all respect will be at the Bidder's risk and may result in rejection of the Bid.

1.7.4. Other Qualification Requirments:

1. **Package- II :** EPC contractor shall have valid HT license from ELBO. The bidder has to furnish Electrical contractor name , detail in his letter head attaching the HT license issued by Electrical License Board of Odisha (ELBO) along with bid .

2. **Package- I** : Bidder should have to submit type test report of the LVRT specified in this tender. If the bidder doesn't have type test report, he has to submit an undertaking mentioning that he will furnish the same with-in 02 months from the date of placement of order. Else, EMD will be forfeited / other action as deemed fit will be initiated. Bidder have in house Testing facility as per Specification provided.

3. **Package-I & Package – II**: Bidder must have all statutory compliance like valid PAN, ESI registration, EPF registration and GSTN registration, Certificate Of Incorporation .

Note :

- **The evaluation of contractor's safety capability with evaluation of safety bid is part of qualifying requirement for the Package-I & II SITC work of CM PDP.**
- **Evaluation of Bidder capacity is part of part-I evaluation. TPCODL have right to reject any bid, at any time with or without assigning notice or reasons thereof.**
- **Joint venture/ consortium is not accepted in the tender.**

TPCODL reserves the right to relax qualification criteria without assigning any reason thereof. TPCODL reserves the right to accept or reject any bid at any time without assigning reason what so ever may be.

1.8 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts. Bidders must agree to these rules prior to participating. In addition to other remedies available, TPCODL reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the General Condition of Contracts. A bidder who violates the market place rules or engages in behavior that disrupts the fair execution of the marketplace, may result in restriction of a bidder from further participation in the marketplace for a length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace

- Breach of terms as published in TENDER/NIT

1.9 Supplier Confidentiality

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

2.0 Evaluation Criteria

- **Package-I & II** : The bids will be evaluated technically & on safety ground on the compliance to tender terms and conditions.
- **Package-I : The Bidder can quote for line items A or B or for both has to pay Same EMD & tender fees**. The bids will be evaluated on **Line Items wise** (A & B) Separately as calculated in Schedule of Items *[Annexure I- for Package – I scope].* TPCODL reserves the right to split the order line item wise and / or quantity wise among more than one Bidder. Hence, all bidders are advised to quote their most competitive rates. **However, the price remain same for Same Specification LVRT for both CM PDP scope & TPCODL Capex scope Qty..**
- **Package –II** : The bids will be evaluated commercially on **overall all-inclusive price of tender BOQ of whole scope** as calculated in Schedule of Items *[Annexure I].* TPCODL reserves the right to split the order line item wise and / or quantity wise or/ scope wise or / Location wise, among more than one Bidder. Hence, all bidders are advised to quote their most competitive rates.
- Bidder has to mandatorily quote as per schedule of item [Annexure-I (package – I -manufacturer & II – EPC Contractor Separately)]. Failing to do so TPCODL may reject the bid.

NOTE: In case of a new bidder not registered, inspection of their any other site and evaluation shall be carried out to ascertain bidder's capability and quality procedures. However, TPCODL reserves the right to carry out site inspection and evaluation for any bidders prior to qualify technically. In case a bidder is found as Disqualified in the factory evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of TPCODL shall be final and binding on the bidder in this regard.

2.1 Price Variation Clause: The prices shall remain **firm** during the entire contract period.

2.2 Quantity variation Clause: There will not be any guarantee on quantity of job. Job has to be carried out on as and when required basis order from TPCODL on the quantity to be specified in the order.

3.0 Submission of Bid Documents

3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document through e-tendering process.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc will happen only through TPCODL E-Tender system (Ariba).

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

Bids shall be submitted in 3 (Three) parts:

FIRST PART: "EMD" as applicable shall be submitted. The EMD shall be valid for 210 days from the due date of bid submission in the form of NEFT/ RTGS / Bank Guarantee / Bank Draft / Bankers Pay Order (issued from a Scheduled Bank) in favoring 'TP Central Odisha Distribution Limited" payable at Bhubaneswar. The EMD (BG) has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted and the bid as submitted shall be liable for rejection. A separate non-refundable tender fee of stipulated amount also needs to be transferred online through in case the tender document is downloaded from our website.

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

Account Name: TP Central Odisha Distribution Limited
Bank Name: SBI, IDCO Towers, Bhubaneswar
Bank Account No. : 10835304915
IFSC Code : SBIN0007891

EMD Original Hard Copy shall be delivered at the following address in Envelope clearly indicating Tender Reference/ Enquiry Number, Name of Tender and Bidder Name

Chief (Procurement & Stores)
TP CENTRAL ODISHA DISTRIBUTION LIMITED
2ND FLOOR, IDCO TOWERS, JANAPATH, BHUBANESWAR- 751022

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

a) Documentary evidence in support of qualifying criteria mentioned as clause 1.7 of this tender documents
b) No Deviation Certificate as per the Annexure III – Schedule of Deviations
c) Acceptance to Commercial Terms and Conditions viz Delivery schedule/period, payment terms etc. as per the Annexure V – Schedule of Commercial Specifications.
d) Acceptance Form for participation in Reverse Auction as per the Annexure VII
e) Quality Assurance Plan *(where applicable)*

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

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

SIGNING OF BID DOCUMENTS:

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

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

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general

Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid.

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

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

3.2 Contact Information

Please note all correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc will happen only through TPCODL E-Tender system (Ariba).

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

Communication Details:

Package Owner

Name: Mr. Malaya Roul, DM, Elect.- Procurement

Contact No: 8763216613

E-Mail ID: Malaya.roul@tpcentralodisha.com

Escalation Matrix

Name: Mr. Sudhakar Behera, Sr. GM-Procurement

Contact No: 9437282663

E-Mail ID: sudhakar.behera@tpcentralodisha.com

Bidders are strictly advised to communicate with Package Owner through TPCODL E-tender System (Ariba) only. They need to pay Tender Participation Fee and receive the Ariba log-in. Above escalation details are for reference purpose only.

3.3 Bid Prices

Bidders need to quote for all packages as per the Price schedule attached in Annexure I. Also bidder need to quote for all the items mentioned in each Package with a break up of prices for supply and erection of individual items and Taxes & duties as per the price schedule format. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total price with taxes, duties & freight up to destination at various sites of TPCODL. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply work, breakup of price constituents

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

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only.

3.5 Period of Validity of Bids

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

Notwithstanding clause above, the TPCODL may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

3.6 Alternative Bids

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

3.7 Modifications and Withdrawal of Bids

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

3.8 Earnest Money Deposit (EMD)

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect the TPCODL against the risk of bidder's conduct which would warrant forfeiture.
The EMD shall be denominate in any of the following form:

- Banker's Cheque/ Demand Draft/ Pay order drawn in favor of TP Central Odisha Distribution Limited payable at Bhubaneswar.
- Online transfer of requisite amount through NEFT/ RTGS.
- Bank Guarantee as per the format (Annexure-A) provided in GCC valid for 210 days after due date of submission.

The EMD shall be forfeited in case of:

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

Or

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

3.9 Type Tests

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

4.0 Bid Opening & Evaluation process

4.1 Process to be confidential

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

4.2 Technical Bid Opening

The bids shall be opened internally by TPCODL. Participating Bidders will get mail intimation from TPCODL E-Tender system (Ariba) when their Technical Bids are opened.

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

4.3 Preliminary Examination of Bids/ Responsiveness

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

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

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

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

4.4 Techno Commercial Clarifications

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

4.5 Price Bid Opening

Price Bid of only Technically qualified Bidders shall be considered and open internally by TPCODL. Bidders will get mail intimation from TPCODL E-Tender system (Ariba) when their Price Bids are opened.

The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of TPCODL without any further correspondence in this regard.

4.7 Reverse Auctions

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

5.0 Award Decision

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

TPCODL reserves all the rights to award the order/issue of RO as per field requirement and sanctioned of Govt. fund time to time to carry out the work scope under CM PDP. Also TPCODL reserves the right to split the contract full or part.

In case performance of the bidder is found unsatisfactory during the delivery/execution process, the award will be cancelled and TPCODL reserves the right to award other performing bidder who are found fit.

6.0 Order of Preference/Contradiction:

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

1. Schedule of Items (Annexure I)
2. Post Award Contract Administration (Clause 7.0)
3. Submission of Bid Documents (Clause 3.0)
4. Scope of work and SLA
5. Technical specification
6. Acceptance form for participation in reverse auction
7. General Conditions of Contract

7.0 Special Condition of Contract /Post Award Contract Administration:

1. AWARD OF CONTRACT:

After finalization of tender,

Package – I : Rate Contract shall be issued on successful bidder with a validity period of **12 Months.**

Package- II : Rate Contract shall be issued on successful bidder with a validity period of **12 Months.** The Contractor shall complete the Survey of the assigned project jointly with authorized person(s) / agency of TPCODL & submit Substation wise Joint Survey Report along with SLD, Substation wise BOQ & proposed work completion Schedule to TPCODL for approval within 30 days of issue of RC. The Work Completion Schedule should consist of Key Mile Stones covering entire scope of work such as engineering, procurement, manufacturing, shipment and field erection activities including Civil works in line with the Work Completion Schedule of TPCODL. After approval of above reports by TPCODL, Substation wise Release Orders shall be issued to the Contractor basing on the approved BOQ. The Contractor shall take all efforts to complete the Project within scheduled Time.

2. PRICES/ RATES/ TAXES

The Contract price comprising of Supply, Installation, Testing and Commissioning shall remain **FIRM** during the entire Contract period except statutory variation in Taxes, which shall be to the account of TPCODL against Tax Invoice. However, the price shall **remain firmed until the completion of the Project**, even if contract period is extended due to any reason. There shall be no price variation during the Contract Period / Extended Contract Period.

3. PROJECT/SUPPLY COMPLETION PERIOD:

Package- I : Delivery Period shall be **03 Months form date of issue of PO for LVRTs**.

Package- II : Work completion Period shall be **6 Months form date of issue of PO/RO**. The work completion period shall be revised if the reason of delay in completion of works is not attributable to the Contractor. L-1 Schedule (Submission of Activity wise Milestones to complete the project within scheduled time line) shall be furnished with the Bid documents. The Supply shall sequential and as per agreed milestones

4. PERFORMANCE GUARANTEE :

1. The Contractor shall guarantee that the equipment/materials will be new, unused and in accordance with the Contract documents and free from defects in material and workmanship for a period of **24 (Twenty Four) months commencing immediately after the satisfactory commissioning and handing over of the entire works of the under the Contract** . The Contractor's liability shall be to the extent of repair/replacement of such defective equipment/material either arising from faulty design or defective equipment/materials and/or bad workmanship. Such defective equipment/materials shall be handed over to the Contractor for repair or replacement by a new one, unless otherwise repairable at site. The Contractor shall complete the repair/replacement work within the reasonable time frame intimated by the Engineer-In-Charge.

2. In the event of any emergency, where in the judgment of the Engineer-In-Charge, delay would cause serious loss or damages, repair may be made by the Engineer-In-Charge or a third party chosen by the Engineer-In-Charge without advance notice to the Contractor and the cost of such work shall be recovered from the Contractor. In the event such action is taken by the Engineer-In-Charge, the Contractor will be notified in due course and he shall assist wherever possible in making necessary corrections. This shall not relieve the Contractor of his liabilities under the terms and conditions of the Contract.

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

5. CONTRACT PERFORMANCE BANK GUARANTEE:

Package- I : Supply of LVRTs:

1. The successful Bidder shall be required to furnish **Contract Performance Bank Guarantee** in non-judicial stamp paper of appropriate value (as per the prescribed format) issued in favour of "TP Central Odisha Distribution Ltd." encashable at Bhubaneswar Branch of the Issuing Bank only within **30 (Thirty) days from the date of issue of the Release Order.**

The Contract Performance Bank Guarantee (CPBG) amount shall be equal to **Five percent (5%)** of the Purchase Order value (including GST) valid for 03 (three) Months over and above the Guarantee period From the last date of supplied i.e. **(60 Months +3 Months** = **63 months**).

Package- II : SITC of Other associate work (including LVRT transportation , Erection, successful Testing & Charging):

1. The successful Bidder shall be required to furnish **Contract Performance Bank Guarantee** in non-judicial stamp paper of appropriate value (as per the prescribed format) issued in favour of "TP Central Odisha Distribution Ltd." encashable at Bhubaneswar Branch of the Issuing Bank only within **30 (Thirty) days from the date of issue of the Release Order.**

The Contract Performance Bank Guarantee (CPBG) amount shall be equal to **Five percent (5%)** of the Contract Price (including GST) of the **Rate contract** value valid for 03 (three) Months over and above work completion period plus Guarantee Period i.e. **(6 months + 24 Months +3 Months** = **33 months**).

2. If the work completion period gets extended the Contract Performance Bank Guarantee shall be extended accordingly. In case the contract price gets revised, the successful bidder shall submit the amended Bank Guarantee to that effect.

3. The aforesaid CPBG shall be returned to the Contractor after successful completion of the guaranteed obligations under the contract.

6. LATENT DEFECT WARRANTY:

1. The period of latent defect warranty **shall be 2 years reckoned from the date of completion of guarantee period** commencing immediately after the satisfactory commissioning for the entire works under the contract.

2. The latent defect warranty shall mean such warranties which are 'Latent' to the equipment supplied or erected which would not normally be discovered/seen by an inspection nor discoverable during the trial run. These are concealed flaws which one would normally not expect from the item during the execution of the contract or during the guarantee period but subjected from a manufacturing defect for which the contractor shall remain liable for replacement/rectification for such 'Latent' defect.

3. OWNER shall exercise the right of latent defect warranty for replacement/rectification of Supply/Workmanship.

4. OWNER will have a claim in damages against the contractor if the defects are a result of the Contractor's breach of contract and/or negligence and OWNER suffers loss as a result.

7. LIQUIDATED DAMAGE / PENALY:

If the Contractor fails to supply the Materials/Equipment or fails to complete the erection including civil works within the due date of agreed key mile stones as defined in the Works Completion Schedule, TPCODL has the right to levy LD **@0.5% for each week** of delay or part thereof of the contract price of un-finished portion of works subject to the maximum of **5% (five percent) of the total contract price**.

8. SUNMITTAL & INSPECTION AND TESTING:

The time line to submit the GTP & drawing materials(HT /LT cable, pole, conductor, RMU, isolator, Insulator) shall be submitted within 5 days and balance materials within 15 days after receiving of RC/ LOI. Also, BA shall have to submit PSS layout within 10days.

For Package-I (Supply of LVRT) : The Inspection & Testing procedure separately mentioned in Technical Specification of (7/11 KV LVRTs).

TPCODL reserves the right to carry out material / services inspection through Third Party Inspecting Agency (TPIA) and or TPCODL or any authorized representative of OWNER at the Contractor's or its Vendor's manufacturing works. The Contractor shall give the advance notice in writing about the place of Inspection and/or Testing at least 15 days before the schedule date on which the equipment/materials will be ready for Inspection and/or Testing.

The Engineer-In-Charge shall have the right to re-inspect any equipment/materials though previously inspected and approved by him at the Contractor's or its Vendor's works, before and after the same are erected at Site. If by the above inspection, TPCODL rejects any equipment, the Contractor shall make good for such rejections either by replacement or modifications/repairs as may be necessary to the satisfaction of the Engineer-In-Charge, free of cost. Such replacement will also include the replacements or re-execution of such of those works of other Contractors and/or agencies, which might have got damaged or affected by the replacements or re-work done to the Contractor's/Vendor's work.

9. INSPECTION COST:

Expenses in respect of witnessing the Inspection & Testing of the equipment / materials offered by the Contractor, at the inspection and testing site, will be to the account of TPCODL. However if re-inspection of same materials is required due to any non-compliance, Additional cost of such re-inspection, if any, shall be borne by the Contractor.

EPC contractor is responsible for arranging the Electrical Inspectorate Clearance and it should be in his purview to get it done. TPCODL will facilitate the process for getting clearance and reimburse the Statutory Fee on production of receipts for such payment.

10. STORE & STORAGE INSURANCE :

1. The Contractor shall make his own arrangements for land for Stores and Workshops as required for storage of materials supplied and brought to site under the Contract at his own cost. The Contractor shall bring to Site all Construction equipment, tools and tackles for the purpose of the works.

2. He shall also employ necessary **watch and ward establishment** for the purpose.

3. All the equipment and materials including spares being supplied by the Contractor shall be kept completely **insured** by the Contractor at his cost from time of dispatch from the Contractor's works / Vender's works, up to the completion of erection, testing & commissioning and taking over of the entire works in accordance with the Contract.

11. SURPLUS MATERIALS/EQUIPMENT:

1. Bidder shall plan & execute the Contract in a manner such that no surplus materials/Equipment is accumulated after completion of the Contract.

2. Surplus Materials/Equipment including construction surplus of the civil works arising out of the contract, if any, the same shall be taken back by the Contractor without any cost to TPCODL.

12. RIGHT OF WAY:

The responsibilities of acquiring Right of Way (ROW) lies with contractor at his risk and cost. However, TPCODL will facilitate process of securing the ROW. The Acquisition of land for Sub- Stations shall be

the sole responsibility of TPCODL. Whereas the Contractor shall be responsible for securing the RoW for lines work. Similarly, responsibilities of getting clearance from Railway, NHAI, Forest, Water and other Statutory/Govt. bodies lie with the contractor at his risk and cost (except payment of statutory fees) . However, TPCODL will facilitate the process for getting clearance and reimburse the Statutory Fee on production of receipts for such payment. The Reinstatement of Roads (damaged during laying of UG Cable) & other RoW compensation are to the account of the EPC Contractor, however statutory fees paid, if any will be reimbursed by TPCODL.

13. EMBOSSING / PUNCHING / CASTING:

For **CM PDP Scope of** equipment and materials supplied /erected under the Project shall bear distinct mark of "**TPCODL/LVRT/ CM PDP**" by a way of embossing / punching / casting.

For **TPCODL CAPEX LVRTS** equipment and materials supplied under the CAPEX shall bear distinct mark of "**TPCODL/LVRT/ CAPEX**" by a way of embossing / punching / casting .
This should be clearly visible to naked eye.

14. ELECTRICITY & WATER :

The Contractor shall be entitled to use for the purpose of performing the Services such supplies of electricity and water as may be available on the Site and shall provide any apparatus necessary for such use. The Contractor shall pay at the applicable tariff plus the overheads, if any, for such use. Where such supplies are not available, the Contractor shall make his own arrangement for provision of any supplies he may require.

15. New Items :

In case any new item(s) are required during the execution of the Contract which are not available in the BOQ/Price Schedule contained initial RC issued after completion of this Tender, the same shall be executed by the Contractor at cost not exceeding the latest Benchmarking Price of TPCODL/other Tata Power managed Utilities in Odisha. In case the benchmarks are not available, the prices shall be mutually agreed.

16. Payment Terms:

Package- I :

A. 80% (Eighty percent) of PO value shall be paid on successfully supply at TPCODL Central Store along with taxes and duties within 30 days after submission of Invoice duly Certified by TPCODL Engineer-in-charge.

B. Balance 20% (Twenty percent) payment of the PO shall be paid within 30 Days after successful testing , charging and Handing Over of the complete systems specified in the order, including clearance of Electrical Inspection (if any), compliance thereof and reconciliation .

Package- II :

C. 80% (Eighty percent) of contract price shall be paid on pro-rata basis along with taxes and duties within 30 days for completed items/work (Supply and erection at site only) after submission of Invoice duly Certified by TPCODL Engineer-in-charge.

D. Balance 20% (Twenty percent) payment of the actual executed Work Order/RO shall be paid after completion of acceptance test and Taking Over of the complete systems specified in the order, including clearance of Electrical Inspection (if any), compliance thereof and reconciliation .

- All other terms and conditions of TPCODL GCC shall be applicable.

The Contractor shall follow and comply with TPCODL Contractor Safety Management (CSM) and annual safety plan and applicable rules and regulation as per relevant safety guidelines i.e CEA 2010 safety guidelines, CEA 2010 construction guidelines etc., pertaining to the safety of workmen, employees, plant and equipment or as may be prescribed from time to time, without any demur, protest or contest or reservations.

7.2 Climate Change

Significant quantities of waste are generated during the execution of project and an integrated approach for effective handling, storage, transportation and disposal of the same shall be adopted. This would ensure the minimization of environmental and social impact in order to combat the climate change. Please refer attached Environment Policy and Sustainability Policy, Annexure-XII, of Tata Power for more details.

7.3 Ethics

- TPCODL is an ethical organization and as a policy TPCODL lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.
- TPCODL work practices are governed by the Tata Code of Conduct which emphasizes on the following:
- We shall select our suppliers and service providers fairly and transparently.
- We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
- Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
- We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
- We respect our obligations on the use of third party intellectual property and data.

Bidder is advised to refer attached Tata Code of Conduct (TCOC), Annexure-XI, for more information.

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

8.0 Technical Specification and standards:

Attached in Annexure-II

9.0 General Condition of Contract

Any condition not mentioned above shall be applicable as per GCC. Attached along with this tender in Annexure VIII.

Any condition not mentioned above shall be applicable as per GCC for Supply attached along with this tender.

10.0 Safety

All jobs are this tender have to be executed strictly in compliance to the Safety terms and Conditions of Tata Power. Please refer attached Safety terms and conditions, Annexure-IX, for details. Violation of Safety norms will result in Penalty as mentioned in the above document. Safety Policy of Tata Power is also enclosed for reference.

ANNEXURE I

Schedule for Items (BOQ)

PACKAGE- I :

		Supply , supervision of erection , testing & commissioning of LVRTs :							
Sl. No.	Sub part	DESCRIPTION OF ITEMS	Unit	Total Quantity	BASIC PRICE PER UNIT (Taxable Value) In Rs	CGST @ 9% PER UNIT (INTRA-STATE)	OGST @ 9% PER UNIT (INTRA-STATE)	TOTAL PRICE PER UNIT (In Rs)	TOTAL PRICE FOR THE TENDER QUANTITY (Rs.)
				5	**6**	**7= (6*9%)**	**8= (6*9%)**	**9= {6+7+8}**	**10= {9*5}**
1	**A**	Supply , supervision of erection , testing & commissioning of **1000 KVA , 7/11 KV** Line Voltage Regulator Transformer **(CM PDP Scheme)**	No's.	**20**					
2		Supply , supervision of erection , testing & commissioning of **1000 KVA , 7/11 KV** Line Voltage Regulator Transformer **(CAPEX Scheme)**	No's.	**08**					
3		Charges for conducting Type test on 1000 KVA,7/11 KV Line Voltage Regulator as per technical specification attached.	No	**1**					
4	**B**	Supply , supervision of erection , testing & commissioning of **500 KVA , 7/11 KV** Line Voltage Regulator Transformer **(CAPEX Scheme)**	No's.	**05**					
5		Charges for conducting Type test on 500 KVA ,7/11 KV Line Voltage Regulator as per technical specification attached.	No	**1**					

							Total (Rs.)	

PACKAGE- II : Other Materials Required for Installation of 11kV LVRT with Accessories as per technical Specification and scope of work under CM PDP Scheme in Turnkey basis (Including LVRTs transportation from TPCODL store to site, Erection, successful Testing & Charging)

1. Supply of Materials Required for Construction of 11kV LVRT with accessories, as per technical specification and scope of work under CMPDP Scheme.

SL. No.	DESCRIPTION OF ITEMS	Unit	Total Quantity	BASIC PRICE PER UNIT (Taxable Value) In Rs	CGST @ 9% PER UNIT (INTRA-STATE)	OGST @ 9% PER UNIT (INTRA-STATE)	TOTAL PRICE PER UNIT (In Rs)	TOTAL PRICE FOR THE TENDER QUANTITY (Rs.)
20 Nos. DPs for LVRTs in CM PDP Scheme			**5 (Sum from1 to 4)**	**6**	**7= (6*9%)**	**8= (6*9%)**	**9= {6+7+8}**	**10= {9*5}**
1	Supply of WPB 160x152 (11Mtr. Long, 30.44KG/Mtr.)	No's.	**40**					
2	Supply of Straight Cross Arm 100X50X6mm, 9.56 KG/Mtr., each channel length 1.2 mtr., 4 no's channel required =(4x9.56x1.2)	Kg	**917.76**					
3	Supply Fish Plate 50x6 mm., 2.36 kg/Mtr., each 0.280 mtr. length, 6 no's required = (6x2.36x0.280)	KG	**79.30**					
4	Supply of Back Clamp for danger Plate 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 2 no's (Each 2x0.59x0.510)	Kg	**12.04**					
5	Supply of 50x6mm GI Flat for earthing, 2.36kg/mtr., (2.5x7 mtr. For mesh formation, 12 Mtr. For LA and 2.5 mtr. For raising, 5x2 mtr. for DTR Nutral,	KG	**2610.16**					

	(1.3+4.5) mtr. For DTR Body, 0.500 mtr for LTDB, 3 mtr. for Fencing, 2X2 mtr. for ICOG) (Each 55.3x 2.36= 130.51 Kg)							
6	Supply of 11kV, 3Core, 120 sqmm, Aluminium UG cable for 3Core (Set)	Mtr.	**2000.00**					
7	Supply of Indoor termination kits Heat Shrinkable type suitable for 11kV, 3Core, 120 sqmm, HT UG cable for 3Core (Set)	Set	**160**					
8	Supply of Outdoor termination kits Heat Shrinkable type suitable for 11kV, 3Core, 120 sqmm, HT UG cable for 3Core (Set)	Set	**160**					
9	Supply of 11 kV RMU VCB ICOG	Set	**40**					
10	Supply of Disc insulator (B&S)70 KN polymer	No's.	**120**					
11	Supply of H W fitting (B&S)70KN(3bolted)	Set	**120**					
12	Supply of Lightning Arrester(12KV,10KA) Station Class 2	No's.	**120**					
13	Supply of 11KV pin insulator polymer	No's.	**120**					
14	Supply of HT stay set complete	Set	**40**					
15	Supply of HT stay Clamp (1.9Kg/pair)	Pair	**40**					
16	Supply of HT stay insulator TYPE-C	No's.	**40**					
17	Supply of 7/10 SWG GI stay wire, Grade -2 (15Kg./ Set)	Kg	**600.00**					
18	Supply of 40 mm Nominal bore GI pipe (medium gauge) earthing device with 3 mtr .Long	No's.	**200**					
19	Supply of GI Nuts & Bolts of Assorted size	Kg	**500.00**					

	(25 Kg/ DSS DP)							
20	Supply of GI Barbed wire/Anticlimbing device (3Kg /Pole)	Kg	**120.00**					
21	Supply of Back Clamp for anticlimbing device 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 8 no's = (8x0.59x0.510)	KG	**48.14**					
22	Supply of Danger plate 11kv	No's.	**40**					
23	Supply of Back Clamp for danger Plate 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 2 no's = (2x0.59x0.510)	KG	**12.04**					
24	Supply of Name plate	No's.	**20**					
25	Supply of Yellow Colour Paint for Background	Ltr	**40.00**					
26	Supply of Black Colour Paint for numbering	Ltr	**20.00**					
TOTAL OF SUPPLY COMPONENT OF THE WORKS CONTRACT (Rs.)								

2	**Erection, Testing & Commissioning of Materials Required for Construction of 11kV LVRT with accessories, as per technical specification and scope of work under CM PDP Scheme.**							
Sl. No.	**Description of Materials**	**Unit**	**Total Quantity**	**BASIC PRICE PER UNIT (Taxable Value) In Rs**	**CGST @ 9% PER UNIT (INTRA-STATE)**	**OGST @ 9% PER UNIT (INTRA-STATE)**	**TOTAL PRICE PER UNIT (In Rs)**	**TOTAL PRICE FOR THE TENDER QUANTITY (Rs.)**
				6	**7= (6*9%)**	**8= (6*9%)**	**9= {6+7+8}**	**10= {9*5}**
1	WPB 160x152 (11Mtr. Long, 30.44KG/Mtr.)	No's.	**40**					
2	Straight Cross Arm 100X50X6mm, 9.56 KG/Mtr., each channel length 1.2 mtr., 4 no's channel required =(4x9.56x1.2)	Kg	**917.76**					
3	Fish Plate 50x6 mm., 2.36 kg/Mtr., each 0.280 mtr. length, 6 no's required = (6x2.36x0.280)	KG	**79.30**					

4	Back Clamp for danger Plate 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 2 no's (Each 2x0.59x0.510)	Kg	**12.04**					
5	50x6mm GI Flat for earthing, 2.36kg/mtr., (2.5x7 mtr. For mesh formation, 12 Mtr. For LA and 2.5 mtr. For raising, 5x2 mtr. for DTR Nutral, (1.3+4.5) mtr. For DTR Body, 0.500 mtr for LTDB, 3 mtr. for Fencing, 2X2 mtr. for ICOG) (Each 55.3x 2.36= 130.51 Kg)	KG	**2610.16**					
6	1000 KVA , 7/11 KV Line Voltage Regulator Transformer(under CMPDP)	No's.	**20**					
7	Erection, Testing & Commissioning of 11kV, 3Core, 120 sqmm, Aluminium UG cable for 3Core (Set)	Mtr.	**2000.00**					
8	Erection, Testing & Commissioning of Indoor termination kits Heat Shrinkable type suitable for 11kV, 3Core, 120 sqmm, HT UG cable for 3Core (Set)	Set	**160**					
9	Erection, Testing & Commissioning of Outdoor termination kits Heat Shrinkable type suitable for 11kV, 3Core, 120 sqmm, HT UG cable for 3Core (Set)	Set	**160**					
10	11 kV RMU VCB ICOG	Set	**40**					
11	Disc insulator (B&S)70 KN polymer	No's.	**120**					
12	H W fitting (B&S)70KN(3bolted)	Set	**120**					
13	Lightning Arrester(12KV,10KA) Station Class 2	No's.	**120**					
14	11KV pin insulator polymer	No's.	**120**					
15	HT stay set complete	Set	**40**					
16	HT stay Clamp (1.9Kg/pair)	Pair	**40**					
17	HT stay insulator TYPE-C	No's.	**40**					
18	7/10 SWG GI stay wire, Grade -2 (15Kg./ Set)	Kg	**600.00**					
19	40 mm Nominal bore GI pipe (medium gauge) earthing device with 3 mtr .Long	No's.	**200**					

20	GI Nuts & Bolts of Assorted size (25 Kg/ DSS DP)	Kg	**500.00**					
21	GI Barbed wire/Anticlimbing device (3Kg /Pole)	Kg	**120.00**					
22	Back Clamp for anticlimbing device 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 8 no's = (8x0.59x0.510)	KG	**48.14**					
23	Danger plate 11kv	No's.	**40**					
24	Back Clamp for danger Plate 25X3 mm. flat, 0.59Kg/Mtr. Flat of 0.510mtr length 2 no's = (2x0.59x0.510)	KG	**12.04**					
25	Name plate	No's.	**20**					
26	Yellow Colour Paint for Background	Ltr	**40.00**					
27	Black Colour Paint for numbering	Ltr	**20.00**					
3	**Civil Works Including Supply of All Materials Like Cement, MS tor Rod, Brick, Coarse & Fine Aggregates & Labour, T&P etc.; for Construction of LVRT**							
1	Excavation of Earth for 11 Mtr. long poles pit. (1000mm X 500mm X 1875mm) = 0.94 Cu.mtr.), as per technical specification and scope of work.	Cum	**37.60**					
2	Concreting ratio 1:1.5:3 (500mmX500mmX1800mm) = 0.450Cu.mtr	Cu.mtr	**18.00**					
3	Couping ratio 1:1.5:3 (500mmX500mmX450mm) = 0.113Cu.mtr	Cu.mtr	**4.52**					
4	Fixing of stay set with 0.5Cum cement concrete foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal with all labor and material except stay set , stay wire , stay insulator .	No.	**40.00**					
5	Earth work excavation of soil (1mtr. width X 1mtr. depth)	Cum	**700.00**					
6	Earth work excavation of hard rock (1mtr. width X	Cum	**300.00**					

	1mtr. depth)							
7	Back filling with excavated soil outside and above the trench	Cum	**1000.00**					
8	Construction of 3-way/4-way/5way RMU Plinth with Brick, Mortar, 12 mm cement plaster as per drawing.Scope of work includes excavation of earth for foundation and supply of raw material i.e. sand, cement, bricks and removal of extra malba if any as per site requirement including labour required for the same as per site requirement & With respect to TPCODL drawing .	EA	**40.00**					
9	Construction of Plinth with Brick, Mortar, 12 mm cement plaster upto 1000KVA transformer as per TPCODL drawing.Scope of work includes excavation of earth,supply of Civil material, machinery for construction of plinth as per TPCODL Drawing desposal of extra malba as per EIC instruction.	No.	**20.00**					
10	Supply and Erection of GI Fencing with Gate	Sq.mtr.	**800.00**					
TOTAL OF ERECTION & CIVIL WORKS COMPONENT OF THE WORKS CONTRACT FOR OTHER ASSOCIATED MATERIAL INCLUDING 20 NOS. LVRT.								
(1) Supply of other associate material of Total (Rs.)								
(2+3) Erection+ Civil part of other associates material Including LVRTs of Total (Rs.)								
(4) Grand Total for Package- II =A+B (Rs.)								

Importance Note for Price schedule:

Package-I :

- prices shall be firm till the validity Period of the Rate contract.
- The bids will be evaluated commercially on the line item wise lowest cost basis.
- The unit price with GST in column no.9, is landed price (inclusive of loading, unloading, transit insurance cost & freight) for TPCODL at their Central store Bhubaneswar / Cuttack. Also the Unit price column includes supervision charges of erection , testing &commissioning.
- The bidders are advised to quote as per the scope provided & strictly in the above format. Failing to do so, bids areliable for rejection.
- The bidder must fill each and every column of the above format. ***Mentioning***

"extra/inclusive"in any of the column may lead for rejection of the price bid.

- No cutting/ overwriting in the prices is permissible.
- The quantity may vary as per actual requirement.
- The Bidder should ensure that the unit prices for the same item furnished in price schedules are consistent with each other. In case of any inconsistency in the Unit prices furnished in the price proposal of the bidder, the TPCODL have right to consider the lowest unit price in evaluation.

Package-II :

- prices shall be firm till the validity Period of the Rate contract. Price shall be quoted considering item description and technical specification.
- The bidders are advised to quote prices strictly in the PRICE format given in Price Annexures. Failing to do so, bids are liable for rejection.
- Bidder should quote as per the "Item description" column. No cutting/ overwriting in the prices is permissible.
- Bidder have to quote against each items having Unit and Qty. No rate should be quoted where unit and Qty. are blank.
- Mentioning "extra/inclusive" in any of the column may lead for rejection of the price bid.
- If any price is mentioned against the line items where unit & Qty. is blank, then the quoted price against the line item will be ignored during evaluation.
- Unit price of the price bid quoted by the bidder in his bid shall be considered and other than unit price i.e. items description, unit, qty., etc. shall be considered as per the TPCODL tender price schedule.
- The bids will be evaluated commercially on the overall all-inclusive price of tender BOQ as Price Annexures..
- All materials shall be supplied and erected by the BA on turnkey basis.
- The unit price should be inclusive of freight, insurance and other levies (if any) and exclusive of GST. GST to be mentioned separately. Total price shall be inclusive of all.
- The bidders advised to visit the site and understand scope of the work before price quotation.
- The Bidder should ensure that the unit prices for the same item furnished in price schedules are consistent with each other. In case of any inconsistency in the Unit prices furnished in the price proposal of the bidder, the TPCODL have right to consider the lowest unit price in evaluation.
- There shall be no price variation during the Contract Period / Extended Contract Period.

ANNEXURE II

Technical Specification Attached with the tender

ANNEXURE III

Schedule of Deviations

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

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

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

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

Seal of the Bidder:

Signature:

Name:

ANNEXURE IV

Schedule of Commercial Specifications

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

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1c.	Inclusive of GST	Yes / No (If Yes, indicate % rate)
1d.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of technical bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Micro, Small & Medium Enterprises Act, 2020	Yes / No (If Yes, indicate, MSME Reg'n No.)

Seal of the Bidder:

Signature:

Name:

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

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

S. No.	Documents attached	Yes / No / Not Applicable	Page No
1	EMD of required value		
2	Tender Fee as mentioned in this RFQ		
3	Company profile/ organogram		
4	Signed copy of this RFQ as an unconditional acceptance		
5	Sheet of commercial/ technical deviation if any (Annexure III)		
6	Duly filled Self Declaration Form (Annexure IV)		
7	Duly filled schedule of commercial specifications (Annexure V)		
8	Letter of award/contract documents/ Order Copy, Performance Certificates is to be provided by bidder in proof of qualifying criteria. (Submit a statement indicated order no, value date of completion to support above)		
9	Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement & Turn Over Certificate certified by CA		
10	Credit rating/ Solvency certificate certified by Bank		
11	HT License and other statutory document (Pan, GSTIN, ESI, EPF)		
12	List of Machine/ tools with updated calibration certificates if applicable		
13	Order copies as a proof of quantity executed		
14	List of trained/ Untrained Manpower		

Annexure VI

Acceptance Form for Participation In Reverse Auction Event

(To be signed and stamped by the bidder)

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

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

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

Signature & Seal of the Bidder

Annexure VII

General Conditions of Contract – Attached separately

Annexure VII (a)

Preferential norms for procurement from Local MSMEs

1) Tender Fees

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

2) Earnest Money Deposit (EMD)

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

3) Qualification Requirement for Open Tenders

Qualification Requirement of Financial Turnover for MSME registered in the State of Odisha shall be reduced to 20% of the existing criteria.

For past experience, instead of relying on the volumes / value of earlier Supplies / Projects, assessment of the Bidder shall be done on the basis of feedback from Customers. Past performance experience at Tata Power and its Group Companies shall supersede feedback from other Customers.

4) Reservation for MSME

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

5) Performance Bank Guarantees

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

Annexure VIII

Safety Policy and Safety terms and conditions (Attached separately)

Annexure-IX

Tata Code of Conduct

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available a tour website:

https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf

The Contractor is requested to bring any concerns regarding this to the notice of our Chief Procurement & Stores mail ID: Pravin.jain@tpcentralodisha.com.

Annexure X

TATA

CORPORATE ENVIRONMENT POLICY

Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
  - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
  - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
  - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
  - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
  - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

ANNEXURE-XI

PROFORMA FOR BANK BALANCE, FIXED DEPOSITS AND AVAILABILITY OF CREDIT FACILITIES BANK CERTIFICATE

This is to certify that M/s. …… (Full Name & Address), who are submitting their bid to TPCODL against their Tender Specification vide Ref. No……..& Date ……..is our Customer for the past……. Years.

Their financial transactions with our Bank have been satisfactory. Their Current A/c Balance & Fixed Deposit Balance as on is also indicated below:

SL.NO.	TYPE OF ACCOUNT(CURRENT/ FD/RD/ANY OTHER)	ACCOUNT NUMBER	BALANCE as on Dt….. (Rs. in Cr)

They enjoy the following fund based and non fund based limits (Cash Credit, Bank Guarantees, L/C and other credit facilities) with us against which the extent of utilization as on is also indicated below:

SL.NO.	TYPE OF FACILITY	. SANCTIONED LIMIT AS ON DATE	UTILISATION AS ON DATE (Rs. In Cr.)	AVAILABLE AS ON DATE (Rs. in Cr)

This letter is issued at the request of M/s …….

Sd/-

Name of Bank……..

Name of Authorized Signatory ……..

Designation ……..

Phone No. ……..

Address ……..

SEAL OF THE BANK.

N.B. : To be issued by the Issuing Bank in their Bank Letter Head

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2038

Specification Name : Technical Specification 7-11 kV 1.0 MVA Line Voltage Regulator Transformer

Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
SWARUP NAYAK	Vijender Goyal	SHANTAPRIYA JENA	JYOTIPRAKASH MOHANTY	KHAJAN BHARDWAJ	POURUSH GARG
TPCODL	TPSODL	TPNODL	TPWODL	TPCODL	TPCODL
10-03-2023	11-03-2023	11-03-2023	17-03-2023	18-03-2023	18-03-2023

CONTENTS

1. SCOPE:

I. This Specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forward, supply and unloading at site/store and performance of Oil immersed, non-sealed, naturally cooled, three Phase 11KV Line Voltage Regulator Transformer 500KVA & 1000 KVA to control voltage variation ranging from 7 to11KV.

II. The transformer shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3

III. Such of the parts that may have not been specifically included, but otherwise form part of the transformer as per standard trade and/or professional practice and/or are necessary for proper operation of transformer, 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. not withstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.

2. APPLICABLE STANDARDS:

The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian standards & other relevant standards for components & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:

Indian Standards	Title
IS 1180	Outdoor Type Oil Immersed Distribution Transformers Upto and Including 2500 KVA, 33 kV-Specification
IS 2026 (all parts)	Specification for Power Transformers
IS 104	Specification for ready mixed paint, brushing, zinc chrome, priming
IS 335	Specification for new insulating oil.
IS 649	Testing for steel sheets and strips and magnetic circuits.
IS 5	Specification for Colors for ready mixed paints and enamels
IS 1576	Solid Pressboard for Electrical Purposes -Specification
IS 2099	Specification for bushings for alternating voltages above 1000 volts

IS 2362	Determination of water content in oil by Karl in oil Fischer Method – Test Method.
IS 3024	Grain oriented electrical steel sheets and strips
IS3347 (Part I & Part-3)	Dimensions for Porcelain Transformer Bushings for Use in Normal and Lightly Polluted Atmospheres - Part 1 : Up to and including 1 kV
IS 4253: Part II:	Specification for cork composition sheets- Part II : Cork and Rubber
IS 4257(Part I):	Dimensions for Clamping Arrangements for Porcelain transformer Bushings - Part I: For 12 kV to 36 kV Bushings
IS 5082	Wrought Aluminum and Aluminum Alloy bars, Rods , Tubes, Sections, Plates and Sheets for Electrical Applications
IS 5561	Specification for Electric Power Connectors
IS 6103	Specification for Testing of specific resistance of electrical insulating liquids
IS 2026 part 7	Guide for loading of Oil-immersed transformer
IS 6792	Method for Determination of Electric Strength of Insulating Oil
IS 7404 (Part-1):	Paper Covered conductors: Round Conductors
IS 7421	Specification for porcelain bushings for alternating voltages up to and including 1000kv
IS 8603 (Part-1) :	Dimensions for Porcelain Transformer Bushings for Use in Heavily Polluted Atmospheres - Part I:12 kV and 17.5 kV Bushings
IS 9335	Specification for Cellulosic Papers for Electrical Purposes
IS 10028	Code of Practice for Selection, Installation and Maintenance of Transformers
IS 11149	Specification for rubber gaskets
IS 12444	Specification for Continuously Cast and Rolled Electrolytic Copper Wire Rods for Electrical Conductors.
IS/IEC 60947 (PART 1& PART 2)	Specification for LV Switchgear & Control gear
IS 6160	Rectangular electrical conductors for electrical machines
IS 13964	Methods of measurement of transformer and reactor sound levels

IS 3401	Specification of silica Gel
IS 1897	Copper strip for electrical purposes
IS 60529	Degree of protection provided by enclosure
IS 816	Welding of Mild Steel
CEA	Guidelines for specifications of energy efficient outdoor type single and three phase distribution transformers
IS 6262	Method of test for power factor and dielectric constant of electrical insulating liquids
IS 16659	Fluids For Electro technical Applications - Unused Natural Esters For Transformers And Similar Electrical Equipment
IS 16081	Insulating liquids — Specifications for. Unused synthetic organic esters for Electrical purposes
IEC 60156	Method of determination of electric strength of insulating oils.
IEC 60296	Specification for unused mineral insulating oils for transformers and switchgear.
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IS 1852	Rolling and cutting tolerances for hot rolled steel 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	1500 mm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr

9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPCODL/TPNODL/TPWODLTPSODL 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	Parameters	Unit	500 KVA	1000 KVA
1.	Description		11KV Line Voltage Regulator Transformer	
2.	Service		Outdoor	
3.	Reference Standard & Tolerances		IS:2026	
4.	KVA Ratings of Transformers	kVA	500	1000
5.	Voltage Variation	KV	7KV-11KV on Source Side to maintain a constant 11KV on Load side.	
6.	Full Load Current	Amp	41.24A at 7KV, 26.24A at 11KV	82.48 at 7KV, 52.48A at 11KV
7.	Voltage Control		By provision of an AVR With OLTC	
8.	Rated Frequency	Hz	50	
9.	No. of Phases	Nos	3	
10.	Max Flux density at normal voltage (11KV) and frequency (50Hz)	Tesla	1.6 T	
11.	Max Flux density at 12.5% increase of Combined Nominal V & f .	Tesla	1.9 T	
12.	Max Current density	A/Sq. mm	2.5	

13.	Vector Group		Ynya0	
14.	Type of Cooling		ONAN	
15.	Temperature Rise- Top Oil/ Winding,	°C	40/45	
16.	No-Load Loss at rated voltage (11kV) & Frequency	kW	1 kW (±10%Tolerance)	2 kW (±10%Tolerance)
17.	Load Loss at rated current and at 75 Deg at Highest Tap	kW	2 kW (±10%Tolerance)	3.5 KW (±10%Tolerance)
18.	Impedance Voltage at rated current at 75 Deg	%	0.55 (±10%Tolerance)	0.6 (±10%Tolerance)
19.	Type of Tap Changer		In-Tank OLTC (On Load Tap Changer)	
	Make		EASUN MR/CTR	
	Tapping Range		16 Step,17-Position	
20.	Insulation Class		Class-A	
21.	Separate Source Power Frequency Voltage Withstand	KVRMS	28	
22.	Induced Over Voltage Withstand	KVRMS	22	
23.	Full Wave Lightening Impulse Withstand Voltage of winding	kVp	95	
24.	Terminal Arrangement -			
	Load Side Bushing		Outdoor type 17.5KV Bushing on Top	
	Source Side Bushing		Outdoor type 17.5KV Bushing on Top	
25.	Weight (With ±10% Tolerance)		As per Manufacturer's Design	
26.	Weight of Core	Kg	As per Manufacturer's Design	
27.	Weight of Winding(Copper)	Kg	As per Manufacturer's Design	

28.	Core &Winding	Kg	As per Manufacturer's Design
29.	Tank &Fitting	Kg	As per Manufacturer's Design
30.	Transformer Oil	Ltrs/ Kg	As per Manufacturer's Design
31.	Total Weight of Transformer	Kg	As per Manufacturer's Design
32.	Auxiliary Transformer 3Ph 1KVA for Tap Changer and Control. (Separate/In Built)	Qty	1
33.	Core Material & Grade		CRGO M3 0.23 mm
34.	Winding Resistance at 20 Deg.c Per phase(Tap.No.1)	Ohm	As per Manufacturer's Design
35.	Magnetizing Current at 90%,100% &112.5%	%	2%,3% & 5.0% of Rated Current
36.	Winding Material Insulation		QPC
37	Type of Mounting		Floor Mounted/ Plinth Mounted

5. GENERAL CONSTRUCTION:

I. The transformer shall be stacked core, copper coil, oil immersed, naturally cooled (ONAN), non-sealed type with plain rectangular tank.

II. The transformer shall be suitable for service with fluctuations in supply voltage as per GTP

III. The transformer shall be designed suitable for service life of 25 years.

IV. The transformer and accessories shall be designed to facilitate trouble free operation, inspection, maintenance and repairs under the various operating and atmospheric conditions specified in clause no. 3.

V. The design shall incorporate every precaution and provision for the safety of the equipment as well as staff engaged in operation and maintenance of the equipment.

VI. All outdoor apparatus of the transformer, including bushing insulators with their

mountings, shall be designed so as to avoid any accumulation of water.

5.1 CORE:

I. Transformer core shall be stack type, 2D, constructed from high grade cold rolled, non-ageing, grain oriented, silicon steel lamination which shall be properly annealed (under inert atmosphere, if required) to relieve stresses.

II. The core shall have low loss and good grain properties.

III. Core should be coated with hot oil proof, with insulation coating, an inorganic coating equivalent to C-5 type as ASTM A976 or IS 3024, like Carlite -3.

IV. All core should be clamped together with frames to prevent vibration and noise. The core clamping shall be preferably without through bolts and if any bolt used same shall be effectively insulated.

V. The core thickness should be 0.23mm or better. 23HP85 as per IS 3024 or better with Minimum Polarization in Tesla at a Field Strength of 800 A/m

VI. Only single grade and same thickness of core stampings shall be accepted and mixing of different grades shall not be allowed.

VII. The complete design of the core must ensure maximum permanency of the core losses without continuous working of the transformers .

VIII. The value of the maximum flux density allowed in the design and grade of lamination used shall be clearly stated. The vendor shall submit the calculations in support of the same.

IX. The handling of core lamination and stacking should be smooth and uniform.

X. The transformer shall be suitable for continuous service without damage under 'over fluxing' where the ratio of voltage over frequency exceeds the corresponding ratio at rated voltage and rated frequency up to 12.5% and the core shall not get saturated. The BH graph to be submitted by bidder for core material.

XI. Increase of 12.5% of rated voltage shall not increase the no-load current by 5% maximum of full load current .

XII. The bidder shall be required to submit the following documents in regard to procurement of core material during stage inspection:

a. Invoice of supplier
b. Mill's test certificate
c. Packing list
d. Bill of landing
e. Bill of entry certificate by custom (if required)

f. Description of material, electrical analysis, physical inspection certificate for surface defects, thickness and width of material.

XIII. The bidder shall offer the core for inspection and approval of TPCODL/TPNODL/TPWODLTPSODL during manufacturing stage. Heavy penalty or black listing shall be imposed on the bidders using defective CRGO sheets i.e in case of nonconformance w.r.t TPCODL/TPNODL/TPWODLTPSODL Specifications.

XIV. Transformer core assembly shall have enclosed type lifting lugs for lifting arrangement.

XV. **Bidder shall provide the below details in below table**:

Sl. No.	**Description**	**Unit**	**To be furnished by bidder**
1	Magnetizing (No Load) Current		
	90% Voltage	%	
	100% Voltage	%	
	112.5% Voltage	%	
2.	Core grade		
3.	Thickness of core Lamination	Mm	
4.	Core Dimension: Length X height X diameter	mm x mm x mm	
5.	Gross core area	Sq.cm	
6.	Net core area	Sq.cm	
7.	Flux density (calculated)	Tesla	
8.	Over fluxing without saturation to be submitted)	Tesla	
9.	Mass of core	Kg	
10.	Loss per Kg of core at the abov specified flux density	Watt	
11.	Core window height	Mm	
12.	Center to center distance of the	Mm	

13	Mass of Core Lamination (min.	Kg	
14	Make of Core offered		

5.2 WINDING CONNECTIONS

I. Load and Source Side windings shall be constructed from high- conductivity (copper conductors), QPC copper conductor with min. 25% overlap per layer of paper.
II. The conductor should be drawn uniformly without any deformation and any burr.
III. No metallic or non-metallic dust should be present in-between QPC conductor.
IV. The current density for Load and Source Side winding should not be more than 2.5 Ampere per sq.mm.
V. The insulation between core and bolts, core and clamps shall withstand **2.5 kV for one minute.**
VI. Proper bonding of inter layer insulation with the conductor shall be ensured.
VII. All turns of windings shall be adequately supported (by which material) to prevent movement. The core/coil assembly shall be securely held in position to avoid any movement under short circuit conditions.
VIII. The joints in the winding shall be avoided but if it is necessary then, they shall be properly brazed and the resistance of the joints shall be less than that of parent conductor. Crimping is not allowed at any joints.
IX. Bidder shall provide the below details in below table:

SL	Parameters	Unit	Technical Data
1	Description		
2	Service		
3	Reference Standard & Tolerances		
4	KVA Ratings of Transformers	kVA	
5	Voltage Variation	KV	
6	Full Load Current	Amp	
7	Voltage Control		
8	Rated Frequency	Hz	
9	No. of Phases	Nos	
11	Max Flux density at normal voltage (11KV) and frequency (50Hz)	Tesla	
11	Max Flux density at 12.5% increase of Combined Nominal V & f .	Tesla	
12	Current density	A/Sq.mm	
13	(Intentionally Kept Blank)		
14	Vector Group		
15	Type of Cooling		
16	Temperature Rise-Top Oil/ Winding,	°C	
17	No-Load Loss at rated voltage (11kV) & Frequency	kW	
18	Load Loss at rated current and at 75 Deg	kW	

19	Impedance Voltage at rated current	%		
20	Type of Tap Changer			
	Make			
	Tapping Range			
21	Insulation Class			
22	Separate Source Power Frequency Voltage Withstand	KVRMS		
23	Induced Over Voltage Withstand	KVRMS		
24	Full Wave Lightening Impulse Withstand Voltage of winding	kVp		
25	Terminal Arrangement -			
	Load Side Bushing			
	Source Side Bushing			
26	Efficiency at 75°C at unit P.F & at 0.8 PF Lagging			
	a. 125% Load	%		
	b.100% Load	%		
	c. 75% Load	%		
	d.50% Load	%		
	e.25% Load _	%		
27	Regulation			
	a. At unit P.F	%		
	b. At 0.8 P.F Lagging at 75°C	%		
	c. Maximum Efficiency occurs at	%		
	d. Maximum Efficiency	%		
28,	Weight (With ±10% Tolerance)			
	Weight of Core	Kg		
	Weight of Winding(Copper)	Kg		
	Core &Winding	Kg		
	Tank &Fitting	Kg		
	Transformer Oil	Ltrs/Kg		
	Total Weight of Transformer	Kg		
29	Auxiliary Transformer 3Ph 1KVA for Tap Changer and Control. (Separate/In Built)	Qty		
30	Core Material & Grade			
31	Winding Resistance at 20 Deg.c Per phase(Tap.No.1)	Ohm		
32	Magnetizing Current at 90%,100% &112.5%	%		
33	Winding Material Insulation			

5.3 INSULATING PAPER AND INSULATING PRESSBOARD

I. Inter layer insulation both for Load and Source Side windings shall be Epoxy diamond dotted Kraft paper and compressed pressboard of make (refer Clause no.5.32) subject to approval of TPCODL/TPNODL/TPWODLTPSODL

II. Load and Source Side windings shall be constructed from high- conductivity (copper conductors), QPC copper conductor with min. 25% overlap per layer of paper.

III. Kraft paper and Pressboard should be made of pure Cellulose from soft wood pulp manufactured from sulphate process. No additive, adhesive or coloring matter shall be present.

IV. Kraft paper and Pressboard should be of class A (105°C) insulation material.

V. All spacers, axial wedges / runners used in windings shall be made of pre-compressed solid pressboard.

VI. All axial wedges/runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely.

VII. Insulation shearing, milling and punching operations shall be carried out in such a way, that there should not be any burr, sharp edges and dimensional variations.

VIII. Kraft paper self-adhesive tape to be used for bonding of insulating paper layer, spanner and paperboards that are immersed in the oil filled transformer.

IX. Insulation shall be uniform throughout the winding. Graded Insulation is not allowed.

X. Below required values could be verified if required at any stage of the inspection and it should fulfill the requirement as per below table:

Characteristics	**Kraft Paper**	**Pressboard (all Sizes)**
1. Dimension	As specified by bidder with ±5% tolerance.	As specified by bidder with tolerance as per IS1576.
2. Apparent Density	>0.80 g/cm^3	as per IS 1576 w.r.t Thickness
3. pH of Aqueous extract	6-8%	6-8%
4. Electrical strength i) in air ii) In Oil	7KV/mm ----------	12KV/mm 35KV/mm
5. Ash content	Maximum 1%	Maximum 0.7
6. Moisture content	Maximum 8%	Maximum 8%
7. Oil absorption	----------	Minimum 9%
8. Heat stability	As per IS 9335-part 3	As per IS 1576
9. Tear index	As per IS 9335-part 3	As per IS 1576

Bidder has to submit the test certificates as per IS-9335, IS-1576 for all type of insulating materials covering above stated parameters along with **below parameters during stage inspection :**

a. Substance (Grammage) (g/m3)
b. Compressibility
c. Tensile strength
d. Conductivity of water extract
e. Shrinkage in air
f. Flexibility

g. Cohesion between plies.
h. Elongation
i. Air permeability
j. Bidder shall provide the below details in below table

Sl. No.	Description	Unit	As furnished by bidder
1.	QPC Paper for Load and Source Side conductors :		
	Type of QPC Paper		
	Make of QPC Paper		
	Thickness QPC Paper	mm	
	Percentage Overlapping (not less than 25%)	%	
2.	Type of Paper for Interlayer Insulation		
	Make of Paper for Interlayer Insulation		
	Thickness of Paper for Interlayer Insulation	mm	
3.	Type of Paper for Insulation Between Load and Source Side winding		
	Make of Paper for Insulation Between Load and Source Side winding		
	Thickness of Paper for Insulation Between Load and Source Side winding (for all sizes)	mm	
4.	Type of Pressboards used for Insulation Between Load and Source Side winding		
	Make of Pressboards used for Insulation Between Load and Source Side winding		
	Thickness of Pressboards for Insulation Between Load and Source	mm	

	Side winding (all size)		
5.	Type of Paper used for insulation between core and Winding		
6.	Type of Pressboard used for insulation between core and Winding		
	Make of Pressboard used for insulation between core and Winding		
	Thickness of Pressboard used for insulation between core and Winding (All sizes)		
7.	Material used for top and bottom yoke insulation		
	Make of material used for top and bottom yoke insulation		
	Thickness of material used for top and bottom yoke insulation	mm	
8.	Type of material used for Spanner, wedge and Axial for insulation		
	Make of material used for Spanner, wedge and Axial for insulation		
	Thickness of material used for Spanner, wedge and Axial for insulation (all sizes)	mm	

5.4 LOSSES

I. The bidder shall individually guarantee No load loss (Iron loss at rated voltage and frequency) and full load Copper Loss (at 75ºC) without any positive tolerance.

II. **The bidder shall also guarantee the total loss at 50% and 100% load condition (at rated voltage and frequency and these should be within the limits of maximum total losses declared by TPCODL/TPNODL/TPWODLTPSODL for both 50% and 100% loading values (as per table below)** :

Description	
Maximum Losses at 50% loading at 75ºC (Watts)	

Maximum Losses at 100% loading at 75ºC (Watts)	
Description	
Maximum Losses at 50% loading at 75ºC (Watts)	
Maximum Losses at 100% loading at 75ºC (Watts)	

No positive tolerance shall be allowed on the losses as mentioned above. However, bidder can offer losses less than specified but no consideration in cost will be given for the same.

*** : Ratings are for optional/ future use**

III. The successful bidder shall guarantee the quoted losses for at least five years. If at any point of time during operation if it is found that the total losses at 50% and 100% load are more than the values given in specifications, then bidder shall be liable to pay a fine of Rs 250 per watt to the amount by which losses at 50% loading and 100% loading increase with respect to the values given in specifications.

IV. During testing at Bidder's works if it is found that the actual measured losses are more than the values quoted by the Bidder, TPCODL/TPNODL/TPWODLTPSODL shall have the right to reject the complete lot.

V. During testing at Bidder's works, if the temperature rise exceeds the specified values, the entire lot shall be rejected by TPCODL/TPNODL/TPWODLTPSODL.

VI. During testing at Bidder's works, if the impedance values differ from the guaranteed values including tolerance, the entire lot shall be rejected by TPCODL/TPNODL/TPWODLTPSODL.

VII. Transformer losses shall be checked on any one of DT from supplied lot at TPCODL/TPNODL/TPWODLTPSODL workshop. If it is found that the actual measured losses are more than the values quoted by the Bidder, TPCODL/TPNODL/TPWODLTPSODL shall have the right to reject the complete lot.

VIII. **Bidder shall provide the below details in below table:**

Sl. No.	Description	Unit	To be furnished by bidder
1	No Load losses	Watt	
2	Load losses at 50%loading at 75° C	Watt	
3	Load losses at 100% loading at 75° C	Watt	
4	Total losses at 50%load at 75° C	Watt	
5	Total losses at 100% load at 75° C	Watt	
6	**Efficiency at 75 deg. C**		
7	**Efficiency at Unity P.F.**		

7.1	100% load	%	
7.2	80% load	%	
7.3	60% load	%	
7.4	40% load	%	
7.5	20% load	%	
8	**Efficiency at 0.8 P.F.**		
8.1	100% load	%	
8.2	80% load	%	
8.3	60% load	%	
8.4	40% load	%	
8.5	20% load	%	
9	**Regulation at :**		
9.1	Unity P.F. at 75 deg. C	%	
9.2	0.8 P.F. at 75 deg. C	%	
9.3	% Impedance at 75 deg. C	%	

5.5 TRANSFORMER TANK AND TANK CONSTRUCTION

I. The transformer tank shall be of robust construction, rectangular in shape and shall be built up of electrically tested welded mild steel plates.

II. The tank shall be fabricated by welding at corners. No horizontal or vertical joints in tank side walls and its bottom or top cover shall be allowed.

III. All welding operations should be carried by qualified welders (performance qualification certificates to the customer) as per the relevant ASME standards and a copy of the welding procedure has to be submitted to TPCODL/TPNODL/TPWODLTPSODL at the time of drawing approval.

IV. The thickness of tank should be as below:
For top and bottom : 6 mm (min.)
For Sides : 5 mm (min.)
Tolerance shall be applicable as per IS 1852 as per above thickness band.

V. In addition the cover of the main tank shall be provided with an **air release plug.**

VI. The tank plates shall be of such strength that the complete transformer when filled with oil may be lifted bodily by means of the lifting lugs provided. The top cover shall have no cut at point of lifting lug.

VII. The transformer tank cover shall be bolted with tank rim so as to make a leak proof joint.

VIII. The tank plate and lifting lugs shall be of such strength that the complete transformer filled with oil may be lifted by means of lifting shackle.

IX. The tank cover shall have slight slope (10 mm ± 2mm) towards Source Side side to drain rain water.

X. There must be sufficient space from the core to the top cover to take care of oil expansion. The oil volume inside the tank shall be such that even under the extreme operating conditions, the **pressure generated inside the tank does not exceed 0.4 kg/sq. cm positive or negative** and the tank shall be of adequate mechanical strength to withstand it.

XI. The transformer should be capable of **withstanding 0.8kg/sq.cm air pressure and a vacuum of 0.7kg/sq.cm**. The permanent deflection of the flat plate, when the tank without oil is subjected to a vacuum of 525 mm of mercury shall not be more than the values specified:

Length of Plate	**Deflection**
Up to 750 mm	5.0 mm
751 mm to 1250 mm	6.5 mm
1251 mm to 1750 mm	8.0 mm
Above 1750 mm	9.0 mm

XII. The tank design shall be such that the core and the windings can be lifted freely without dismantling the bushings.

XIII. All joints of tank and fittings shall be oil tight and no bulging shall occur during service.

XIV. Anti –theft arrangement via drill hole in one of the thread shall be provided at top cover.

XV. The tightening torque chart to be provided for all bolts used. This shall be submitted along with each rating drawings.

XVI. The transformer shall be provided with four pulling lugs of MS plate of 8mm thick to pull the transformer horizontally.

Lifting lugs:

I. The transformer shall be provided with a minimum of four welded heavy duty enclosed lifting lugs of Structural steel E250 or better grade quality A (Minimum quality A) as per IS 2062 plate of minimum 16mm thickness for lower rating and gradually increased for higher rating as per weight suitably reinforced by vertical supporting flat stiffener smooth welded properly on the side walls up to reinforcing angle. They shall be so extended that cutting bend plate is not required. The transformer lifting lug shall be painted with yellow colour.

II. The location of lifting lugs shall be such that the clearance between lifting chain and nearest part of bushing shall be at least 100 mm.

III. There shall be facilities for lifting the core coil assembly separately.

IV. The lifting lugs shall be designed in such a way that any two diagonal lugs are capable of lifting two times of the total weight of the transformer. The design of should be such that it should be suitable for 120degree lifting rope angle as per ASME B30.9 and at any point of time the maximum stress allowed on the Lug martial shall be lesser than 82MPa as per ANSI C.57.12.10

V. Calculation sheet for Lifting lug design to be submitted by Bidder. The calculation shall include the Stress on lifting lug material and stress on welding both. The Stress on the welding should be less than 840kg/cm2 as per ANSI C.57.12.10. All calculation to be done for considering lifting on any diagonal opposite two lugs conditions.

VI. The lifting lugs shall be located on the side walls only and conservator on LT box side. Separate drawing to be submitted stating welding thickness, welding length and location on tank along with stiffener support for all rating and all lugs.

Bidder shall provide the transformer size and clearances in below table:

Sl. No.	Description	Unit	To be furnished by bidder
1	Transformer overall Length x Height x width	mm x mm x mm	
2	Only Tank overall Length x Height x width	mm x mm x mm	
3	Source Side Cable box overall LxWxH (If applicable)	mm x mm x mm	
4	Load Side Cable box overall LxWxH (If applicable)	mm x mm x mm	
5	**Clearances**		
5.1	Core and Winding	mm	
5.3	Winding Phase to phase	mm	
5.5	Between yoke and inside of tank to cover	mm	
5.6	Between yoke and bottom	mm	
5.7	Any point of winding to tank	mm	
6	**Calculated Impedance**	%	
7.1	Winding to Earth Creepage distance in oil (minimum 15mm)	mm	
8.	Conservator dimension (dia x Length)	mmxmm	
9.	Size of Pipe used for conservator to Tank	mm	
10.	Size of Pipe used for Valves	Mm	
11.	Base Channel size	mmxmmxmm	
12.	No. of Radiators	Nos	
13.	No. of fins per Radiator	Nos	

14	Dimension of radiator fins (L x W)	mmxmm	
15	Make of Tank material		

5.6 RADIATORS

I. Radiators of pressed steel type conforming to the design requirement suitable for mineral oil and Ester oil (all type) type transformer.
II. The Pressed Steel type should be used in vertical formation without any bending and should be individually tested for leakage and pressure test etc. before welding with the main tank.
III. **Thickness** of sheet for radiators shall be **1.20 mm (min)**.
IV. The **mounting** of the radiators shall be **detachable**
V. The number / cross section / length / fixing arrangement of radiators shall be indicated in the general assembly drawing.
VI. Radiator thickness must be uniform without any dent or damage and also no bulging or concave should occur even after performing pressure/ vacuum test and temperature rise test.
VII. Corrugated designs are not accepted.

5.7 GASKET

I. **Cork rubber gaskets** conforming to Type C , grade RC70 as per IS 4253 (Part-2) shall be provided for all oil bearing & water ingress resistant requirements for components like bushings bottom gasket, terminal box, Top Cover, Conservator, Valves etc.
II. **Nitrile/Neoprene rubber gaskets** conforming to Type IV – 4C (heat and oil resistant) as per IS 11149 shall be provided for bushing O ring (oil gaskets).
III. **Only Joint free Gasket to be used. Only in case of top cover gasket and terminal box gasket up to two dove-tail joints with adhesive shall be allowed. The terminal box gasket joint shall come at bottom part.**
IV. Cork sheet, Nitrile/Neoprene rubber gaskets shall be free from cracks, pinholes and shall be capable of being cut or punched without crack or tearing.

5.8 On Load Tap Changer

On Load Tap changer (OLTC) on Source Side	
a) Type	On Load (In Tank)
b) Range	7kV -11kV 0 to -36%
c) Number of Steps	16 Step (17 Position)
e) Manual / Automatic	Yes (Both)
f) Remote / Local	Yes (Both)
g) IS	8468-2006
h) All contacts should be SCADA compatible and suitable for connection to TMU	Yes
i) Protection for OLTC	Yes
j) Potential free contacts for SCADA shall be Provided	Yes

k) Flow of Power	Bidirectional
l) AVR and SCADA compatibility	Yes

5.9 BUSHINGS AND TERMINAL CONNECTORS

A. HT Bushings (17.5 kV/250 A) on Load and Source Side Side:

I. The bushings shall be outdoor type, external part shall be made of porcelain material. Rods, nuts and flat washer (Tightening Nut along with Check Nut) shall be made of tinned brass material.

II. IS to be followed: IS 8603(Part- I) for porcelain, IS 3347 part3 section 2 for metal part and Complete bushing shall comply IS 2099.

Outdoor Bushing on Top with Bird Guard

III. The bushings shall have Hot Dipped Galvanized or Alum-zinc coated or SS material arcing horns with 8mm diameter. The thickness of coating shall be **86 microns** (minimum at any point).

IV. The bushing shall be fitted with bird guard on the bushing connector.

V. Complete Tinned Brass joint less connectors shall be provided on bushing rods suitable for bare dog conductor connections. The connector should have large contact area. Hardware shall be Hot Dipped Galvanized or Aluzinc coated or SS material

LA of suitable voltage rating shall be mounted at both ends of the transformer

5.10TERMINAL CONNECTORS

HT TERMINAL CONNECTOR:

I. Tinned Brass connectors shall be provided connected with bushing rods for bare top plate bushings .

II. UV resistant polymeric insulating shrouds shall be provided on the bare bushing terminals.

5.11 INTENTIONALLY KEPT BLANK

5.12 EQUILISING/ EQUIPOTENTIAL STRIP

I. The Transformer top cover shall be connected with main tank using **tinned copper strip (30mm wide, 0.7mm thick)** at two places (diagonally opposite with each other).

II. The strip should touch bare surface of tank in order to ensure proper electrical connection of tank body with top cover with the strip.

III. All the covers like inspection cover, Conservator cover must be electrically connected using **tinned copper strip (30mm wide, 0.7mm thick).**

IV. Separate arrangement to be made and cover tightening bolt not to be used for equipotential strips.

5.13 EARTHING CONNECTIONS

NEUTRAL EARTHING:

I. 12KV Grade of neutral bushing shall be provided

BODY EARTHING:

I. Two body earthing terminals pads boss arrangement (up to 500sq.mm) shall be provided on Transformer tank with M12 SS Bolt with 70 sq. mm lug. with SS plain washer and spring washer.
II. It shall be located on the lower side of the transformer, diagonally opposite to each other.
III. Each Earthing terminal pad on DT shall be provided with two SS M12 bolts on each pad on each side with two 70 sq.mm AL Lugs and washers.

5.14 OIL

Note: Default Oil shall be Mineral oil only if not specified / asked for other oil.

Mineral Oil: In case of Mineral Oil below are the requirements to be fulfilled:

1. All transformers shall be filled with new, unused, clean, standard mineral oil in compliance with IS 335-2018 / IEC 296 type-II and shall be free from all traces of polychlorinated biphenyl (PCB) compounds.
2. The use of recycled oil is not acceptable.
3. Oil shall be filled under vacuum before filling it shall be filtered and tested (as per IS 6103).
4. The test parameters should be as per the table below:

Test parameters	**Values**
Break Down Voltage (min)	70 kV
Water content ppm, (max.)	30 ppm
Specific resistance (min.) (at 27˚C)	2.5×10^{12} ohm-cm

Bidder has to provide the oil data in below table:

Sl. No.	**Description**	**Unit**	**To be furnished by bidder**
1	**Type of oil**		
2	**Oil Qty. for first filling**	Ltr.	
3	Grade of Oil		
4	Maker's name		
5	BDV at the time of first filling	kV	

5.15 CONSERVATOR

I. The conservator shall be supported / fixed on the main body of the transformer tank.
II. The capacity of the conservator tank shall be designed keeping in view the total quantity of oil and its contraction and expansion due to temperature variations. The total volume of

conservator shall be such as to contain **10% quantity of the oil used in transformer**. Normally, at least **30% volume of conservator** shall be filled with Oil.

III. The connecting pipe of the conservator shall be so fitted to transformer tank that the pipe can be detached from the tank.

IV. Joint less pipe shall be used which shall be connected with round flanges.

V. The inside diameter of the pipe connecting the conservator to the main tank shall be within 25 to 50 mm and it should be projected into the conservator so that its end is approximately 20mm above the bottom of the conservator so as to create a sump for collection of impurities. The minimum oil level corresponding to -5°C should be above the sump level.

VI. The conservator oil filling cap/hole shall be of 32mm diameter & female type cap to be provided.

VII. The conservator to be fitted with MOG such that it shall operate/open contact when the oil level in conservator goes below -5 degree C /Minimum mark. The float switch shall be with normally closed type. This contact shall be wired up in auxiliary terminal box.

VIII. Buchholz relay: The pipe should not contain any right angle elbows. Its diameter should correspond to the diameter of the hole for the passage of oil of the relay. The pipe must be arranged to slope upwards towards the conservator at an angle of about 2 to 4 degrees to the horizontal (max 5 degrees). The part of the pipe preceding the relay should be straight for a length equal to at least five pipe diameters; the part of the pipe leading to the conservator immediately adjacent to the relay should be straight for a length equal to at least three pipe diameters.

IX. The Oil conservator shall be provided with:

a. **Oil level indicator** (as per clause no. 5.18).
b. **Dehydrating breather** (as per clause no. 5.22).
c. **Drain plug**
d. **Oil filling hole** (1.25 inch/32mm with thread size of BSP 1.25inch, 11TPI) with cover.
e. **Detachable end plate** on one side (the side on which the gauge glass is fitted), to enable the maintenance staff to periodically clean the inside of the conservator tank

Center of Gravity

The transformer should be designed in such a way that the centre of gravity of complete transformer with oil and with all accessories shall fall at the vertical centre at lower height such that the transformer should be stable on flat surface ground and while lifting at lifting hooks.

5.16 OIL LEVEL INDICATOR

I. Oil level indicator with **prismatic glass and red colour background** shall be provided.

II. The oil gauge glass shall be removable and so embodied in the end plate so as to prevent oil leakage.

III. The Oil level indicator should indicate oil level at minimum, normal and maximum as -5˚C, 30˚C and 90˚C respectively.

5.17 PRESSURE RELEASE VALVE

I. All transformers shall be provided with PRV with auxiliary contacts. The contact to be wired up in the auxiliary terminal box.

II. PRV shall be provided to operate before reaching the test pressure as specified in the above class.

III. PRV shall not have air release arrangement.

IV. The PRV shall seal-off after the excess pressure has been released and it shall have mechanical flag arrangement.

V. The PRV shall have NO, NC contacts wired up in auxiliary terminal box.

5.18 AIR RELEASE PLUG

The cover of the main tank shall be provided with an **air release plug on all ratings.**

5.19 DRAIN VALVE AND FILTER VALVE

I. The drain valve and filter valve shall be of Brass with gate valve.
II. The drain valve and filter valve shall have double round flanges. One side shall be fixed with tank and other side should be left open for oil filling/filtration purpose.
III. The drain valve and filter valve shall be provided with embossed name plate stating drain valve and filter valve.
IV. The drain valve shall be located on the bottom and filter valve shall be provided at side top of tank.
V. Locking arrangement shall be provided to stop movement of hand wheel.
VI. The valves shall be covered with a MS box of 2mm thickness by welding on tank. The paint thickness shall be min. 120 micron on the box.

5.20 DEHYDRATING BREATHER

I. The breather pipe shall enter the conservator from the upper side of the conservator.
II. The breather shall contain 1 kg of silica gel.
III. The silica gel shall be blue colored as per IS: 3401 – 1992. Quantity shall be decided by manufacturer.
IV. The body of the breather shall be unbreakable, transparent, UV stabilized seamless polycarbonate tube of minimum thickness 3mm
V. The top cover shall be of pressure die cast aluminum and powder coated.
VI. The oil cup shall be of UV protected polycarbonate.
VII. Oil cup shall have marking of oil filling level
VIII. The breather shall be supplied as per approved make and as per specifications.
IX. The gasket should be of Class 3B, Type III as per IS 11149 Nitrile rubber (Oil resistant gaskets)
X. All tie rods and all hardware should be of stainless steel material (SS 304)
XI. While fixing of breather on transformer Teflon tape should be used to make it air tight & water tight. This shall be checked during inspection and after receipt at our stores on each transformer.
XII. The breather should have passed air pressured test as per our specification i.e. Breather shall be tested at an air pressure of 0.35kg/cm2 (5 PSI) for period of 30 minutes. NABL lab test report to be submitted from OEM.

5.21 OIL TEMPERATURE INDICATOR

I. Dial Type Oil temperature indicator shall be provided inside the marshalling Box
II. Range: 0- 120 ˚C, Accuracy: $\pm$ 4 ˚C.
III. The OTI shall have auxiliary contacts for alarm and trip contacts at preset temperatures, both the contacts should be wired up in the auxiliary terminal box.
IV. The IP65 gland should be used for dial for taking out auxiliary wires.
V. The OTI shall be IP55 tested.

5.22 FASTENERS

I. All the bolts or studs shall be **at least 6 mm in diameter** except when used for small wiring terminals. **All bolts shall be of grade 8.8.**
II. All nuts/bolts/washers exposed to atmosphere shall be as follows:

Size 12mm (or below)	Stainless Steel
Above 12mm	Steel with antirust coating (aluzinc coated) ,Hot dip galvanized

III. All ferrous bolts, nuts and washers placed in outdoor positions shall be hot dip galvanized to prevent corrosion (except high tensile steel bolts and spring washers which shall have electrolytic action between dissimilar metals).

IV. In case the galvanization is removed due to welding or manufacturing, the parts should be properly cleaned and painted to avoid exposure to atmosphere.

V. The cup type washers to be used as spring washers, cut spring washers are not accepted.

VI. Taper washers shall be provided where necessary. Protective washers of suitable material shall be provided on front and back of the securing screws.

VII. Each bolt shall project at least one thread but more than three threads through the nut. If bolts and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided. The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members.

VIII. Core bolts shall be black colored high tensile grade-8.8

5.23 SURFACE PREPARATION AND PAINTING

I. The paint shall be applied by airless spray. Thickness shall be 120 Microns.

II. Steel surfaces shall be prepared by **shot blast cleaning** (IS-9954) to grade Sq.2.5 of ISO 8501-1 or **chemical cleaning** including phosphating of the appropriate quality (IS 3618).

III. **Heat resistant (Hot oil proof) paint** shall be used for the **inside surface** and whereas for **external surface one coat of thermosetting powder paint or one coat of epoxy primer (zinc chromate/Zinc Phosphate) followed by two coats of polyurethane (P.U.) base pain**t. as per table given below

S.No.	Paint type (should be UV restraint, non-fading)	Area to be painted	No of coats	Total dry film thickness (min); micron
1.	Thermosetting **powder paint**	Inside Outside	01 01	30 60
2.	**Liquid Paint**			
a.	Epoxy (primer)	Outside	01	30
b.	P.U. Paint (finish paint)	Outside	02	25 (each)
c.	Hot oil resistant paint	Inside	01	35

The two coats shall be of oil and weather-resistant nature with final coat as flossy and non-fading paint of shade 631 as per IS 5.

IV. The dry film thickness shall not exceed the specified minimum dry film thickens by more than 25%.

V. Any damaged part shall be cleaned to bare metal with an area extending 25 mm around its boundary. A priming coat shall be immediately applied followed by full paint finish equal to that originally applied and extending 50 mm around the perimeter of the original damage. The repainted surface shall present a smooth surface which shall be obtained by carefully chamfering the paint edges before and after priming.

VI. Painting shall not affect by weather changes & performance against pilling out or fading etc. to be guaranteed for 5 Years.

5.24 RADIO INTEREFENCE

When operated at voltages up to **12.5%** in excess of the normal system rating, transformers shall be substantially free from partial discharges (i.e. corona discharges in either internal or external insulation) which are likely to cause interference with radio or telephone communication.

5.25 OVERLOAD CAPACITY

The transformer shall be suitable for loading as per IS 2026 part 7

5.26 FITTINGS

The following standard fittings shall be provided:

I. Two earthing terminal pads/ boss with earthing symbol ⏚ for body earthing on opposite sides with 70sq.mm AL lug and M12 SS bolt and washers.
II. Air Release Device.
III. Thermometer Pocket with cap.
IV. Drain cum Sampling Valve & filter valve
V. Pressure Release Valve
VI. Radiators
VII. Cable **Box** /Bare Bushing (as per site requirement) for all transformer. For Source side, cable box or Bare bushings can be provided. **User group shall decide this during tender.**
VIII. For bare bushing transformer- bird guard on bushings terminals connectors
IX. Load and Source Side two part Gland plates (Non-Magnetic and with Single compression Brass glands).
X. Conservator with Dehydrating Breather on Load Side.
XI. Prismatic Oil level Gauge and MOG in conservator.
XII. Lifting lugs (enclosed type) for the top cover, complete transformer and core and winding assembly.
XIII. Pulling Lugs.
XIV. Jacking Pads
XV. Stiffener Angle.
XVI. 2 Base channels all Transformer
XVII. Marking Plates as asked in clause 6.1
XVIII. Oil Temperature indicator with alarm & trip contact
XIX. Two GI earth strip of Size 50x6 mm for neutral earthing from both side with minimum GI coating thickness of 86 microns. With SS nut bolts and washer.
XX. Magnetic Oil level Gauge , Winding Temperature Indicator , Magnetic Reed type Buchholz relay in line with IS 1180.
XXI. Marshalling Box with stud type terminals .

5.27 WINDING TEMPERATURE INDICATOR (WTI)

I. WTI shall be provided (Qty:1)
II. WTI shall be **indicating type**, responsive to the combination of top oil temperature and winding current, calibrated to follow the hottest spot temperature of the transformer winding.
III. WTI shall operate a remote alarm and trip in the event of attaining the predefined temperature.

5.28 BUCHHOLZ RELAY

I. Magnetic Reed type Buchholz relay shall be provided with alarm and tripping contacts to detect accumulation of gas.
II. The installation shall be fixed and weather proof to avoid any water seepage inside the relay.
III. Round flange of nominal pipe bore of **50mm diameter** shall be used.
IV. In addition, pocket with heater coil along with Resistance Temperature Indicator (RTD) shall be provided for WTI and OTI. CT for RTD for winding hot spots shall be provided.

5.29 Two Separate Marshalling Box shall be provided

1. For Transformer OTI, WTI, etc and AVR

I. Marshalling Box of suitable size, made up of **Mild Steel** and with **theft proof locking arrangement** shall be provided.
II. Marshalling box shall have IP 55 protection.
III. Marshalling Box shall have provision for wiring the **WTI, OTI, MOG, PRV, Buchholz relay and WTI CT terminals.** The terminals shall be provided as per table below:

Element	Alarm	Trip
Oil Temperature Indicator	NO,NC,COM	NO,NC,COM
Winding Temperature Indicator	NO,NC,COM	NO,NC,COM
Buchholz	NO,NC,COM	NO,NC,COM
Magnetic Oil Level Gauge	NO,NC,COM	
PRV	NO,NC,COM	
Spare TB	4 No.	
Tap Position		

IV. WTI meter shall be wired/ installed in the marshalling box.
V. Plastic ferrules engraved with black letters shall be used to mark the wires in the marshalling box.
VI. Wiring in Marshalling box shall be done by 2.5 sq.mm Cu FRLS PVC stranded panel wires.
VII. All the cables and conduits between the transformer and control cabinet shall be included in the scope of supply by the bidder.

2 . For AVR Controls

I. Marshalling Box of suitable size, made up of Mild Steel and with theft proof locking arrangement shall be provided.
II. All necessary arrangement for local operation /Remote operation to be provided.
III. All the cables and conduits between the transformer and control cabinet shall be included in the scope of supply by the bidder.
IV. Marshalling box shall have IP 55 protection.
V. All necessary protection for OLTC/AVR to be provided.
VI. AVR should have SCADA compatibility using Modbus or IEC60870-103 Protocol for remote monitoring and control.

5.30 MAKE OF MAJOR COMPONENTS & RAW MATERIALS

The BA shall procure the following constituent items from the designated vendors as follows:

S.no	RAW MATERIAL/EQUIPMENT	MAKE
a)	Copper	M/S Sterlite, M/S Hindustan Copper, M/S Hindalco.
b)	Core	M/S AK Steels, POSCO, Kawasaki/ JFE, Nippon Steel.
c)	Insulation paper and Pressboards	ITC paper, ABB, Raman Boards-Mysore, Senapathy Whiteley – Bangalore
d)	Transformer Oil (Mineral oil)	Savita, Apar, Gandhar
e)	Gaskets & Corks	Nu Cork, Anchor Corks
f)	Steel For Tank	M/s, TATA Steel, M/s SAIL, M/s. JSW Steel, M/s. IISCO, M/s. RINL/Vizag Steel, M/s. Jindal Steel,
g)	Dehydrating Breather	Yogya, Anushree, Electrical engineers
h)	Bushings	Genesys Electricals,Hindustan Chemicals, Rashtriya Electricals,LAMCO
i)	Buchholz, PRD, SPR, OTI , WTI, and other devices	Reputed make to be approved by TPCODL/TPNODL/TPWODLTPSODL during detailed engineering.

Also, Bidder has to provide all test certificates from original manufacturers & relevant sourcing documents. BA shall also have shot blasting facility.

6. MARKING:

6.1 MARKING PLATES

I. Name Plate (Rating) Plate : SS material

A rating plate shall be fitted to each transformer in a visible position and shall carry all the information as **specified in clause no. 6.2**

II. Terminal Marking Plate : on same name plate also accepted

- The terminal marking plate shall be provided which shall be strictly in accordance with **figure 4 of IS 1180-Part 1: 2014**. This plate may be combined with the rating plate or can be provided separately.
- Value of short circuit impedance on extreme tapping and on principal tapping and indication of winding to which impedance is related has to be displayed additionally.

III. Details Plate : MS sheet of 2.5mm with punched details and welded on tank.

A separate plate of **size 125 mm x 125 mm** shall be provided having following details:

- Name of the firm.
- Serial No.
- Rating of transformer.
- Order no. and date.
- Date of dispatch.

IV. Guarantee Plate :

A separate warranty plate made of **Stainless Steel** with following clause written on it.

"THE EQUIPMENT GUARANTEED UPTO A PERIOD OF 48 MONTHS FROM THE DATE OF COMMISSIONING OR 60 MONTHS FROM THE DATE OF LAST SUPPLY"

All the plates described above (clause 1 to 4) should be as followings:

Material	Stainless Steel
Thickness	1 mm
Engraving	The letters on the rating plate shall be engraved black on the white/silver back ground.
Fixing	Fixing screws shall be of stainless steel.

V. Danger Plate: On all cable boxes (If applicable)

Danger notice shall have red lettering on a white background on a plate as specified in **IS: 2551 – 1982.**

VI. BIS Certification Mark: On main name plate

The Bidder is required to get approval from BIS and display BIS mark on the name plate.

a. Oil filled, naturally cooled type
b. Make

c. Capacity in KVA
d. Voltage up to 11 KV
e. Total losses at 50% loading in watts
f. Total losses at 100% loading in watts
g. Model and year of manufacturing.

VII. Control Circuit drawing Plates:

- Engraved drawing for control circuit unit shall be available on Marshalling box.

6.2 NAME PLATE DETAILS

The name plate shall be strictly as per **IS 1180: 2014 (figure 1)**. Additionally, following points shall be displayed :

I. **Actual no load losses of transformer.**
II. **Actual total losses of transformer at 50% load and 100% load.**
III. Standard mark (BIS certification).
IV. "**PROPERTY OF TPCODL/TPNODL/TPWODLTPSODL**" shall be written in bold letters.
V. PO number with date has to be mentioned.
VI. Overall dimensions of the transformer

6.3 MARKING

I. All transformers shall have Source Side windings marked as 2U, 2V, 2W. The neutral point terminal shall be indicated by the letter 2N. Clear Marking as "Source Side" to be done.
II. The Load Side winding for the same phase shall be marked by 1U, 1V, 1W. Clear Marking as "Load Side" to be done.
III. The markings shall be done by steel strips in which marks had been engraved in black colour.
IV. Colour marking of the bushings shall be done.
V. On the top cover of tank and the core channel, Manufacturer's name and Manufacturer's serial no. shall be engraved.
VI. On the body of tank, Manufacturer's name, rating, serial no. and year of manufacturing shall be written with black paint on yellow base. It should be written in suitable place in approved format that it is readable from ground after installation on pole.
VII. Durable QR code Sticker with name plate details and warranty details to be fixed on two accessible places i.e one on side wall of Load Side terminal box and other one is on conservator.

7. TESTS:

I. All routine, acceptance & type tests shall be carried out in accordance with the IS 2026 and IS 1180: Part-1 (2014).
II. All routine & acceptance tests shall be witnessed by the TPCODL/TPNODL/TPWODLTPSODL/his authorized representative.
III. All the components shall also be type tested as per the relevant standards.

Following tests shall be necessarily conducted on the Distribution Transformers in addition to others specified in IS/IEC standards.

7.1 TYPE TESTS

I. Lightning Impulse Test [As per IS 2026 (Part 3) Clause no. 12].
II. Temperature Rise Test [As per IS 2026 (Part 2) Clause no.4].
NOTE: Maximum measured total loss (No load at Rated excitation load loss at maximum current tap converted to 75°C reference temperature) at 100 percent loading shall be supplied during temperature rise test.
III. Short Circuit Withstand test [As per IS 2026 (Part 5)].
NOTE: Routine tests before and after short circuit test shall be conducted as per IS 2026(Part 1).
IV. Pressure Test [As per IS 1180: Part 1 (2014)].
V. Determination of sound levels [IS 2026 (part 10)].
VI. No load current at 112.5% voltage
VII. BDV and moisture content of oil in transformer (IS 335).
VIII. Magnetic balance test.
IX. Measurement of Zero-phase sequence impedance.
X. Measurement of Harmonics of no-load current.
XI. Test to verify IP 55 for Marshalling Box.

Note: - Out of the above mention type test, the tests under sl. No. 1, 2 ,3 and 4 shall be conducted at CPRI/ERDA labs and the balance tests to be conducted at TPCODL/TPNODL/TPWODLTPSODL recommended NABL lab. **In-house test labs are accepted if in-house lab is NABL accredited for these tests.**

7.2 ROUTINE TESTS

Sr. No.	Test to be done	Reference BIS	Clause no.
1	Measurement of Winding Resistance on each tap.	IS 2026 (Part 1)	16.2.1 & 16.2.3
2	Measurement of voltage ratio, check of voltage displacement, polarity, phase sequence and vector group	IS 2026 (Part 1)	16.3
3	Measurement of short circuit impedance (principal tapping, when applicable) and load loss at 50% and 100% load	IS 2026 (Part 1)	16.4
4	Measurement of no load losses and magnetizing current at rated frequency and 90%, 100% and 112.5% of rated voltage	IS 2026 (Part 1)	16.5
5	Measurement of insulation resistance	IS 2026 (Part 1)	16.6
6	Induced over voltage withstand test	IS 2026 (Part 3)	11
7	Separate Source voltage withstand test	IS 2026 (Part 3)	10
8	Oil leakage test	IS 1180 (Part 1)	21.5.1.3
9	Neutral current measurement	IS 1180	7.9.2
10	BDV and moisture content of oil in transformer (Type-2 oil)	For mineral oil : IS 335 (2018) For Ester oil : IEC 60247 & IEC61099	For mineral oil : IS 335 Table 2

7.3 ACCEPTANCE TESTS

I. Temperature Rise test on one unit of first lot against every release order / PO for each rating. For further lots, TPCODL/TPNODL/TPWODLTPSODL reserves the right to perform Temperature rise if required. [As per IS 2026 (Part 2) Clause no.4]

II. Oil leakage test for acceptance shall be conducted at pressure of 0.35kg/sq.cm for one hour. (IS 1180 (Part 1) clause 21.5.1.3)
III. The painted surface shall pass the Cross Adhesion Test (IS1180 part 1 clause no. 21.4.d).
IV. Calibration of WTI and OTI.
V. Magnetic Balance Test.
VI. OEM test reports for breather for air pressure test.
VII. At stage inspection -Checking of weight, dimensions, fitting and accessories, tank sheet thickness, oil quantity, material finish and workmanship, physical verification of core coil assembly and measurement of flux density on one unit of each rating of the offered lot with reference to the GTP and contract drawings. Oil BDV of all offered lot.
VIII. At least 10% transformer of the offered lot (minimum of one) shall be subjected to all the tests mentioned under the section 'ROUTINE Test" in presence of TPCODL/TPNODL/TPWODLTPSODL's representative at the place of manufacture before dispatch without any extra charges. The testing shall be carried out in accordance with IS: 1180 and IS: 2026.
IX. Device trails & test (Buchholz trip, Buchholz alarm, PRV trip, WTI alarm, WTI trip and OTI alarm.
X. At Stage and Final inspection, the incoming raw material and its movement/consumption record in the related jobs of TPCODL/TPNODL/TPWODLTPSODL will be verified by inspecting officer. In case of any deviation or non-availability of such records, the offered lot may get rejected.

8. TYPE TEST CERTIFICATES:

I. The Bidder shall furnish the type test certificates of the offered rating and design of transformer for the tests as mentioned above as per the corresponding standards.
II. All the tests shall be conducted at CPRI / ERDA or as defined in 7.1 as per the relevant standards.
III. 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 TPCODL/TPNODL/TPWODLTPSODL.
IV. Type tests should have been conducted as perTS during the period not exceeding timeline as per latest CEA guideline.

9. PRE-DISPATCH INSPECTION:

I. Bidder to raise the inspection calls for stage inspection and only after getting clearance from TPCODL/TPNODL/TPWODLTPSODL shall proceed for further manufacturing. The bidder shall raise the inspection call for Final Inspection or prototype Inspection in TPCODL/TPNODL/TPWODLTPSODL format.
II. If the prototype inspections asked for during drawing approval then bidder to make one unit of transformer and raise for inspection call for stage and final for prototype inspection.
III. Equipment shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODLTPSODL.
IV. 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, the same is liable to rejection.
V. Bidder shall grant free access to the places of manufacture to TPCODL/TPNODL/TPWODLTPSODL's representatives at all times when the work is in progress.
VI. Inspection by the TPCODL/TPNODL/TPWODLTPSODL or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment

in accordance with the specifications.

VII. The BA shall ensure that 100% of the lot must be ready for inspection and atleast 10% must be ready with all mounting and accessories during inspection.

VIII. Material shall be dispatched only after getting MDCC (Material Dispatch Clearance Certificate) from TPCODL/TPNODL/TPWODLTPSODL.

IX. Following documents shall be sent along with material:

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

X. To ascertain the quality of the transformer oil, the original manufacturer's tests report shall be submitted at the time of inspection.

XI. Arrangements shall also be made for testing of transformer oil, after taking out the sample from the manufactured transformers and tested in the presence of TPCODL/TPNODL/TPWODLTPSODL's representative.

XII. In respect of raw material such as core stampings, winding conductors, insulating paper and oil, bidder shall use materials manufactured/supplied by standard manufacturers and furnish the manufacturers' test certificate as well as the proof of purchase from these manufacturers (excise gate pass) for information of the TPCODL/TPNODL/TPWODLTPSODL.

XIII. The bidder shall furnish following documents along with their offer in respect of the raw materials:

a) Invoice of supplier.
b) Mill's certificate
c) Packing List.
d) Bill of Landing
e) Bill of entry certificate by custom.

XIV. To ensure about the quality of transformers, the inspection shall be carried out by the TPCODL/TPNODL/TPWODLTPSODL's representative at following two stages:

a) Online anytime during receipt of raw material and during manufacturing/assembly Stage.
b) At finished stage i.e. transformers are fully assembled and ready for dispatch.

XV. Advance intimation of 7Days (Within Odisha)/12 Day (Outside Odisha) is required for both Stage and final inspections.

XVI. All tests and inspection shall be carried out at the place of manufacture unless otherwise specifically agreed upon by the manufacturer and TPCODL/TPNODL/TPWODLTPSODL at the time of purchase.

XVII. The manufacturer shall offer the inspector representing the TPCODL/TPNODL/TPWODLTPSODL all reasonable facilities, without charges, to satisfy him that the material is being supplied in accordance with this specification. This will include Stage Inspection during manufacturing stage as well as Active Inspection during Acceptance Tests.

XVIII. During the stage inspection a few assembled core coil and assembled Tanked transformer shall be dismantled (only in case of CRGO material) to ensure that the CRGO laminations, Windings and workmanship are of good quality. TPCODL/TPNODL/TPWODLTPSODL also reserves the right to review any document or certificates related to material, manufacturing process, quality checks at any point of stage inspection.

XIX. TPCODL/TPNODL/TPWODLTPSODL also reserves the right to inspect the tank of transformer before surface preparation and painting. The same shall be informed to TPCODL/TPNODL/TPWODLTPSODL accordingly.

XX. Final inspection Call for carrying out acceptance tests as per relevant IS/IECs shall be sent by the Bidder along with routine test certificates.

XXI. The bidder shall provide all services to establish and maintain quality of workmanship in his works and that of his sub-contractors to ensure the mechanical / electrical performance of components, compliance with drawings, identification and acceptability of all materials, parts and equipment as per latest quality standards of ISO 9000.

XXII. The TPCODL/TPNODL/TPWODLTPSODL has the right to have the test carried out at his own by an independent agency wherever there is a dispute regarding the quality supplied. **Also TPCODL/TPNODL/TPWODLTPSODL has right to test 1% of the supply selected either from the stores or field** to check the quality of the product. In case of any deviation TPCODL/TPNODL/TPWODLTPSODL have every right to reject the entire lot or penalize the bidder, which may lead to blacklisting, among other things.

XXIII. At the time of inspection the material should be ready as specified, In case of material non-readiness or material failure in acceptance, Cost of re-inspection shall be borne by bidder.

10. INSPECTION AFTER RECEIPT AT STORE:

I. The material received at the TPCODL/TPNODL/TPWODLTPSODL store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.

II. In case the transformers proposed for supply against the order are not exactly as per the tested design, the Bidder shall be required to carry out the short circuit test and impulse voltage withstand test at its own cost in the presence of the representative of TPCODL/TPNODL/TPWODLTPSODL.

III. The supply shall be accepted only after such test is done successfully, as it confirms on successful withstand of short circuit and healthiness of the active parts thereafter on un-tanking after a short circuit test.

IV. Apart from dynamic ability test, the transformers shall also be required to withstand thermal ability test or thermal withstand ability will have to be established by way of calculations

V. TPCODL/TPNODL/TPWODLTPSODL reserves the right to conduct all tests on Transformer after arrival at site / stores and the manufacturer shall guarantee test certificate figures under actual service conditions.

VI. TPCODL/TPNODL/TPWODLTPSODL reserves the right to conduct short circuit test and impulse voltage withstand test in accordance to IS, afresh on each ordered rating at purchaser cost, even if the transformer of the same rating and similar design are already tested. This test shall be carried out on a transformer to be selected by TPCODL/TPNODL/TPWODLTPSODL either at the manufacturer's works when they are offered in a lot for supply or randomly from the supplies already made to TPCODL/TPNODL/TPWODLTPSODL stores. The findings and conclusions of these tests shall be binding on the bidder.

11. GUARANTEE:

I. 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 Purchaser up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier.

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

III. In case of Distribution transformer fails within the guarantee period TPCODL/TPNODL/TPWODLTPSODL will immediately inform the Bidder who shall take back the failed Distribution Transformer within 15 days from the date of intimation at his own cost and replace / repair the transformer within forty five days of date of intimation with a roll over guarantee. The outage period i.e. period from the date of failure till unit is repaired / replaced shall not be counted for arriving at the guarantee period.

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

12. PACKING AND TRANSPORT:

I. Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

II. Transformers shall be delivered filled with oil and supplied with all accessories mounted. Screws and bolts shall be thoroughly tightened to ensure no leakage of oil.

Note: One use plastic not to be used for packing of the material.

13. TENDER SAMPLE:

All offered transformer detailed documents to be submitted as per clause no.18. The sample shall be not applicable

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. TPCODL/TPNODL/TPWODLTPSODL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

The following information shall necessarily be submitted with the bid:

I. List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives.

II. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.

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

IV. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.
V. QAP withhold points for TPCODL/TPNODL/TPWODLTPSODL inspection.

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of each part along with CCA, breather, bushings, terminal box etc. as per RC line items to be submitted for getting approval before mass manufacturing.

The first time supplier will have to make one prototype sample of each line tem of RC as per CAT-B approved drawing within 30 days of drawing approval. Inspection call to be raised by bidder before 7 days of date of proposed inspection. TPCODL/TPNODL/TPWODLTPSODL shall arrange inspectors and intimate or confirm the date. Any observation during inspection shall have to be addressed within 7 days and revised improved drawing & technical details to be shared to TPCODL/TPNODL/TPWODLTPSODL for final approval.

Manufacturing mass quantity to start only after getting CAT-A approved drawings or as per intimation from TPCODL/TPNODL/TPWODLTPSODL

17. SPARES, ACCESSORIES AND TOOLS

Bidder shall give an assurance that the reparability of transformer is ensured by using standard spare parts and accessories available in market in India.

18. DRAWINGS AND DOCUMENTS:

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

a. Completely filled in compliance to each clause of Technical Specification and any Additional Details and Fittings.
b. Description of the transformer and all components drawings.
c. General arrangement for Transformer.
d. Bill of material.
e. Design calculation details of transformer losses, cooling, efficiency and current density, weight of coils and components
f. Experience Certificate and list
g. Type test certificates.
h. List of makes of major components as listed above.

Drawings / documents to be submitted for approval after the award of the order within 7 days before mass manufacturing 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 Transformer (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
c. Internal Core arrangement drawing.
d. Internal Core-coil assembly drawing.
e. Foundation Plan drawing.
f. Marking plates and Markings (as mentioned in clause 6)
g. Load and Source Side bushings drawing (with internal view and metal parts)
h. Conservator drawing.
i. Marshalling Box with wiring details
j. Prismatic oil level gauge drawing.
k. Silica Gel Breather drawing.
l. BH curve & Loss/Kg graph of core material offered.
m. The tightening torque chart to be provided for all bolts used in specific rating.
n. Type Test Certificates.
o. Installation/ Mounting Instructions/Drawing.
p. Efficiency vs Load curve of the offered design.
q. Quality Assurance plan.

List of Calculations to be submitted:

a. All the calculations shall be step by step showing the use of formulas and other practical considerations. **Concise calculations in table or excel sheet shall not be accepted.** Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.
b. Resistance Calculation (75 deg. C)
c. Load Losses Calculation (at 75 deg. C)
d. No load Losses.
e. Stray Losses.
f. Weight of Copper (Bare and with Insulation also).
g. Weight of Core.
h. Flux Density calculations.
i. Current Density Calculations.
j. Short Circuit withstand.
k. Temperature Rise Calculations.
l. Conservator Volume calculations
m. Cooling Calculations showing cooling with tank and radiators separately with no. of radiators and fins mentioned specifically (For both Mineral oil and Ester oil)
n. Calculation sheet for Lifting lug design and mounting lug design to be submitted by Bidder.

Additional Documents to be submitted :

a. List of raw materials as well as bought out accessories and name 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/TPNODL/TPWODLTPSODL for approval.

Instruction Manuals:

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

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

All clauses and points in the Specification to be complied for along with GTR and offered design details.

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

CONTENTS

1.0	**Scope**	This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store and performance of 11kV 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 TPCODL, 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.
2.0	**APPLICABLE STANDARDS**	The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest editions of the following Standards /IEC and shall conform to the regulations of local statutory authorities. IS9920: Part 1 : High Voltage Switches, Part 1: Switches for Rated Voltages Above 1kV and Less Than 52 Kv IEC 62271-200 : HV switchgear and control gear-AC Metal Enclosed switchgear and control gear for voltages above 1kV and up to and including 52Kv. IEC 62271-100 : Alternating-current circuit-breakers IS 513 : Cold Rolled Low Carbon Steel Sheets and Strips. IEC 60694 : Common specifications for high voltage switchgear and control gear standards IEC 62271-102 : HV switchgear and control gear-Alternating current disconnectors and earthing switches IEC 60265-1 : High voltage switches – Part 1: Switches for rated voltages above 1 kV and less than 52 kV IEC 60529 : Degrees of protection provided by enclosures (IP Code) IEC 62262 : Degrees of protection provided by enclosures for electrical equipment against mechanical impacts (IK Code) IEC 60060 : High-voltage test techniques IEC 60947 /IS 13947 : Low voltage switchgear and control gear IEC 60439-1 : Low-voltage switchgear and control gear assemblies- Type tested and partially type tested assemblies IEC 60255-3 : Electrical relays - Part 3: Single input energizing quantity measuring relays with dependent or independent time. IEC 60044-1 / IS 2705 : Current Transformers IEC 60044-2 / IS 3156 : Voltage Transformers IEC 60376 : Specification of technical grade sulfur hexafluoride (SF6) for use in electrical equipment IEC 62271-206:2011 :High-voltage prefabricated switchgear and control gear assemblies - Voltage presence indicating systems. IS 13573-2 : Cable accessories for extruded power cable for Working Voltages from 3.3 kV up to and Including 33 Kv.
3.0	**CLIMATIC CONDITIONS OF THE**	a) Max. Ambient Temperature : 50 deg.C b) Max. Daily average ambient temp. : 40 deg.C c) Min Ambient Temp : 0 deg C

	INSTALLATION OF RMU:	d) Maximum Humidity : 95% e) Minimum Humidity : 10% f) Average No. of thunderstorm days per annum : 50 g) Maximum Annual Rainfall : 1458 mm h) Average No. of rainy days per annum : 60 i) Rainy months : June to Oct. j) Altitude above MSL not exceeding : 300 meters k) Wind Pressure : 300 kg/sq m up to an elevation at 10 m. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g. For ODISHA the atmosphere is mainly humid, windy& saline across year.
4.0	**GENERAL TECHNICAL REQUIREMENTS OF RMU:**	

Sr. no.	Description	Requirement
1	Application	Three phase - Three wire
2	Rated Voltage	12kV
3	Service Voltage	11kV
4	System Frequency	50 Hz
5	Internal Arc rating	IAC AFL , AFLR or better
6	Internal Arc test	20 kA for 1 Sec.
7	Lightning Impulse withstand Voltage	75 kV Peak
8	Power Frequency withstand voltage	28 kV 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 (3 sec)	21 Ka
12	Rated Short circuit making current	50 kA
13	Number of operations at rated short circuit current on line switches, earthing switches ,CB	5 close
14	Opening time of breaker (max.) without relay time	2.5 cycle
15	Closing time of breaker (max.) without relay time	3 cycle
16	Breaker Duty Cycle	O – 3min - CO - 3min - CO

			17	Rated cable charging interrupting current of incomer- - Load Break Switch	10 A
			18	Rated cable charging breaking current of breaker	25 A
			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 bus bar shall not be 65˚C at an ambient temperature not exceeding 40˚C, as per IEC 62271-1. However, the temperature rise 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
4.1	RMU CONFIGURATIONS	Types of Ring Main Units shall be as under: A) For TPCODL, ODISHA: **i) 1 Way with 1 CB (**For Indoor and Outdoor application)**:** Both side extensible 1 Nos. 630A Incomer Load Break Switches along with Vaccum circuit break sorrounded by SF6. 1 No. 630A Local Feeder/transformer Control Vacuum Circuit Breaker with self-powered O/C + E/F relays+ shunt trip coil (24V DC) + 1 No. Electronic Fault Passage Indicator on the VCB Cable Voltage presence Indicators to be provided in compartment of RMUs in above mentioned combination. All CB shall be with auxiliary contacts for SCADA status indication. All LBS and CB should be given24V DC motorized RMU while designing RMU having inbuilt Battery & Battery charger. **Note- All shunt trip coils shall be 24V DC for TPCODL**			
5.0	**General construction for RMU**				
5.1	MAIN TANK	5.1.1 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 2mm thick with thick gland plates as per IS 513. 5.1.2 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.
		5.1.3	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.
		5.1.4	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.
		5.1.5	The RMU shall be complete with all connection and copper bus bar with continuous current carrying capacity of 630A. The bus bar shall be fully encapsulated by SF6 gas inside the steel tank.
		5.1.6	The tank shall have an separate SF6 refilling valve and the filling pressure must be mentioned near the valve. And the refilling valve should be marked properly.
		5.1.7	If same valve is used for pressure indicator or remote communication then the procedure to refill to be mentioned near the NRV from with permanent sticker.
		5.1.8	The SF6 tank shall be completely enclosed in the enclosure such way that any rodent entry on top or side of tank is deterred.
		5.1.9	All configurations should be in one tank without any coupling/joint on main Busbar.
5.2	GENERAL DETAILS	5.2.1	The mimic board shall be provided with IP2X degree of protection for Indoor RMUs and protection for Outdoor RMUs shall be minimum IP 54(Main door closed). Cable compartment shall be IP54.
		5.2.2	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.
		5.2.3	The RMU shall be identified by an appropriately sized permanent labels 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.
		5.2.4	The RMU shall be designed to be tamper proof so as to prevent access to all live parts during operation without the use of special tools.
		5.2.5	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 out side enclosure shall open for access.
		5.2.6	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.
		5.2.7	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 control gear. The cables shall be earthed by an earth switch with short-circuit making capacity in compliance with IEC 62271-102. 5.2.8 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. 5.2.9 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. 5.2.10 The default design of cable compartment for TPCODL, ODISHA shall be for 3Cx400sq.mm AL cables (91mm external dia.). Cable boots, gland plate, cable cleat, washer, bushings & terminal bolts should be suitable for 3Cx400 sq.mm cables in all RMU compartments except three way with 2 CB 5.2.11 Three way with two CB configuration following thing to be complied: The incomer LBS shall be suitable for 1Cx 630 sq.mm cable. Cable boots, gland plate, cable cleat, washer, bushings & terminal bolts should be suitable for 1Cx 630 sq.mm cable in only incomer LBS cable compartment. The other two CB compartment shall be suitable for 3Cx 400 sq.mm cable termination. The terminal bolt used in LBS compartment shall have 15mm extra length than regular bolt to accommodate the mechanical type lug having large thickness. For Incomer LBS shall be provided with nonmagnetic base plate section and suitable cable cleat for 51 mm diameter 3x1C cables. 5.2.12 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 8mm in diameter. 5.2.13 For ODISHA the atmosphere is mainly humid,saline across year hence necessary anticorrosive fasteners & components to be provided on switchgear. Anticorrosive painting should be painted for RMU
5.3	INTERNAL ARC TESTING	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.
5.4	**Incomer Load Break Switches**	5.4.1 Load break switches shall be maintenance-free. The position of the power contacts and earthing contacts shall be clearly visible on the front of the RMU. The position

	(LBS)		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.
		5.4.2	**Electrical /Mechanical Interlock should be provided to the Earth switch it should not be Close when cable is back charged .**
		5.4.3	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.
		5.4.4	The disconnector should have the maximum 200micro ohm contact resistance.
		5.4.5	Earthing of the cable shall be either through a three position switch of a separate snap action type or Earth Switch having fault making capacity.
		5.4.6	The switches shall be fully mounted and inspected in the factory. Provision for future motorisation of LBS and CB should be kept in configuration while designing RMU.
		5.4.7	The load break switch and earthing switch operating mechanism shall have mechanical endurance of at least 1000 operations. The type test reports to be submitted along with Bid.
		5.4.8	Load break switch shall have mechanical switch operation counter and should be visible on front in horizontal alignment.
		5.4.9	The Load break switch should have minimum spare (for TPCODL use) 3 NO+ 3 NC auxiliary contacts and 1NO+1NC for earth switch.
		5.4.10	The load break switch shall be compatible for 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.
5.5	**Circuit Breaker For Transformer / Local Feeder Control**	5.5.1	The circuit breakers/ interrupter shall be of the maintenance free.
		5.5.2	The position of the power and earthing contacts shall be clearly visible on the front of the RMU.
		5.5.3	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.
		5.5.4	For TPCODL where the RMU CB is used for switching operation & protection of feeder (cables) - In view of safety each VCB shall be assisted with feeder side disconnector 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.
		5.5.5	They shall be fully mounted and inspected in the factory.
		5.5.6	Breaker contact resistance should be <=50 micro-ohms. The various circuit contact resistance should comply with provisions in IEC 62271-200.
		5.5.7	The breaker should have minimum spare (exclusively for TPCODL use) 4 NO+ 4 NC auxiliary contacts.
		5.5.8	An operating mechanism can be used to manually close and open the circuit breaker with single push on push buttons. It shall be fitted with a local system for manual

			tripping by an integrated push button. There will be no mechanical automatic re-closing.
		5.5.9	The operating mechanism shall be compatible for remote/ SCADA operation. The required motor for this operation shall be delivered separately to stores (at a later date) and shall be compatible with older versions of RMUs already working within the TPCODL network.
		5.5.10	The circuit breaker shall be associated with an integrated protection unit that will operate without any auxiliary power supply and shall include three toroid transformers incorporated in the transformer tee-off bushings, an electronic self-powered relay, a low energy release, and a "fast-on" test receptacle for protection testing (with or without CB tripping).
		5.5.11	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 tan 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.
		5.5.12	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.
		5.5.13	In any mounting the CT shall be mounted in such a way that the secondary connection shall be accessible and visible form front side after opening cable compartment door
		5.5.14	Breaker shall have mechanical endurance of at least 2000 operations. Relevant type test reports to be submitted along with bid.
		5.5.15	Breaker operation counter should be provided and should be visible on front in horizontal alignment.
		5.5.16	The circuit breaker shall be compatible for remote operation and can close (ON) and open (OFF) by remote operation in future if automated.
		5.5.17	In control cabinet the Terminal block shall have AC input wiring provision and MCB provision for incoming of LT AC supply.
		5.5.18	The relay auxiliary power, communication ports and other required ports should be wired up on the TB.
		5.5.19	The breaker should have one series trip coil and one shunt trip coil.
		5.5.20	For TPCODL, ODISHA supply - The shunt trip coil shall be of 24V DC along with charger and complete wiring up to trip coil through DC MCB and socket and switch arrangement for AC charger.
		5.5.21	**Electrical /Mechanical Interlock should be provided to the Earth switch it should not be Close when cable is back charged.**
		5.5.22	The protection system shall ensure circuit breaker tripping as of a minimum operating current which is the rated current of the underground network to be protected. The CT settings shall be adjustable between 60 - 400/1 Amp for outgoing feeder and transformer in relay. The pickup current of relay should be adjustable as per relay specification as per the requirement at site.
		5.5.23	CT shall be resin cast only, CT shall be of Protection class having duel ratio i.e. 400/1A and 60/1A. The ratio selection shall be made available on one TB on control cubicle. The ratio section chart shall be fixed permanently at suitable nearest arrangement available.

		5.5.24 The class of CT shall be 5P10 for both cores and CT Burden shall be 2.5 VA. 5.5.25 The relays shall be self-powered suitable numerical relay with necessary elements. Please refer Specification no. ENG-HV-95 for Self power relay for RMU feeder protection. The preferable make of relay are ABB, Ashida, Schneider, Siemens make relay. 5.27 For TPCODL ODISHA Supply- Following shall be applicable The circuit breaker shall be associated with an integrated protection unit that will operate without any auxiliary power supply and shall include: Three toroid transformers incorporated in the transformer tee-off bushings, An electronic relay,(self powered target latched by battery or capacitive unit) A low energy release, A "fast-on" test receptacle for protection testing (with or without CB tripping) 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 5P20 Class shall be employed. CT ratio shall be 200/1 (Further CT ratio may finalized during detailed engineering) The transformer ratings which are to be controlled by the breaker are as follows: 500kVA to 2000kVA. The terminal protectors to be supplied with the RMU by the vendor along with the cable termination bolt for termination 400 Sq. mm 11kV 3 C for isolator & Breaker compartment. There should be provision of flag Relay on each outgoing vacuum breaker module for indication of Trip on Fault The preferable make of relay at ODISHA supplies are ABB, Ashida, Schneider, Siemens, C&S, Alstom make relay.
5.6	**Bushings and Cable terminations**	5.6.1 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 M16 only for TPCODL ODISHA supplies for all bushings & M12 for TPCODL ODISHA supplies 5.6.2 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 (fire retardant) cleat. The Sizes of incoming and outgoing cable shall be as per clause no. 5.2.10 to 15.2.12

		5.6.3 BA should provide bimetallic washer for connection between Copper bushing stud and Aluminum Lug. Necessary spring and flat washers to be provided on each terminal. The bimetallic washer shall be suitable for M16 bolt for ODISHA & M12 bolt for ODISHA supply and 630A rating in all compartments with minimum thickness of 2mm and sufficiently cover the completely copper bushing stud. The bidder can alternately offer tinned copper surface of bushing then bimetallic washer not required. 5.6.4 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. 5.6.5 The bolt tightening pressure must be written inside each cable chamber with permanent sticker. 5.6.6 Cable boot for cable termination should be as per IS 13573-2. Boot should be easy to install. 5.6.7 The cable compartment must be without any holes or gaps and properly vermin proofing before inspection. 5.6.8 The cable testing provision to be ensured in design. In case cables are to be tested with front door open, doors shall have interlocks such that doors can be opened only with earth switch in closed position & a cable test rod (to be quoted as spare) which can be fixed on the terminations/ termination bolt through boot hole to facilitate testing. Termination boots as approved by the TPCODLshould have a proper opening to facilitate the testing. The opening in boot shall be covered by means of removable protection cap. 5.6.9 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. 5.6.10 In outdoor RMU the door should have pad lock 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. 5.6.11 Locking provision of cable compartment door to be provided in case of any switch/CB is at earth position to avoid pilferage. 5.6.12 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 marshaling box separately for relay, CT etc. 5.6.13 The wiring of the relay to be done on the TB for its terminals along with communication terminals. 5.6.14 All terminals wires shall have proper identification ferrules and the identification marking provided on TB. 5.6.15 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. Note: Supply of Cable terminations is not to be part of RMU supply.
5.7	**Earthing:**	5.7.1 The RMU outdoor metal clad switchgear enclosure, load Break Switch, VCB, SF6 tank etc. shall be equipped with an copper earth bus throughout all compartments and

		securely fixed along the base of the RMU with cover. 5.7.2 The extension of this earth bus shall be taken out minimum 50mm outside the enclosure on both sides for fixing of the TPCODLs 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. 5.7.3 The size of copper earth bus-bar should be Min.105 sq.mm inside the enclosure to withstand short time current carrying capacity as per IEC. 5.7.4 Two nos. body earthing bolts of M12X70 mm to be provide on the extended bus-bar. 5.7.5 The mother earth need to be extended up to 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 need to be provided in each compartment of RMU. 5.7.6 The main tank must be connected to mother earth at least two positions with proper contact. 5.7.7 In Three way outdoor type compact design bidders should ensure the earthing from mother earth is provided inside the cable compartment for earthing of the cable terminations. that TPCODL shall provide only two main earthing on switchgear 5.7.8 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 thank or enclosure. 5.7.9 If bolt are provided as current carrying path then the bolt material shall be brass and size shall be suitable to carry specified fault current .
5.8	**Voltage indicator lamps and phase comparators**	5.8.1 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 other device. These devices shall be in compliance with IEC 62271-206:2011 standard. The VPIS without dip ports are not accepted. 5.8.2 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. The auxiliary contacts in VPIS shall be there should be electrical interlock of cable presence indicator and operation of earth switch in RMU incomer cable compartment of LBS.
5.9	**Front Cover**	5.9.1 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. 5.9.2 The position indicators shall give a true reflection of the position of the main contacts. Position Indicators shall be clearly visible to the operator. 5.9.3 The lever operating direction shall be clearly indicated in the mimic diagram. 5.9.4 The bidder shall provide a operating sequence process on each compartment with

		permanent type arrangements. So that all data shall be self-explanatory. 5.9.5 The mimic shall have clear Words for "CLOSE/OPEN/EARTH' at each desired place. 5.9.6 All status indicators shall be marked appropriately with permanent labels as Earth On/OFF, Disconnector/LBS On/OFF, CB On/OFF. 5.9.7 All operating ports shall have marking like spring charging provision, three position disconnector port and Shutter operator for interlocking, Operation allowed along with arrow indication and labeled as earth operation or disconnector operation. 5.9.8 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 details shall be as per annexture-2 of this specification for 5.9.9 The Direction of operation shall be clock wise for any close operation and anti-clock wise for any open operation of disconnector/LBS and earth switch or as per type tested design with undertaking 5.9.10 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 permeant marked. 5.9.11 For gas pressure indication a dial type manometer to be provided with will show actual pressure. Gas pressure shall have SCADA compatible contacts and wired up on TB with labeling. 5.9.12 All the other accessories and boxes shall be properly labelled with permanent marking/printing such a way that the product is self-explanatory for user.
5.10	**Fault Passage Indicators**	5.10.1 Fault Passage Indicators shall be installed on the Ring Main Unit. These devices shall be, electronic devices with their own energy source and connected to Single 3 phase Split Core CTs (CBCT) for O/C. These shall be provided with bright LED s / flag Indicators, which shall be clearly visible in the day time. 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 5.10.2 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. 5.10.3 The preferred range is – O/C setting range 200-1000A. 5.10.4 The default setting shall be and 300A for overcurrent. This shall be ensured before

		inspection call in each RMU. 5.10.5 The Approved Make of FPI are EKL8000, EKL8000NG, Easergy Flair 22D ,SICAM and any other makes can be approved subject to TPCODL Approval 5.10.6 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. 5.10.7 The process of fixing the FPI shall be fixed on the wall of the incomer LBS cable compartment along with pictorial view. 5.10.8 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. 5.10.9 These shall confirm to the following standards: IEC 60068-2-6, IEC 60068-2-9 : Environmental testing – For Vibration, solar radiations IEC 60950 : Information Technology equipment – Safety IEC 1000-2 : Electromagnetic compatibility for low-frequency conducted disturbances and signaling in public low power supply systems IEC 1000-4 : EMC – Testing & Measurement IEC 1000-6 : EMC- Immunity for Residential, Commercial and light industrial environments.
5.11	**Remote Control of the RMU:**	5.11.1 For non-motorized RMU: Future provision for motorization to be kept along with the hurting plug arrangement on each feeder of each RMU 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. 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. 5.11.2 For motorized RMU- The motors to be fitted in LBS sections only. 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. Preferred communication protocol for FRTU shall IEC-60870-5-104. All Close-Open coils / signaling contacts shall be rated for 24 V 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 E) Aux. contact for Protection trip (Breaker module) F) Aux. Contact for Low Gas Pressure 2 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 harting 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. 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. Signal requirement for field RTU (which shall be mounted near RTU) is attached (refer Annexure-1). The bidder shall quote the cost of field RTU (FRTU) separately with all technical details for acquisition of the signal as described in Annexure-1.
5.12	**Paint**	All paint shall be applied on clean dry surfaces under suitable atmospheric conditions by seven tank process and powder coating. The overall paint thickness shall not be less than 70 microns. The paint shall not scale off or crinkle or be removed by abrasion during normal handling. The enclosure of the RMU shall be painted with shade light Grey, i.e. RAL 7032. The RMU should be painted with Anticorrosive paints. If any damage observed after delivery same need to be touch-up painted after delivery at site. The paint should sustain for harsh environment & saline weather , Corrosion Protection for RMU entire life cycle(minimum25Years) .
5.13	**SLD and configuration**	The SLD and the offered configurations cannot be changed without prior notice and approval from TPCODL. TPCODL reserve the right to accept the change or reject the same. Safety being utmost concern hence same need to be taken care in offered designs.
6.0	**NAME PLATE & MARKING: -**	All the components and operating devices of the RMU shall be provided with durable and legible nameplates containing all technical parameters. Name plates shall be suitably embossed with" PO no. with date", "PROPERTY OF TPCODL, ODISHA' & "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.
7.0	**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:
7.1	TYPE TESTS	1. Lightening Impulse test 2. Power Frequency Voltage Test 3. Temperature Rise Test 4. Measurement of Circuit Resistance 5. Rated Short Time and Peak Current Withstand test for main and Earth Circuit. 6. Breaking and Making Capacity Test for Breaker & Isolating Switches. 7. Operational & Interlock Performance Test 8. Internal Arc Withstand Test. 9. Degree of Protection (IP Code verification tests) 10. Mechanical Endurance Tests for Isolator and Breaker. 11. Pressure withstand test & Leakage test on SF-6 Gas chamber 12 Dimensional and Visual Checks. 13. Salt Spray Test for 1000Hours
7.2	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. Measurement of Circuit Resistance 5. Sf-6 chamber pressure withstands/leakage test. 6. HV withstand test across isolator distance. 7. HV withstand test of control and auxiliary circuits. 8. Voltage Indication Tests. 9. Breaker Contact Resistance Test 10. Total Trip Time Check Test through Current Injection in primary. 11. IR Value. Below routine test has to be provided on cable Boot for cable termination:

		a) Visual inspection of the final finished product. b) Intactness with Bushing. c) Insulation Test. d) AC HV test.
7.3	ACCEPTANCE TESTS	All the tests specified under Routine Test Clause above shall be carried out as acceptance test on random samples as per sampling plan under IEC/IS for each lot. Bidder should have all the requisite testing equipment's to carry out routine and acceptance test mentioned above including: a. Facility for primary current injection up to 1000amp. 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 PHELA, 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 5 years from the date of opening the bid. In case if type test conducted beyond 5 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 TPCODL. Bids without all type test report shall stand disqualified.
9.0	**PRE-DISPATCH INSPECTION**	Equipment shall be subject to inspection by a duly authorized representative of the TPCODL. 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 TPCODL's representatives at all times when the work is in progress. Inspection by the TPCODL or it's 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 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 Challen h) Installation and maintenance Manual soft copy for FPI, Relay, RMU i) Other Documents (as applicable)
10.	**INSPECTION**	

0	**AFTER RECEIPT AT STORE**	The material received at TPCODL Store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.
11.0	**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 time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the " Security cum Performance Deposit" as the case may be. 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.
12.	**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.
13.0	**TENDER SAMPLE**	Not applicable. Bidders to mention offered model number or type in GTP along with GA drawing during tender for each variant.
14.0	**QUALITY CONTROL**	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 TPCODL teams as and when required. To ensure quality of installations bidder shall provide supervision support during impartation.
15.0	**TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards
16.0	**MANUFACTURING ACTIVITIES**	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage with quantity. This bar chart shall 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 & SPECIAL TOOLS / GAUGES**	Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. TPCODL may order all or any of the spare parts listed at the time of contract award and the spare parts so ordered shall be supplied as part of the definite works. The may order additional spares at any time during the contract period at the rates stated in the Contract Document. 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 TPCODL 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. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification. Bidder has to provide separate quotation unit rate for below mentioned spare of RMU
18.0	**DRAWINGS & 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 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 TPCODL approval.

Instruction Manuals: Bidder shall furnish softcopies and one hard copy 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.

			S.N.	Description	As specified by TPCODL (Options defined in specs)	As furnished by Bidder
19.0	**GENERAL TECHNICAL PARTICULARS FOR RMU**		1.0	RMU Category -Motorized	3Way - 1CB or 2 CB or LBS 4Way - 2 CB or 3 CB or LBS 5 Way - 3CB	
			2.0	RMU application	Indoor or Outdoor as mentioned in tender	
			3.0	Offered Model nos. and OEM type	a. 3Way (E/NE, I/D or O/D) b. 4Way (E/NE, I/D or O/D) c. 5 Way (E/NE, I/D or O/D)	
			4.0	Dielectric medium	SF6	
			5.0	Interrupting medium	Vacuum- for CB SF6 for LBS and earth switch	
			6.0	System Frequency	50 Hz	
			7.0	Rated Voltage	12 KV	
			8.0	Service Voltage	11 KV	

		9.0	Rated current -Line Switches	630 A	
		10.0	Rated Current-CB and LBS	630 A for all type	
		11.0	Rated Short time current withstand (3 sec)	21 KA	
		12.0	Rated Short time Making capacity	50 KA	
		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- 5 close ES- 5 close The ES in line with CB	
		17.0	Opening time of breaker (max.) Without relay time	2.5 cycle	
		18.0	Closing time of breaker (max.)	3 cycle	
		19.0	Breaker Duty Cycle	O – 3min - CO - 3min – CO	
		20.0	i. Mechanical endurance for Isolator & Earth Switch	Min 1000 Operations	
			ii. Mechanical endurance for Circuit Breaker	Min 2000 Operations	
		21.0	Electrical operations of at rated current a. LBS/Disconnector b. Earth Switch	To be provided by bidder	
		22.0	Temp rise above ambient of 50 deg.	50 Deg C. (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 RFS etc. not accepted)	1. Dial type Manometer to be provided for gas pressure indication 2. 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	a. IP 67 for the tank and b. IP2X for the front cover / mimic board and c. IP 54 (Main door closed) for Outdoor RMUs. d. IP 54 for cable compartment	

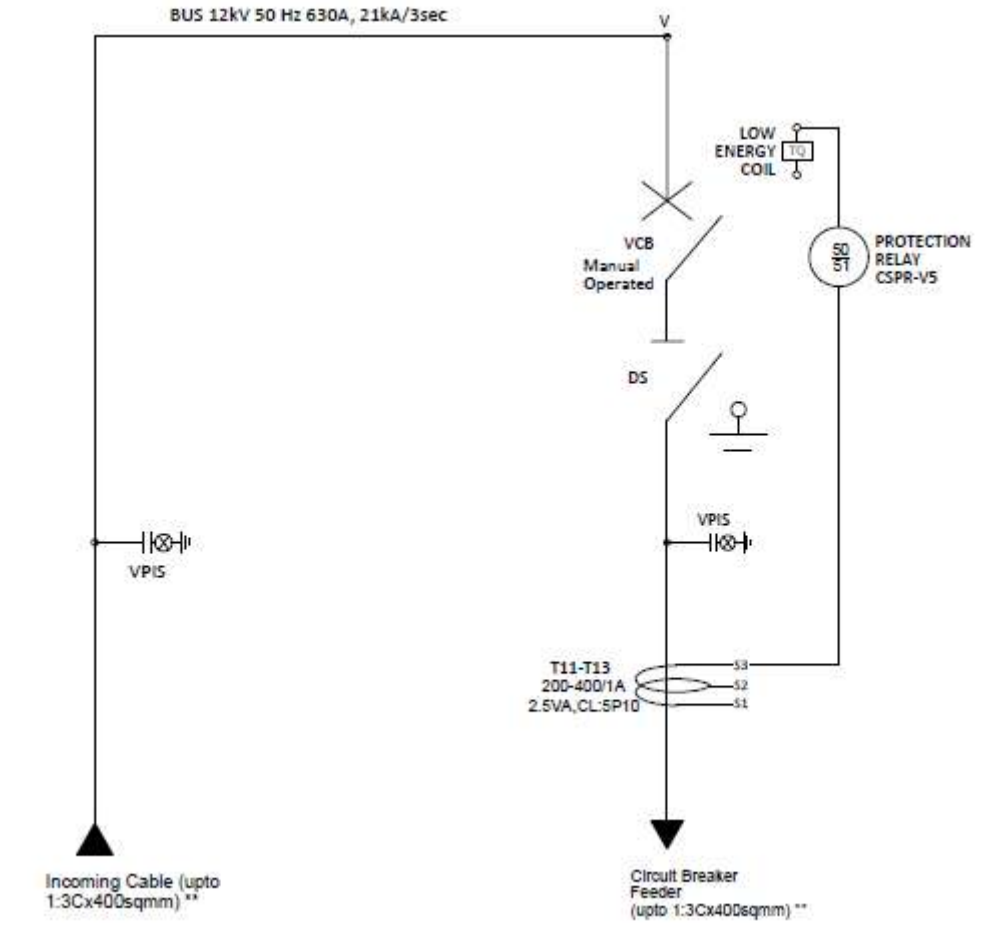
		28.0	Internal Arc rating	IAC AFL or better	
		29.0	Internal Arc test	20kA for 1 Sec.	
		30.0	Lightning Impulse withstand Voltage	75 kVp	
		31.0	Power Frequency withstand voltage	28 kVrms.	
		32.0	SF6 Tank design	Hermetically/robotically sealed unpainted stainless steel enclosure with SF6 Gas. Sealed 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 tamperproof to prevent access to live parts. No gaskets shall be used. No bolts shall be provided.	
		32.1	Tank material and grade of SS and welding	Should be of SS and non-corrosive, offered grade of SS to be mentioned. The welding shall be such that there shall be corrosion of welding for useful life of equipment.	
		33.0	Earth bus bars	In enclosure to prevent tampering.	
		34.0	Material & size of earth bus bar	To be provided by the bidder	
		35.0	Earthing of main CCT Cables shall be earthed with earth switch with S/C making capacity as per IEC 129. Moving contacts of earthing switch shall be visible in closed position thru transparent covers AND 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. The electrical interlock of cable charge with earth switch is preferred.	To be provided by bidder	
		37.0	Circuit Breakers: a. 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	To be provided by bidder as per specs.	

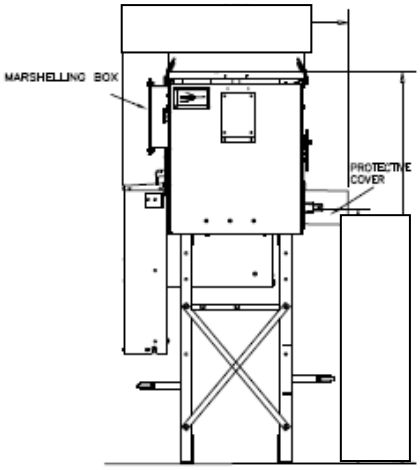
			be possible if required. b. In view of safety each VCB shall be assisted with feeder side disconnector having 3 positions, open-disconnected, closed, and earth (having fault making capacity) and shall be constructed in such a way that natural interlocking prevents unauthorized operations.		
		38.0	Protection Relay-Without auxiliary power & shall include , electronic relay, low energy release & fast on test receptacle for protection testing		
		39.0	Make of self-powered Relay & offered model	a. For TPCODL, ODISHA – ABB ,Ashida, Schneider, Siemens	
		40.0	Flag indication for CB Trip on fault in relay/ mechanical	To be provided by bidder	
		41.0	Testing of Cable- If doors are opened then earth switch shall be in closed position with necessary interlocks and cable test rod fixing provision in bolt head which can be fixed on terminations through boot cap/opening for testing purpose AND if doors are opened it shall not be possible to operate, Isolator, E/Switch or CB through interlocks	To be confirmed. If separate test bushing are provided, it shall be covered with suitable antitheft covers with anti vandal screws	
		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 antitheft 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 shall not be acceptable.	
		44.0	Voltage indicator box shall be fixed type-This device shall be in compliance with IEC	Capacitive dividers type which will supply low voltage to power the lamps AND 3 inlets can be used to	

				62271-206:2011 standard only	check phase sequence or presence of voltage in cable	
			45.0	Cable cleats (full circle)	HDPE/Nylon (Fire Retardant)	
			46.0	Cable termination and bushing suitability	Heat/ Cold shrink terminations	
			46.A	Cable Termination boot /Cable boot	Bidder should provide Cable Termination protector /cable boot for each cable compartment, 12KV Class Cable size 3x400sqmm.Approved make - 3M/Raychem	
			46.0	Cable compartment suitability shall be	Suitable for cable sizes a. 11kV 3CX400 sq.mm having dia of 92mm in all compartment and b. For three way with two CB the LBS shall be suitable for 11kV 1CX630 sq.mm cable having diameter of 51mm in incomer LBS- the necessary cleat and nonmagnetic base plate cable entry arrangement and 15mm longer bolt than other compartment shall be provided.	
			47.0	The cable compartment	All cable compartment shall be bottom entry and front opening type only	
			48.0	Size of bimetallic washer in all compartments	Must be suitable for M16 for TPCODL, ODISHA) bolt and bushing sizes with min. 2mm thick.	
			49.0	Height of bushing terminal from base plate	Minimum 800mm for proper termination space.	
			50.0	Fault passage indicator	FPI on each LBS as a part of each RMU with specified default setting.	
			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 yellow for TPCODL-ODISHA As per annexture-2	
			53.0	Main Bus bar Material	Copper	
			53.1	Bus bar Cross Section	To be specified by bidder as per current density	
			54.0	Opening & Closing times with relay	125 ms maximum	

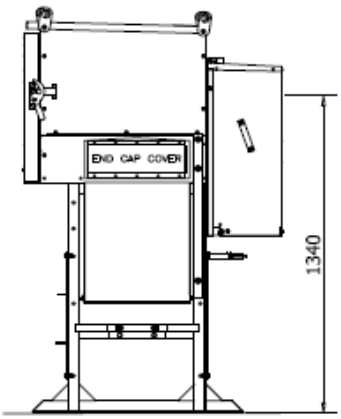
			55.0	Current Transformer for CB compartment	Shall be epoxy resin casted and mounted on cables. The CTs around the cables shall be supported on the sheet steel bracket and should be fixed with bolts. The mounting frame should be moveable up and down or to and fro but shall be fixed at co-axial position with base plat holes and bushing terminal bolts. a. For TPCODL, ODISHA The CT settings shall be adjustable between 60 - 400/1 Amp at terminal block. CT ratio is 60-400/1A, Burden is 2.5 VA, Class - 5P10.	
			56.0	Future motorization and SCADA Compatibility	To be provided	
			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 provide along with RMU lot.	
			63.0	VPIS auxiliary contact	The VPIS shall have auxiliary contact 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.	
			67.0	Direction of operation (As offered) (Close - clock wise Open- counter clock wise)	a. LBS – ON/off b. ES- Open/ close c. CB disconnector- ON/off d. CB earth switch-Open/ close	
			68.0	Making of earthing operations	a. For TPCODL, ODISHA All earth operation to be marked with Yellow back ground and permanent in nature.	
			69.0	Auxiliary contacts (total	LBS	

			numbers and spare numbers)	Earth Switch CB CB Disconnector - CB earth switch-	
		70.0	Control cable entry provision	To be provided	
		71.0	Shunt trip coil 24V DC	a. For TPCODL, ODISHA 24V DC shunt trip coil to be provided and specify DC voltage rating and charger rating 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		
		a	Terminal protector	Insulating Boots	
		b	System voltage	12 kV	
		c	AC High voltage	28kV For 1 min	
		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 mal operation 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	24 V DC	
		b	Max. power rating	240 Watts	
		c	Max current drawn	9 Amp (±10%)	
		d	Operating time	4-8 seconds	
		e	Power Supply	There shall be provision of 230 V AC (maximum 5 Amp current) & 24 V DC	
20	**SLD**			



FRONT VIEW



SIDE VIEW

21 **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
I/O LIST -SIGNAL LIST FOR AUTOMATION

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							1	1
Pressure Gauge (manometer)							1	
VPIS						1	1	

FRTU SIGNAL LIST

Description	Analog Inputs (AI)				
Type	Amp. Loading-R ph	Amp. Loading-Yph	Amp. Loading-B ph	Phase Voltage	Power factor
Switch *	0	0	0	0	0
Breakers *	1	1	1	1	1
Fault passage indicator *	0	0	0	0	0

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

***** Denotes the nos of switches/ Breaker s in RMU based on the type of RMU (3way, 4way, 5way).

Additional IOs

RMU switch Control Command
Earth Sw. 1 Status Input
Earth Sw. 2 Status Input
FPI Reset
FRTU Local/Remote Position
FRTU Door Open
FRTU Battery Charger Faulty
FRTU Battery Faulty
FRTU Switchgear Supply Off
FRTU Aux Supply Off
FRTU Fault
Relay operation
CB OFF status
CB ON status
CB ON/OFF Command

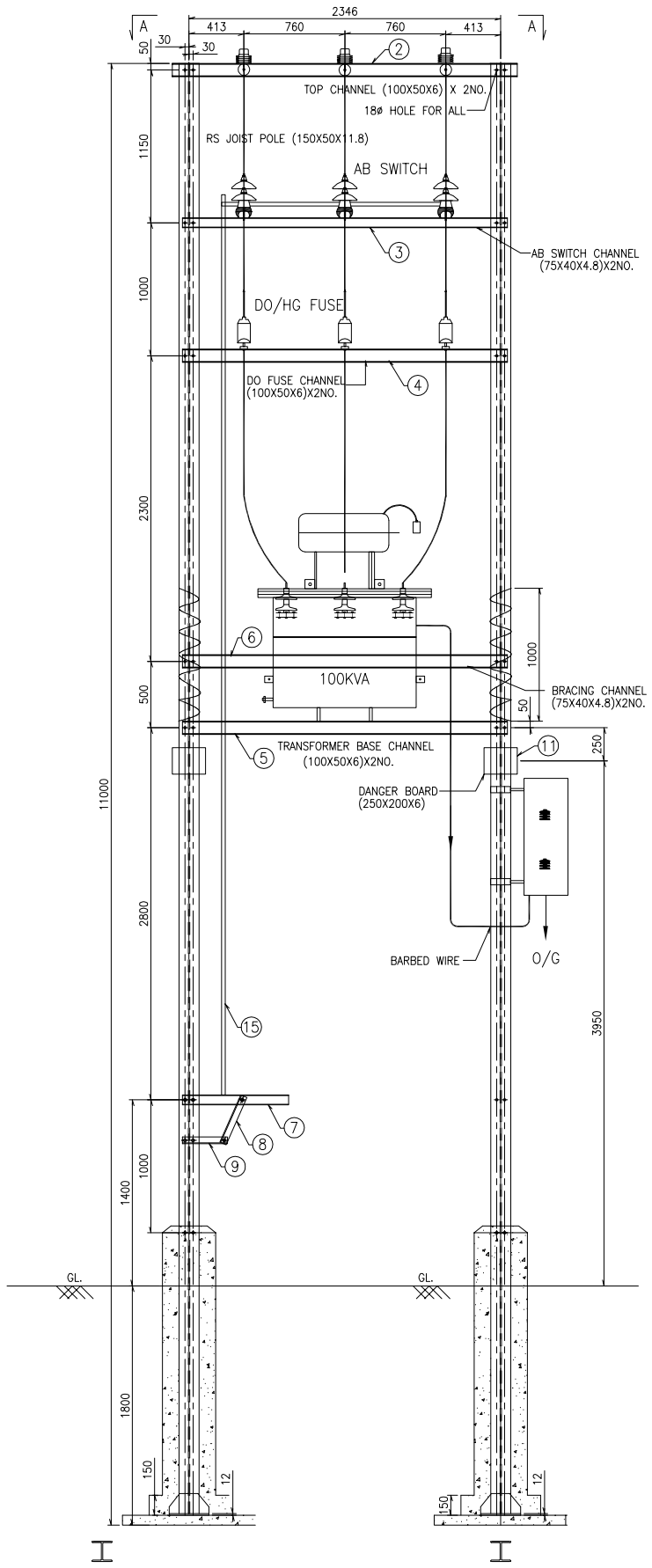
. Annexture-2

The reference sample MIMIC used for earthing color identifications.

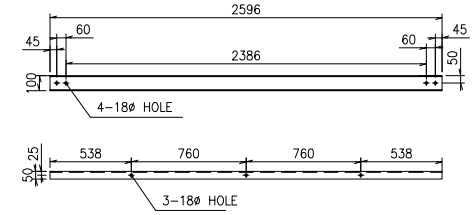
a. TPCODL, ODISHA

TITLE: 11KV DTR MOUNTING WITH RSJ 150X150/ WPB 160 DOUBLE POLE STRUCTURE

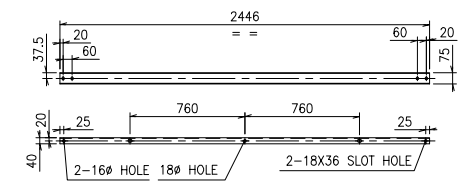
DWG NO TCE.—



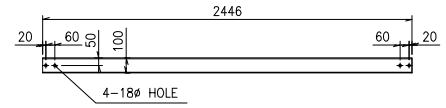
DTR MOUNTING DP STRUCTURE
(SCALE 1:50)



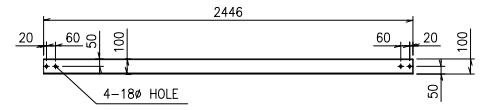
② DP TOP CHANNEL (100X50X6)
(SCALE 1:25)



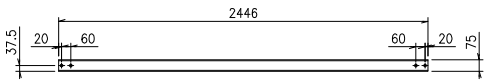
③ AB SWITCH MOUNTING CHANNEL
(75x40x4.8 MM)
(SCALE 1:25)



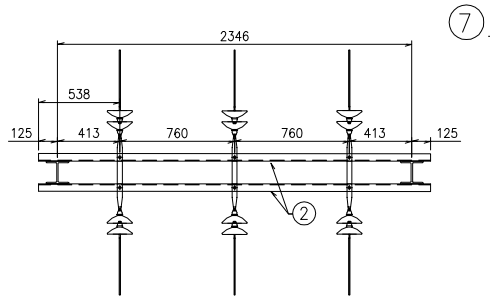
④ DO FUSE CHANNEL (100X50X6)
(SCALE 1:25)



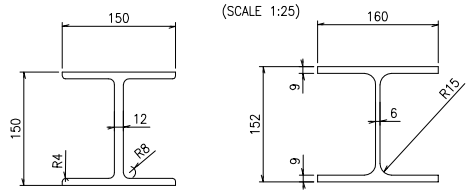
⑤ TRANSFORMER BASE CHANNEL(100X50X6)
(SCALE 1:25)



⑥ BRACING CHANNEL(75X40X4.8)
(SCALE 1:25)

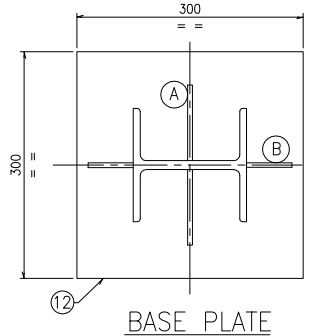


PLAN AT A–A
(SCALE 1:25)

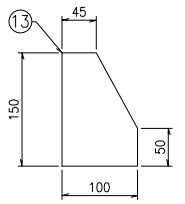


RSJ 150X150
(SCALE 1:5)

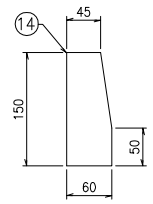
WPB 160
(SCALE 1:5)



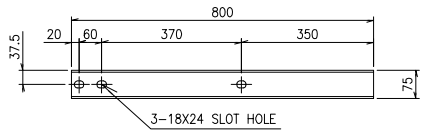
BASE PLATE
(300X300X12MM)
(SCALE 1:5)



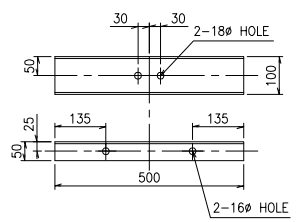
STIFFNER PLATE–A
(150X100X6MM)
(SCALE 1:5)



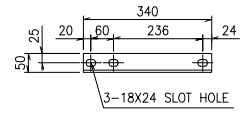
STIFFNER PLATE–B
(150X60X6MM)
(SCALE 1:5)



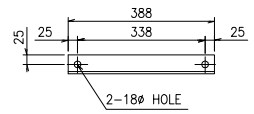
⑦ CHANNEL SUPPORT FOR DOWN PIPE
(SCALE 1:10)



⑩ AB SWITCH SIDE CHANNEL
(100x50x6 MM)
(SCALE 1:10)



⑨ BASE ANGLE FOR DOWN PIPE
(SCALE 1:10)



⑧ DIAGONAL ANGLE FOR DOWN PIPE
(SCALE 1:10)

WEIGHT OF PARTS

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM (Kg)	TOTAL WT./ ARGMT (Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	2596	2	9.56	24.82	49.64
3	AB SWITCH MOUNTING CHANNEL	75X40X4.8 MM	CHANNEL	2446	2	7.14	17.46	34.93
4	DO FUSE CHANNEL	100X50X6 MM	CHANNEL	2446	2	9.56	23.38	46.77
5	TRANSFORMER BASE CHANNEL	100X50X6 MM	CHANNEL	2446	2	9.56	23.38	46.77
6	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	2446	2	7.14	17.464	34.93
7	CHANNEL SUPPORT FOR DOWN PIPE	75X40X4.8 MM	CHANNEL	800	1	7.14	5.712	5.71
8	DIAGONAL ANGLE FOR DOWN PIPE	50X50X6 MM	ANGLE	388	1	4.5	1.75	1.75
9	BASE ANGLE FOR DOWN PIPE	50X50X6 MM	ANGLE	340	1	4.5	1.53	1.53
10	AB SWITCH SIDE CHANNEL	100X50X6 MM	CHANNEL	500	2	9.56	4.78	9.56
11	DANGER BOARD	250X200X6 MM	PLATE		2	47.10	2.36	4.71
12	BASE PLATE	300X300X12 MM	PLATE		2	94.20	8.48	16.96
13	BASE STIFFNER PLATE	150X100X6MM	PLATE		4	47.10	0.83	2.83
14	BASE STIFFNER PLATE	150X60X6MM	PLATE		4	47.10	0.63	1.70
15	AB SWITCH OPERATING ROD	25 DIA	ROD	7000	1	3.85	26.95	26.95
							TOTAL WEIGHT FOR RSJ STRUCTURE	1045.93
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	954..41
A	BOLT & NUTS	M16		40	104		0.121	12.58
B	BOLT & NUTS	M16		120	8		0.246	1.97
C	BOLT & NUTS	M16		190	16		0.360	5.76
D	BOLT & NUTS	M8		50	24		0.029	0.696
E	FLAT WASHER	M16			128		0.014	1.792
F	SPRING WASHER	M16			128		0.009	1.152
G	FLAT WASHER	M8			24		0.005	0.12
H	SPRING WASHER	M8			24		0.002	0.048
							TOTAL WEIGHT	22.15

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
2. ALL HOLES ARE ø18 MM UNLESS OTHERWISE SPECIFIED.
3. REFERENCE STANDARD– IS 2062, & IS–808

FOR RO ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE
CLEARED						CIVIL	ELEC	I&C	MECH			
DISC.	SIGNATURE	DATE										
CIVIL												
ELEC												
I&C												
MECH												

ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE
			CIVIL	ELEC	I&C	MECH			

FILE NAME :

"P" (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK AT THE TOP RIGHT HAND CORNER OF THE TITLE BLOCK.

CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.

INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTRUCTION/ FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLDS' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION/FABRICATION WORK RELATED TO 'HOLDS'.

DO NOT SCALE | PRELIMINARY

TPCODL TP CENTRAL ODISHA DISTRIBUTION LIMITED

TP CENTRAL ODISHA DISTRIBUTION LIMITED

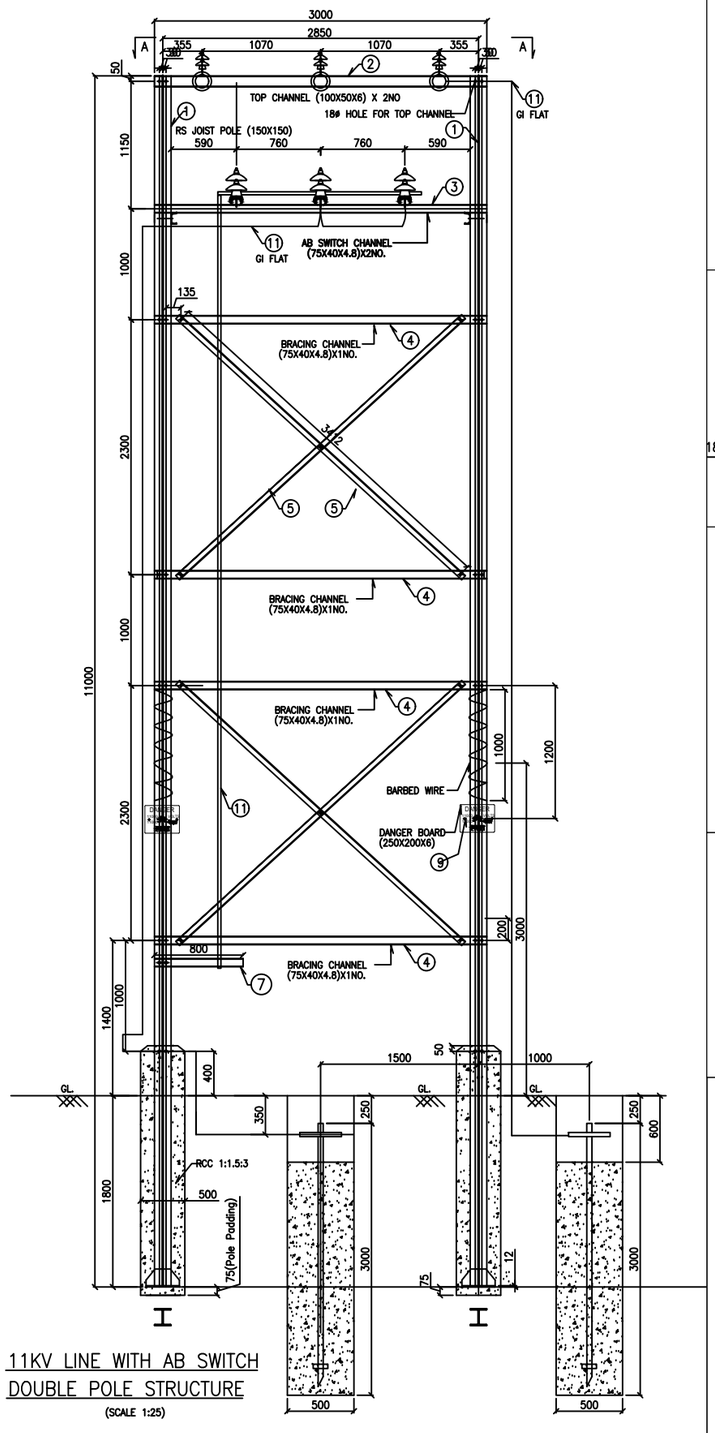
11KV DTR MOUNTING WITH RSJ 150X150/ WPB 160 DOUBLE POLE STRUCTURE

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

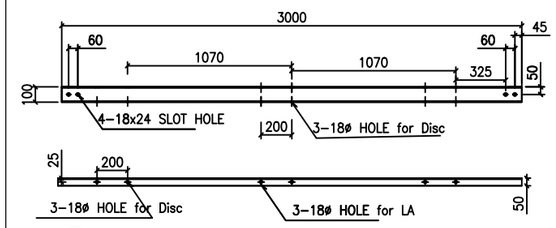
SCALE: AS SHOWN	APPROVED	DATE (RO ISSUE) 03/04/2021
DEL.CENTRE–DISC:EL		DATE (CURRENT ISSUE) 03/04/2021
DRN: RF		
CHD: SS	DWG NO TCE.——	ISSUE -

SIZE–A1

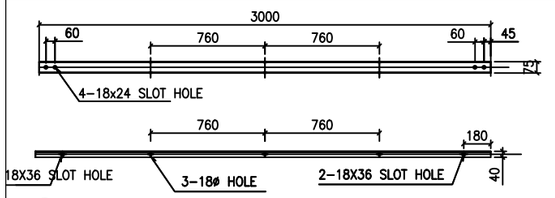
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



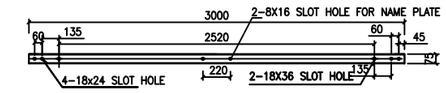
11KV LINE WITH AB SWITCH DOUBLE POLE STRUCTURE
(SCALE 1:25)



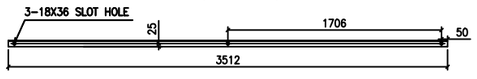
② DP TOP CHANNEL (100X50X6)



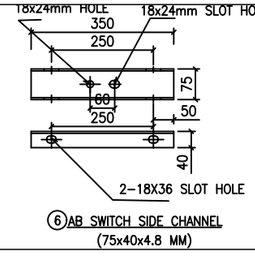
③ AB SWITCH MOUNTING CHANNEL
(75x40x4.8 MM)



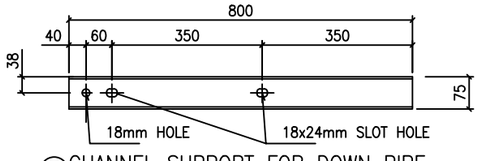
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)



⑥ AB SWITCH SIDE CHANNEL
(75x40x4.8 MM)

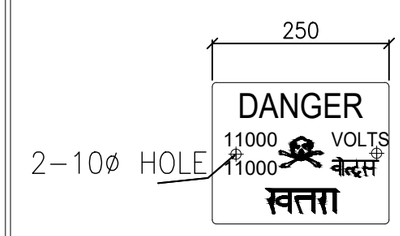


⑦ CHANNEL SUPPORT FOR DOWN PIPE

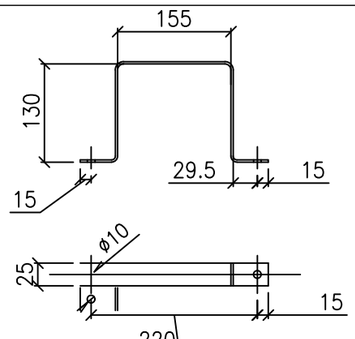
(75x40x4.8 MM)

BOM OF GI ITEMS OF 11KV LINE DP WITH AB SWITCH

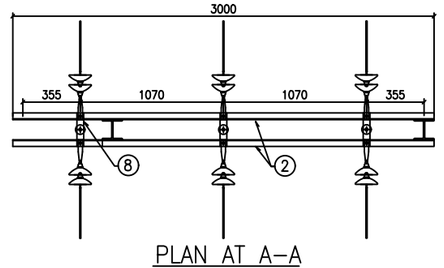
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
3	AB SWITCH CHANNEL	75X40X4.8 MM	CHANNEL	3000	2	7.14	21.42	42.84
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
6	AB SWITCH SIDE CHANNEL	100X50X6 MM	CHANNEL	350	2	9.56	3.35	6.692
7	CHANNEL SUPPORT FOR DOWN PIPE	75X40X4.8 MM	CHANNEL	800	1	7.14	5.71	5.712
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	2800	1	1.90	5.32	5.32
12	PIPE EARTHING		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1037.30
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	888.42
A	BOLT & NUTS	M16		50	48		0.134	6.432
B	BOLT & NUTS	M16		120	8		0.229	1.832
C	BOLT & NUTS	M16		140	9		0.256	2.304
D	BOLT & NUTS	M17		200	0		0.331	0
E	BOLT & NUTS	M8		50	4		0.026	0.104
F	FLAT WASHER	M16			130		0.014	1.82
G	SPRING WASHER	M16			130		0.009	1.17
H	FLAT WASHER	M8			8		0.005	0.04
I	SPRING WASHER	M8			8		0.002	0.016
							TOTAL WEIGHT	13.718



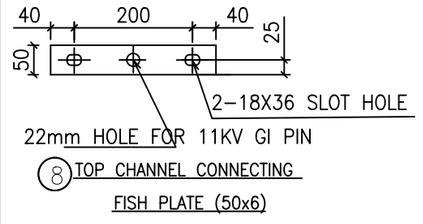
DANGER BOARD
⑨ (250X220X3)X2NO.



⑩ BACK CLAMP FOR DANGER BOARD(25X3)



PLAN AT A–A



⑧ TOP CHANNEL CONNECTING FISH PLATE (50x6)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

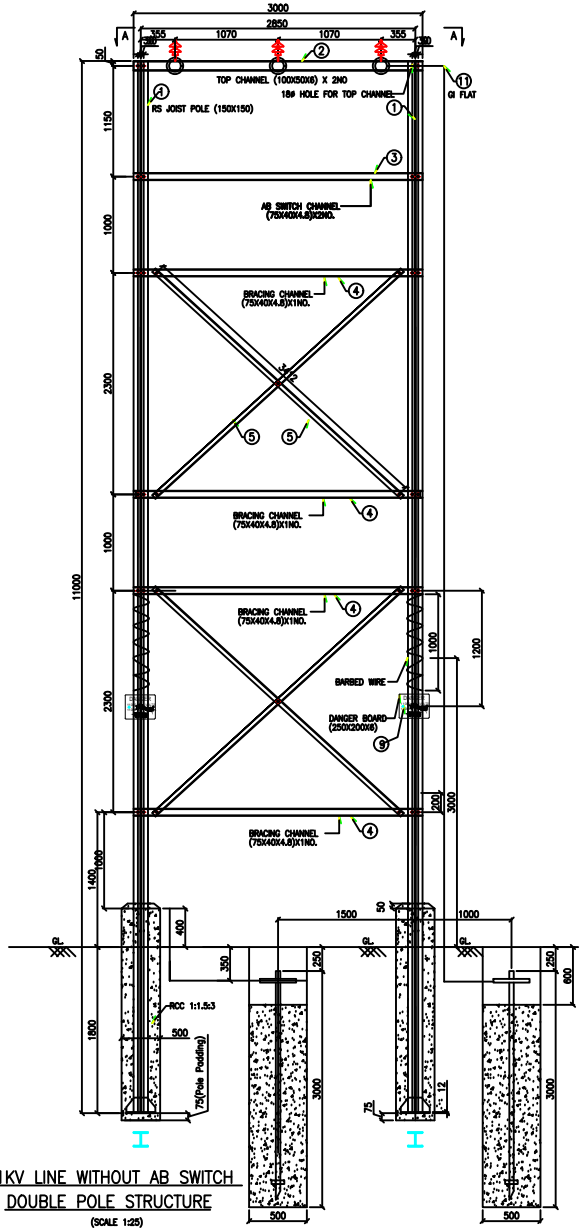
TITLE:-

11KV LINE DP WITH AB SWITCH
(with 11mtr. 150x150 RSJ or WPB 160)

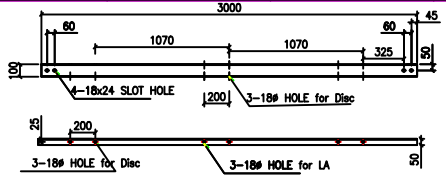
	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO: TPCODL-MVD-0001 REV NO:

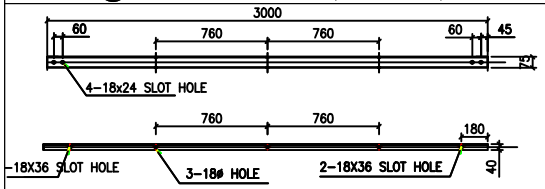
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



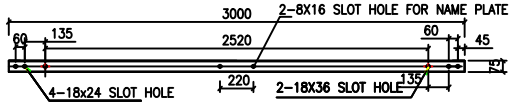
11KV LINE WITHOUT AB SWITCH DOUBLE POLE STRUCTURE
(SCALE 1:25)



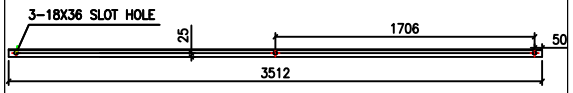
② DP TOP CHANNEL (100X50X6)



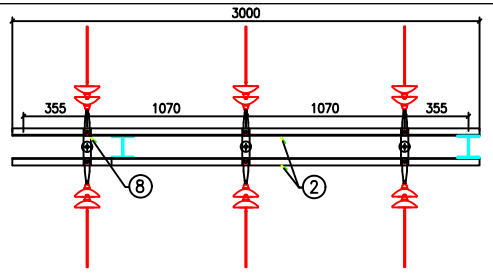
③ AB SWITCH MOUNTING CHANNEL
(75x40x4.8 MM)



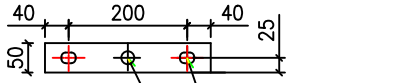
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)



PLAN AT A-A

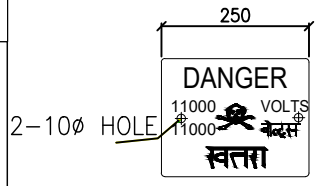


22mm HOLE FOR 11KV GI PIN

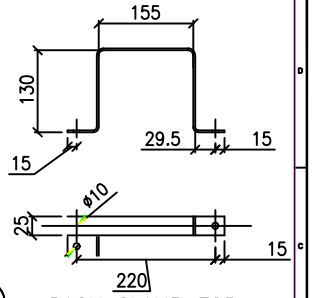
⑧ TOP CHANNEL CONNECTING FISH PLATE (50x6)

BOM OF GI ITEMS OF 11KV LINE DP WITHOUT AB SWITCH

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
3	AB SWITCH CHANNEL	75X40X4.8 MM	CHANNEL	3000	2	7.14	21.42	42.84
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	1400	1	1.90	5.32	2.66
12	PIPE EARTHING		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1022.23
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	873.35
A	BOLT & NUTS	M16		50	48		0.134	6.432
B	BOLT & NUTS	M16		140	12		0.256	3.072
C	BOLT & NUTS	M16		200	0		0.331	0
C	BOLT & NUTS	M8		50	4		0.026	0.104
D	FLAT WASHER	M16			120		0.014	1.68
E	SPRING WASHER	M16			120		0.009	1.08
F	FLAT WASHER	M8			8		0.005	0.04
G	SPRING WASHER	M8			8		0.002	0.016
							TOTAL WEIGHT	12.424



⑨ DANGER BOARD (250X220X3)X2NO.



⑩ BACK CLAMP FOR DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

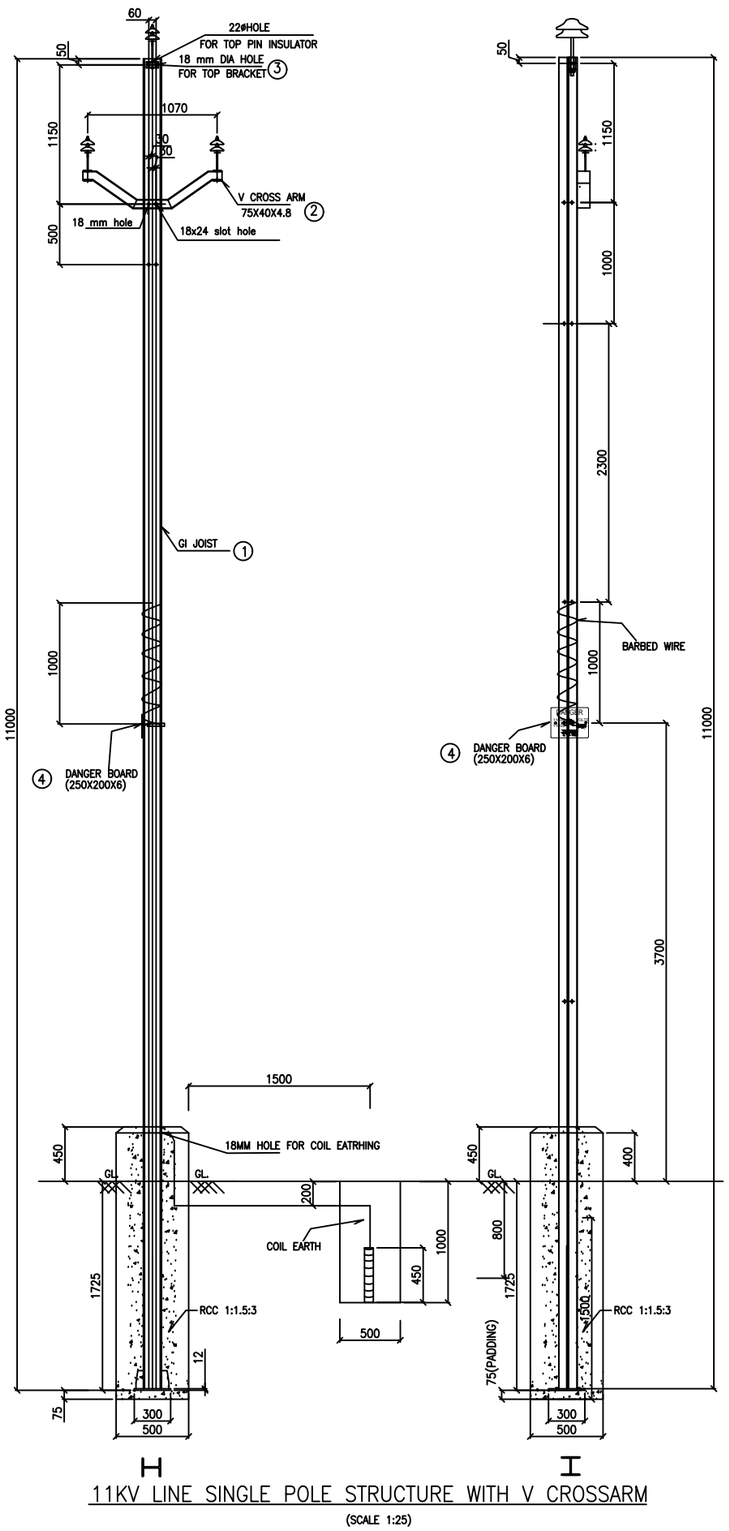
TITLE:-

11KV LINE DP WITHOUT AB SWITCH (with 11mtr. 150x150 RSJ or WPB 160)

	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0002 REV NO:

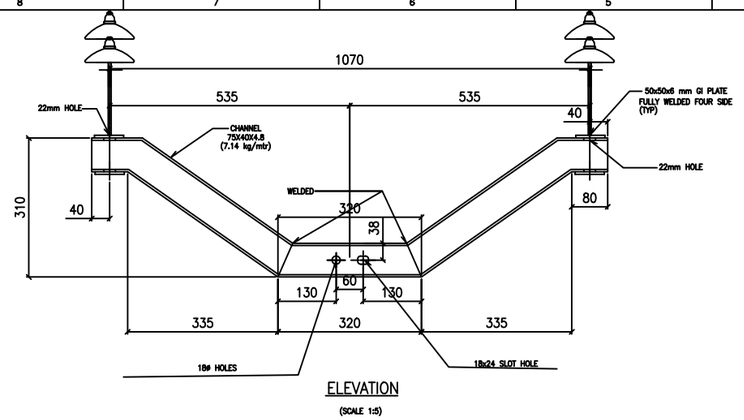
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



H I

11KV LINE SINGLE POLE STRUCTURE WITH V CROSSARM

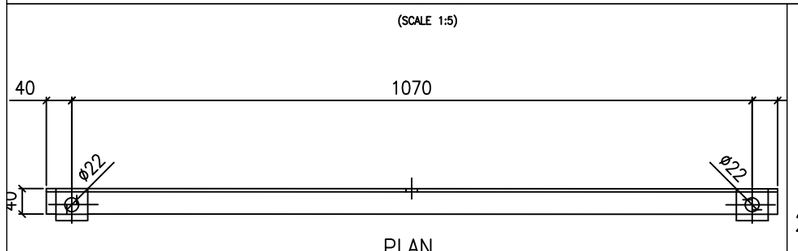
(SCALE 1:25)



ELEVATION

(SCALE 1:5)

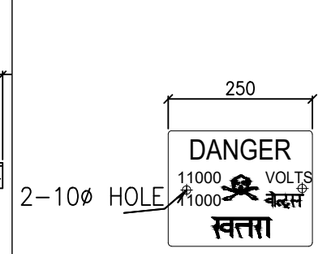
BOM OF GI ITEMS OF 11KV LINE SP WITH V CROSSARM								
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY (NOS)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	11KV V CROSS ARM	75X40X4.8 MM	CHANNEL	1395	1	7.14	9.960	9.960
2A	50X6 FLAT FOR V	50X6 MM	FLAT	50	4	2.36	0.118	0.472
3	POLE TOP BRACKET	100X50X6 MM	CHANNEL	120	1	9.56	1.147	1.147
4	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.355	4.710
5	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.300	0.601
						TOTAL WEIGHT FOR RSJ STRUCTURE		397.49
						TOTAL WEIGHT FOR WPB 160 STRUCTURE		351.73
A	BOLT & NUTS	M16		50	3		0.134	0.402
B	BOLT & NUTS	M16		120	2		0.229	0.458
C	BOLT & NUTS	M6		50	2		0.02	0.04
D	FLAT WASHER	M16			10		0.014	0.14
E	SPRING WASHER	M16			10		0.009	0.09
F	FLAT WASHER	M8			4		0.005	0.02
G	SPRING WASHER	M8			4		0.002	0.008
							TOTAL WEIGHT	1.158



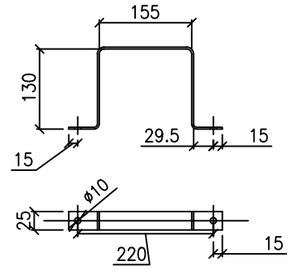
PLAN

11KV V-CROSS ARM(75x40x4.8)

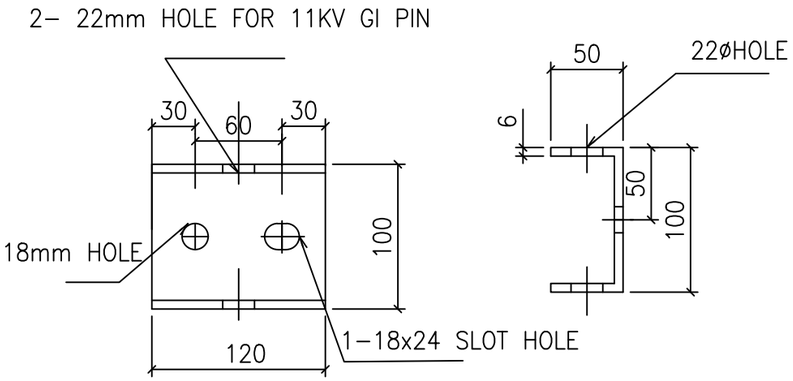
(SCALE 1:5)



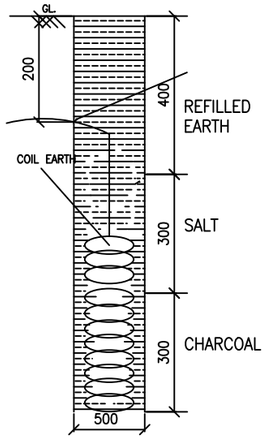
④ DANGER BOARD (250X220X3)X2NO.



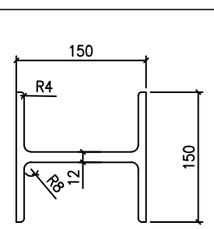
⑤ BACK CLAMP FOR DANGER BOARD(25X3)



③ POLE TOP BRACKET(100x50x6)

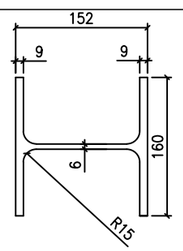


COIL EARTH PIT



RSJ 150X150

(SCALE 1:5)



WPB 160

(SCALE 1:5)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

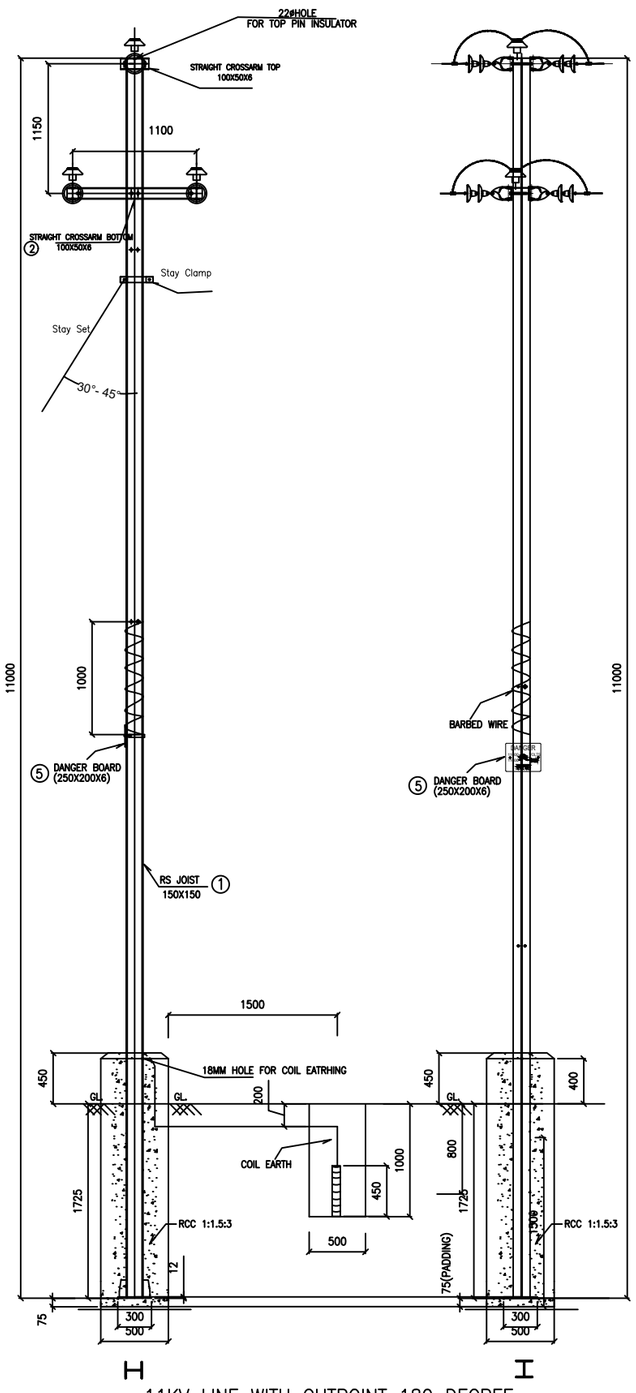
TITLE:-

11KV LINE SINGLE POLE WITH V CROSS ARM (with 11mtr. 150x150 RSJ or WPB 160)

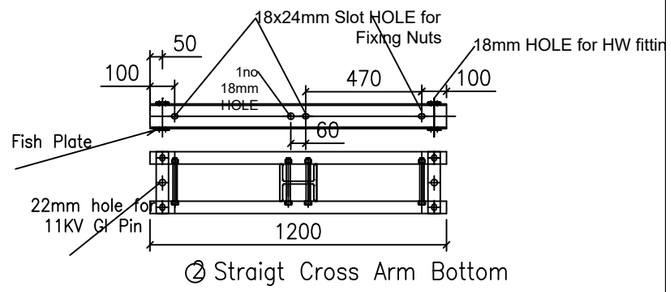
	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0003 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)

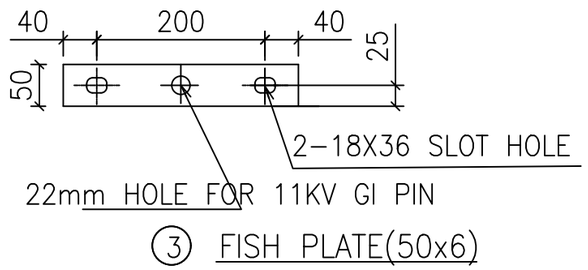


11KV LINE WITH CUTPOINT 180 DEGREE
SINGLE POLE STRUCTURE
(SCALE 1:25)

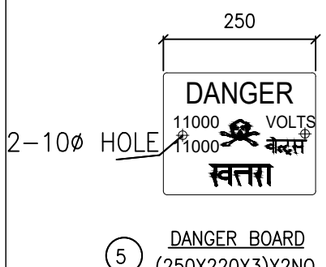


② Straigt Cross Arm Bottom

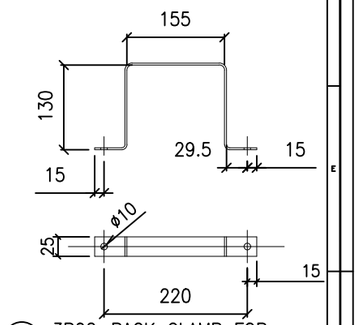
BOM OF GI ITEMS OF 11KV LINE CUT POINT 180 DEGREE								
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	STRAIGHT CROSSARM BOTTOM	100X50X6 MM	CHANNEL	1200	2	9.56	11.472	22.944
3	FISH PLATE	50X6 MM	FLAT	280	8	2.36	0.661	5.286
4	STRAIGHT CROSSARM TOP	100X50X6 MM	CHANNEL	306	2	9.56	2.925	5.851
5	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.355	4.710
6	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.300	0.601
7	STAY CLAMP	50x8M	FLAT	551	2	3.14	1.730	3.460
							TOTAL WEIGHT FOR RSJ STRUCTURE	423.45
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	377.69
A	BOLT & NUTS	M16		50	1		0.134	0.134
B	BOLT & NUTS	M16		90	3		0.187	0.561
C	BOLT & NUTS	M16		200	7		0.331	2.317
D	BOLT & NUTS	M8		50	2		0.002	0.004
E	FLAT WASHER	M16			22		0.014	0.308
F	SPRINGWASHER	M16			22		0.009	0.198
G	FLAT WASHER	M8			4		0.005	0.02
H	SPRINGWASHER	M8			4		0.002	0.008
							TOTAL WEIGHT	3.55



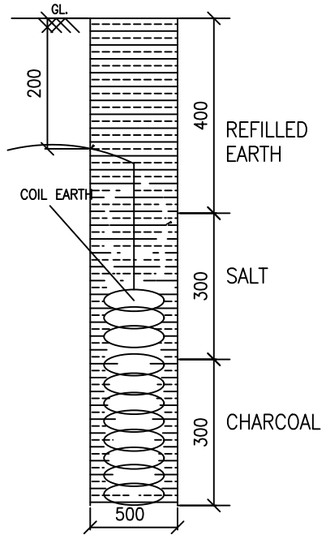
③ FISH PLATE(50x6)



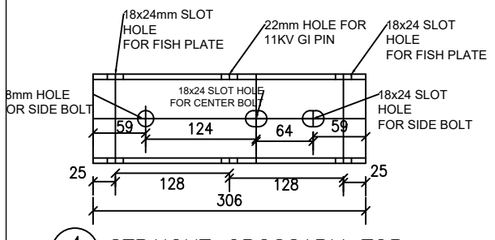
⑤ DANGER BOARD
(250X220X3)X2NO.



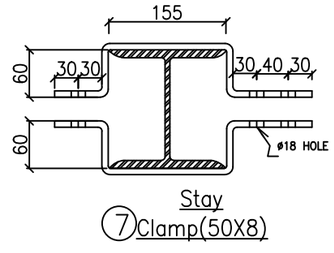
⑥ 3R02–BACK CLAMP FOR
DANGER BOARD(25X3)



COIL EARTH PIT



④ STRAIGHT CROSSARM TOP
(100x50x6)



Stay
⑦ Clamp(50X8)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

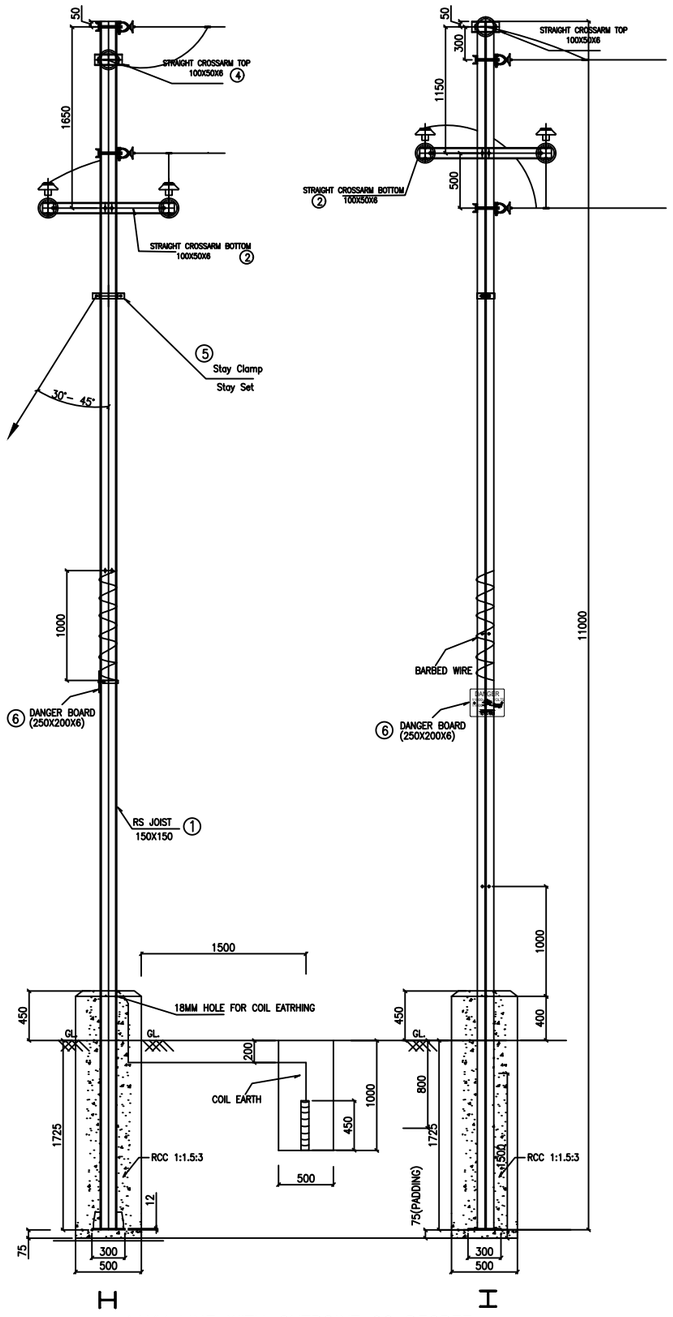
TITLE:-

11KV LINE SINGLE POLE CUT POINT 180 DEGREE(with 11mtr. 150x150 RSJ or WPB 160)

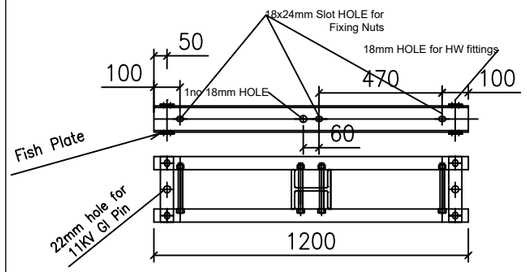
	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0004 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



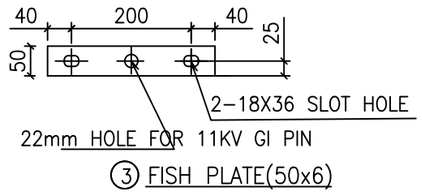
11KV LINE WITH CUTPOINT 90 DEGREE
SINGLE POLE STRUCTURE
(SCALE 1:25)



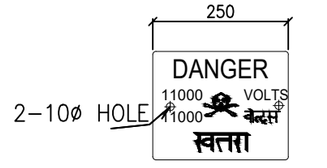
② Straigt Cross Arm Bottom

BOM OF GI ITEMS OF 11KV LINE CUT POINT 90 DEGREE

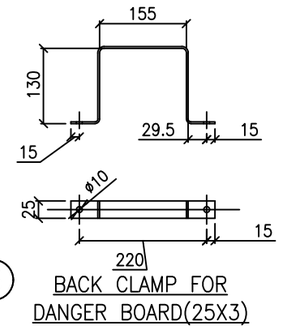
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	STRAIGHT CROSSARM BOTTOM	100X50X6 MM	CHANNEL	1200	4	9.56	11.472	45.888
3	FISH PLATE	50X6 MM	FLAT	280	8	2.36	0.661	5.286
4	STRAIGHT CROSSARM TOP	100X50X6 MM	CHANNEL	306	4	9.56	2.925	11.701
5	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.355	4.710
6	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.300	0.601
7	STAY CLAMP	50x8M	FLAT	551	2	3.14	1.730	3.460
							TOTAL WEIGHT FOR RSJ STRUCTURE	452.25
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	406.49
A	BOLT & NUTS	M16		50	1		0.134	0.134
B	BOLT & NUTS	M16		90	3		0.187	0.561
B	BOLT & NUTS	M16		140	4		0.256	1.024
C	BOLT & NUTS	M16		200	14		0.331	4.634
D	BOLT & NUTS	M8		50	2		0.02	0.04
E	FLAT WASHER	M16			44		0.014	0.616
F	SPRING WASHER	M16			44		0.009	0.396
G	FLAT WASHER	M 8			4		0.005	0.02
H	SPRING WASHER	M 8			4		0.002	0.008
							TOTAL WEIGHT	7.433



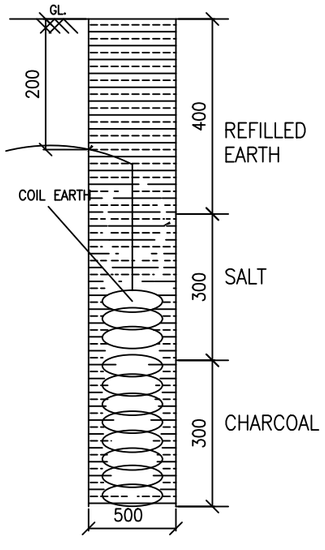
③ FISH PLATE(50x6)



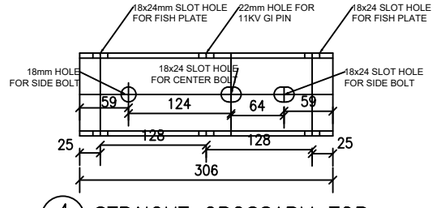
⑤ DANGER BOARD (250X220X3)X2NO.



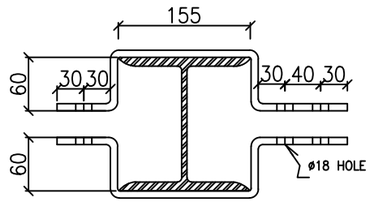
⑥ BACK CLAMP FOR DANGER BOARD(25X3)



COIL EARTH PIT



④ STRAIGHT CROSSARM TOP (100x50x6)



Stay
⑦ Clamp(50X8)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

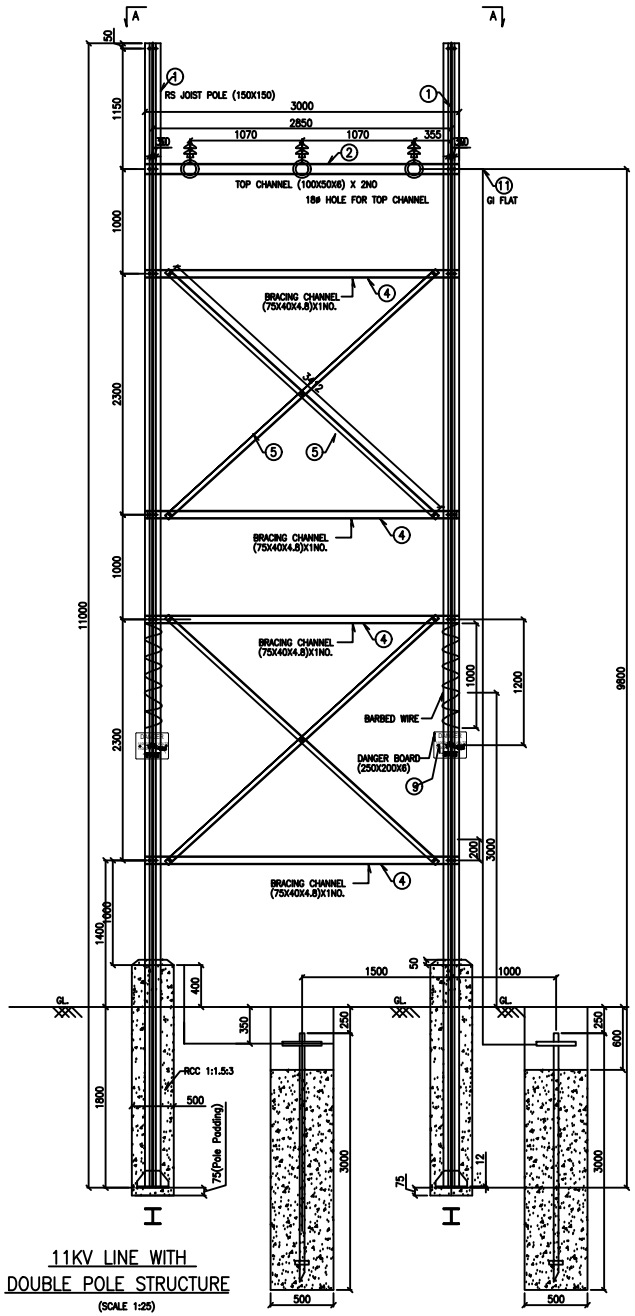
TITLE:-

11KV LINE SINGLE POLE CUT POINT 90 DEGREE(with 11mtr. 150x150 RSJ or WPB 160)

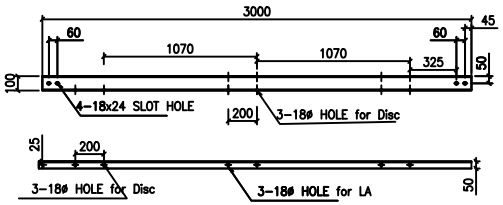
	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0005 REV NO:

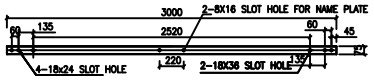
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



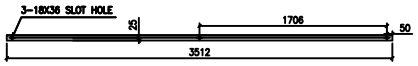
11KV LINE WITH DOUBLE POLE STRUCTURE
(SCALE 1:25)



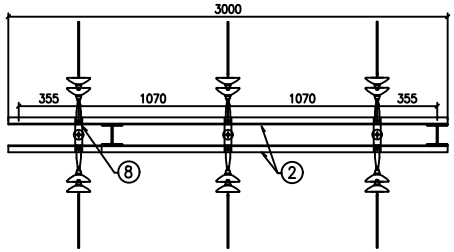
② DP TOP CHANNEL (100X50X6)



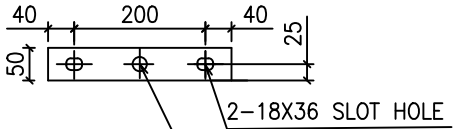
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)



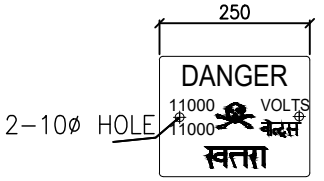
PLAN AT A-A



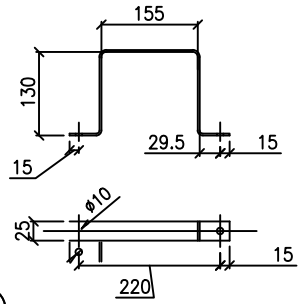
⑧ TOP CHANNEL CONNECTING FISH PLATE (50x6)

BOM OF GI ITEMS OF 11KV INTERPOSING LINE DP FOR EXISTING 9 MTR 11KV LINE

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	13000	1	1.90	5.32	24.70
12	PIPE EARTH		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1001.43
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	852.55
A	BOLT & NUTS	M16		50	40		0.134	5.36
B	BOLT & NUTS	M16		140	6		0.256	1.536
C	BOLT & NUTS	M16		200	0		0.331	0
D	BOLT & NUTS	M8		50	4		0.026	0.104
E	FLAT WASHER	M16			84		0.014	1.176
F	SPRING WASHER	M16			84		0.009	0.756
G	FLAT WASHER	M8			12		0.005	0.06
H	SPRING WASHER	M8			12		0.002	0.024
							TOTAL WEIGHT	9.016



⑨ DANGER BOARD (250X220X3)X2NO.



⑩ BACK CLAMP FOR DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER CENTRAL ODISHA DISTRIBUTION LTD.

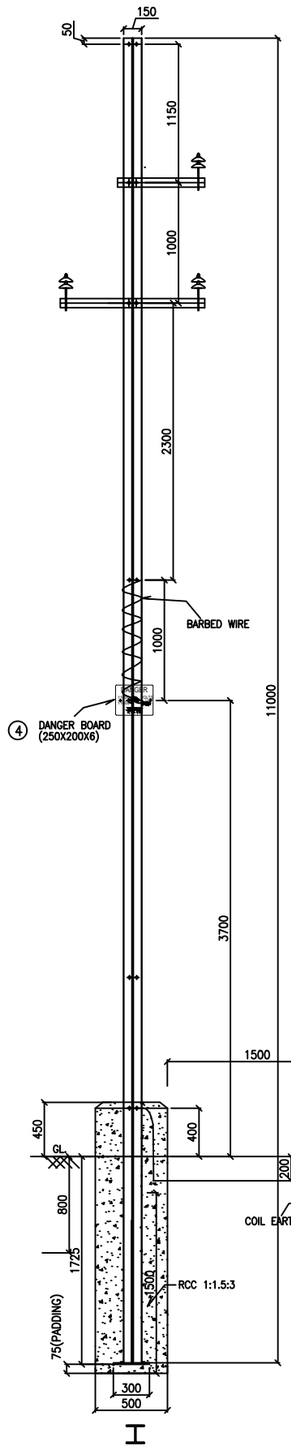
TITLE:-

11KV INTERPOSING LINE DP FOR EXISTING 9MTR 11KV LINE

	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

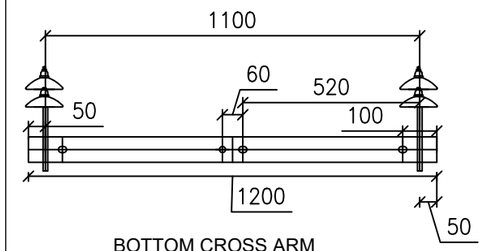
SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0007 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)

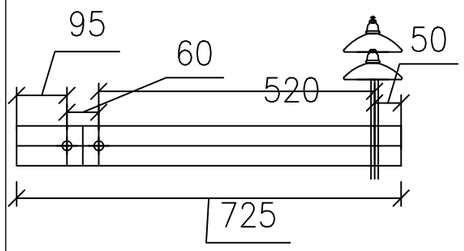


11KV SINGLE POLE CANTELEVER ARRANGEMENT FOR EXST. 9 MTR CKT LINE

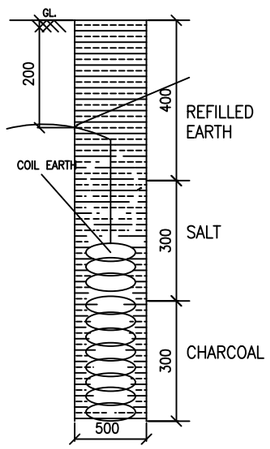
(SCALE 1:25)



BOTTOM CROSS ARM
75x40x4.8mm CHANNEL



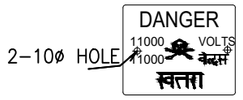
TOP CROSS ARM
75x40x4.8mm CHANNEL



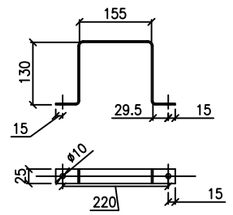
COIL EARTH PIT

BOM OF GI ITEMS FOR LINE POLE ON EXISTING 9MTR 11KV LINE

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	BOTTOM CROSSARM	75X40X4.8 MM	CHANNEL	1200	1	7.14	8.568	8.568
3	TOP CROSS ARM	75X40X4.8 MM	CHANNEL	725	1	7.14	5.177	5.177
4	DANGER BOARD	250X200X6 MM	PLATE	250	1	9.42	2.355	2.355
5	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	1	0.59	0.300	0.300
							TOTAL WEIGHT FOR RSJ STRUCTURE	397.00
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	351.24
A	BOLT & NUTS	M16		50	5		0.134	0.67
B	BOLT & NUTS	M16		120	0		0.229	0
C	BOLT & NUTS	M8		50	2		0.02	0.04
D	FLAT WASHER	M16			10		0.014	0.14
E	SPRING WASHER	M16			10		0.009	0.09
F	FLAT WASHER	M 8			4		0.005	0.02
G	SPRING WASHER	M 8			4		0.002	0.008
							TOTAL WEIGHT	0.968



4 DANGER BOARD (250X220X3)X2NO.



5 BACK CLAMP FOR DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER CENTRAL ODISHA DISTRIBUTION LTD.

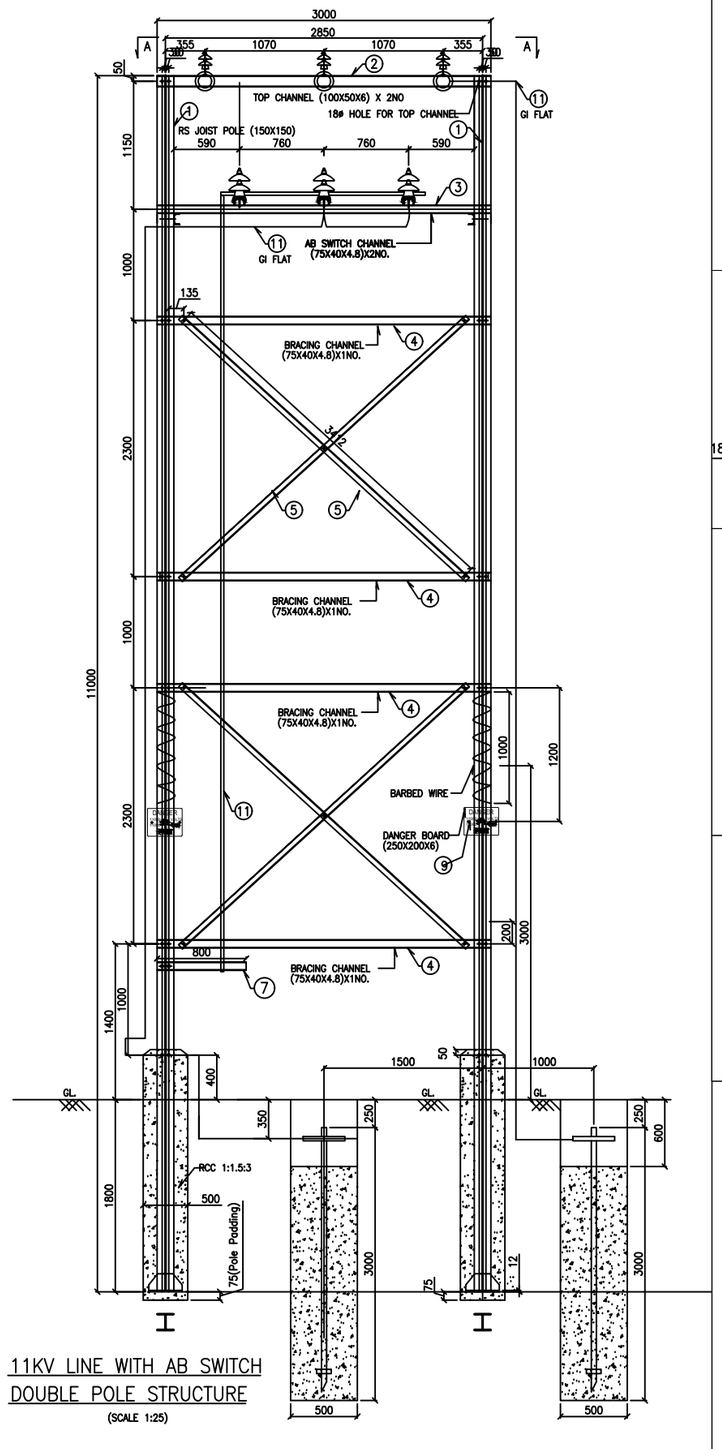
TITLE:-

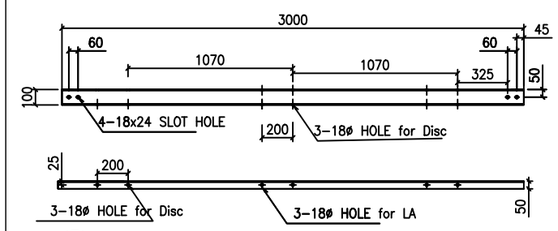
11KV INTERPOSING POLE HAVING CANTELEVER ARRANGEMENT FOR 9MTR EXISTING 11KV LINE

	NAME
DESIGN:	PHIROJ UTTARAY,E&Q
DRAWN:	J SANGRAM, E&Q
CHECKED:	K BHARDWAJ, E&Q
APPROVED:	P GARG, E&Q

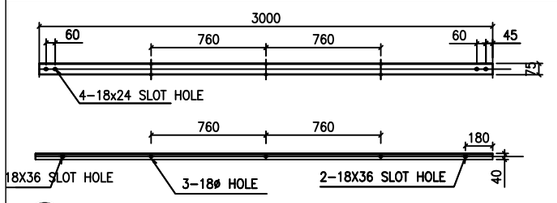
SCALE : NTS | ISSUE DT: 31/05/2021 | DRAWING NO:TPCODL-MVD-0006 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)

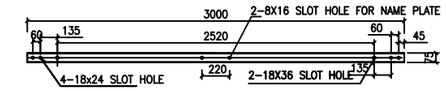




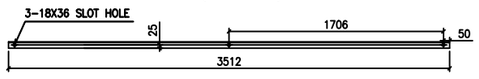
② DP TOP CHANNEL (100X50X6)



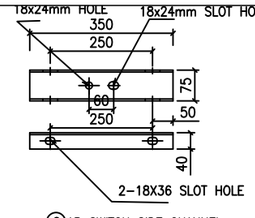
③ AB SWITCH MOUNTING CHANNEL
(75x40x4.8 MM)



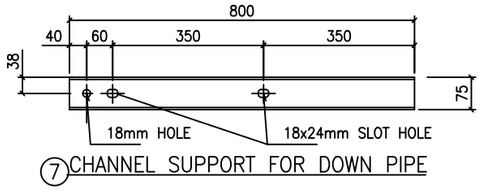
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)



⑥ AB SWITCH SIDE CHANNEL
(75x40x4.8 MM)

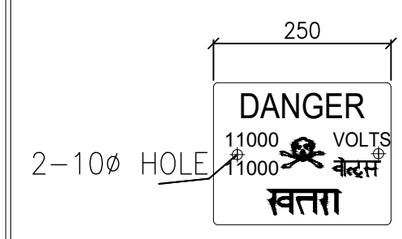


⑦ CHANNEL SUPPORT FOR DOWN PIPE

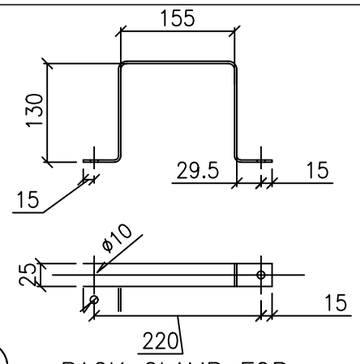
(75x40x4.8 MM)

BOM OF GI ITEMS OF 11KV LINE DP WITH AB SWITCH

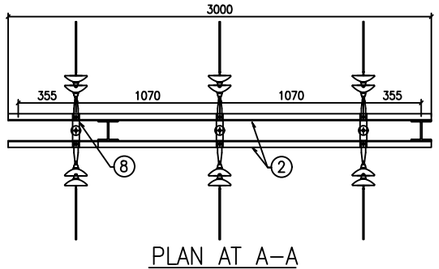
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
3	AB SWITCH CHANNEL	75X40X4.8 MM	CHANNEL	3000	2	7.14	21.42	42.84
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
6	AB SWITCH SIDE CHANNEL	100X50X6 MM	CHANNEL	350	2	9.56	3.35	6.692
7	CHANNEL SUPPORT FOR DOWN PIPE	75X40X4.8 MM	CHANNEL	800	1	7.14	5.71	5.712
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	2800	1	1.90	5.32	5.32
12	PIPE EARTHING		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1037.30
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	888.42
A	BOLT & NUTS	M16		50	48		0.134	6.432
B	BOLT & NUTS	M16		120	8		0.229	1.832
C	BOLT & NUTS	M16		140	9		0.256	2.304
D	BOLT & NUTS	M17		200	0		0.331	0
E	BOLT & NUTS	M8		50	4		0.026	0.104
F	FLAT WASHER	M16			130		0.014	1.82
G	SPRING WASHER	M16			130		0.009	1.17
H	FLAT WASHER	M8			8		0.005	0.04
I	SPRING WASHER	M8			8		0.002	0.016
							TOTAL WEIGHT	13.718



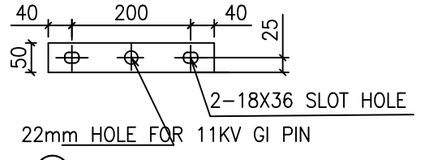
DANGER BOARD
⑨ (250X220X3)X2NO.



⑩ BACK CLAMP FOR DANGER BOARD(25X3)



PLAN AT A–A



⑧ TOP CHANNEL CONNECTING FISH PLATE (50x6)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

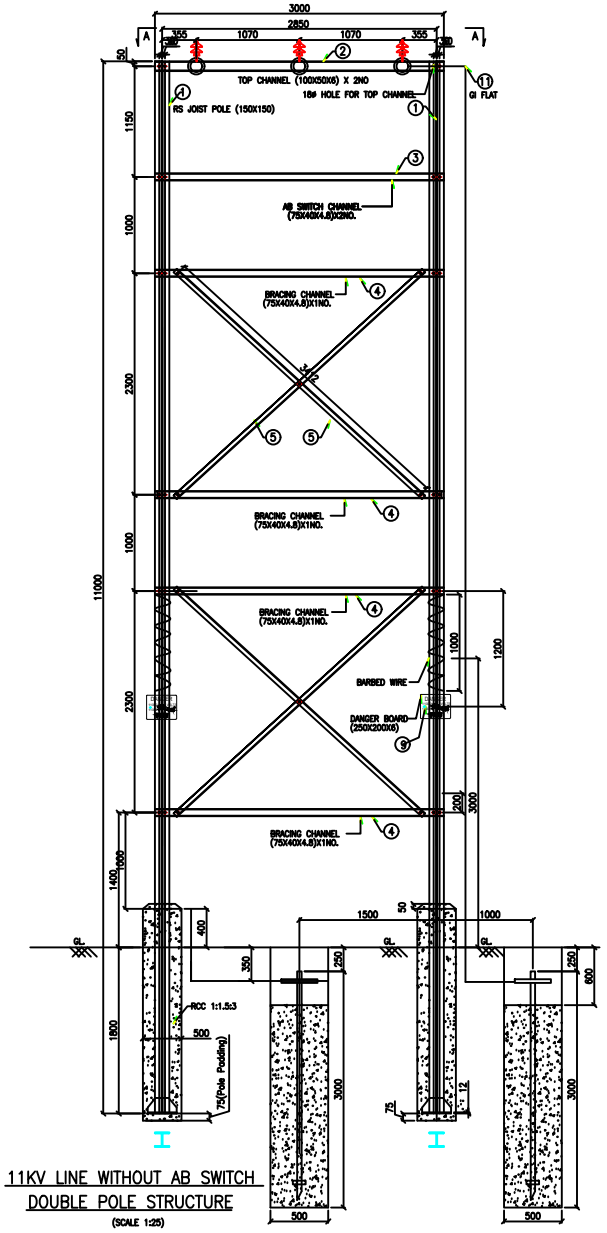
TITLE:-

11KV LINE DP WITH AB SWITCH
(with 11mtr. 150x150 RSJ or WPB 160)

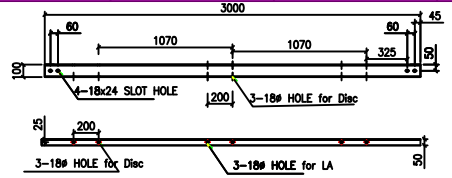
	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO: TPCODL-MVD-0001 REV NO:

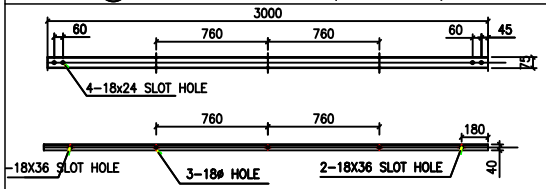
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



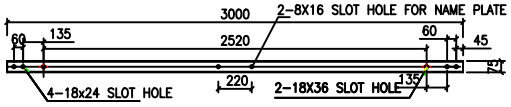
11KV LINE WITHOUT AB SWITCH
DOUBLE POLE STRUCTURE
(SCALE 1:25)



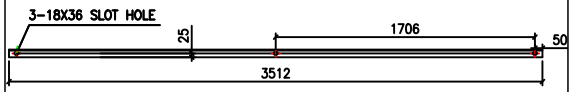
② DP TOP CHANNEL (100X50X6)



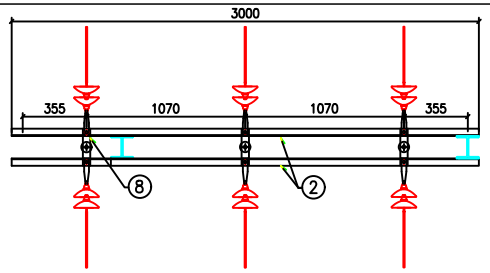
③ AB SWITCH MOUNTING CHANNEL
(75x40x4.8 MM)



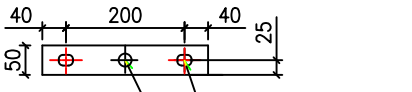
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)



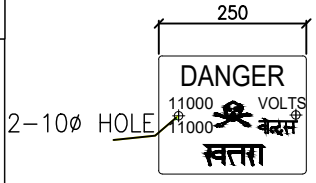
PLAN AT A-A



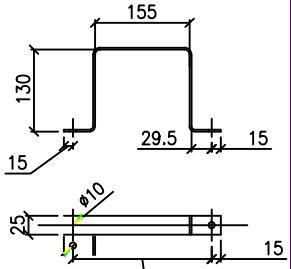
⑧ TOP CHANNEL CONNECTING
FISH PLATE (50x6)

BOM OF GI ITEMS OF 11KV LINE DP WITHOUT AB SWITCH

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
3	AB SWITCH CHANNEL	75X40X4.8 MM	CHANNEL	3000	2	7.14	21.42	42.84
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	1400	1	1.90	5.32	2.66
12	PIPE EARTHING		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1022.23
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	873.35
A	BOLT & NUTS	M16		50	48		0.134	6.432
B	BOLT & NUTS	M16		140	12		0.256	3.072
C	BOLT & NUTS	M16		200	0		0.331	0
C	BOLT & NUTS	M8		50	4		0.026	0.104
D	FLAT WASHER	M16			120		0.014	1.68
E	SPRING WASHER	M16			120		0.009	1.08
F	FLAT WASHER	M8			8		0.005	0.04
G	SPRING WASHER	M8			8		0.002	0.016
							TOTAL WEIGHT	12.424



⑨ DANGER BOARD
(250X220X3)X2NO.



⑩ BACK CLAMP FOR
DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

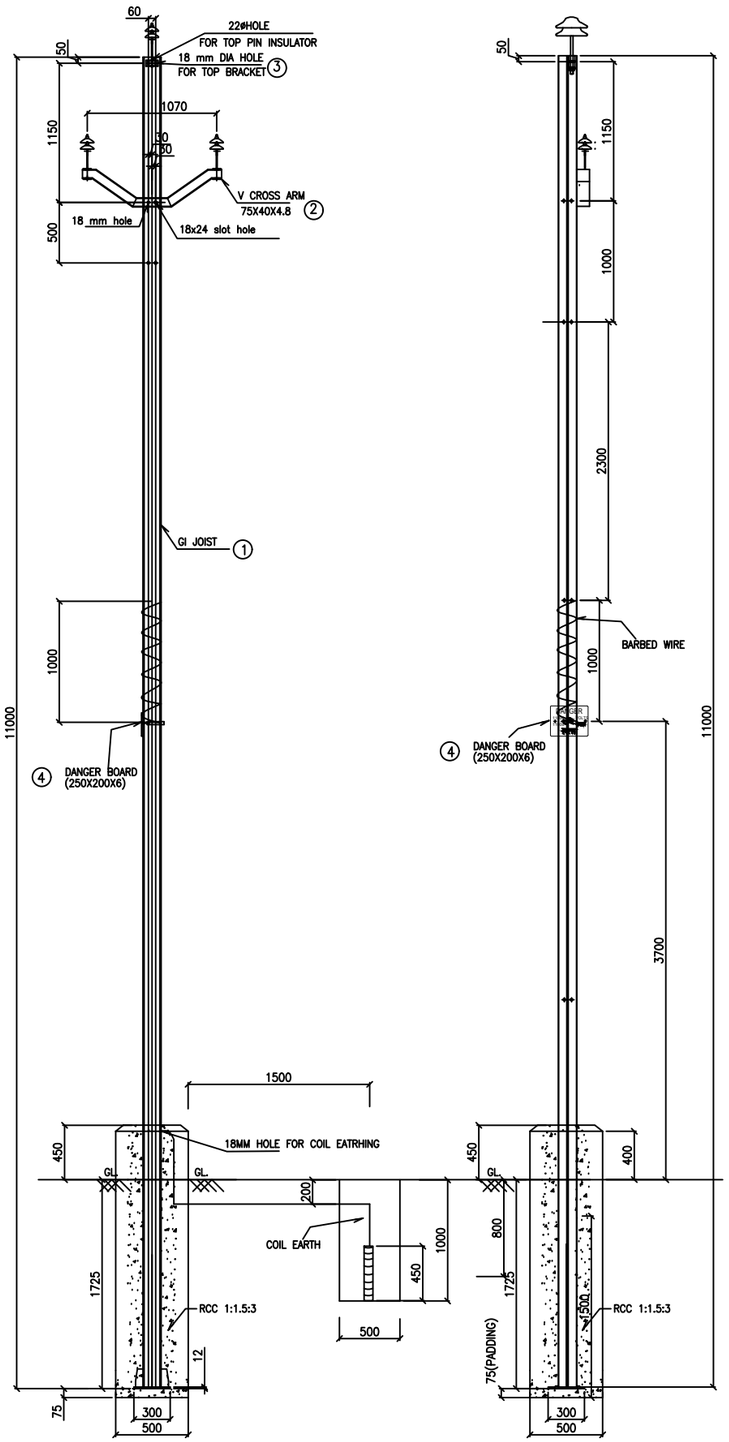
TITLE:-

11KV LINE DP WITHOUT AB SWITCH
(with 11mtr. 150x150 RSJ or WPB 160)

	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0002 REV NO:

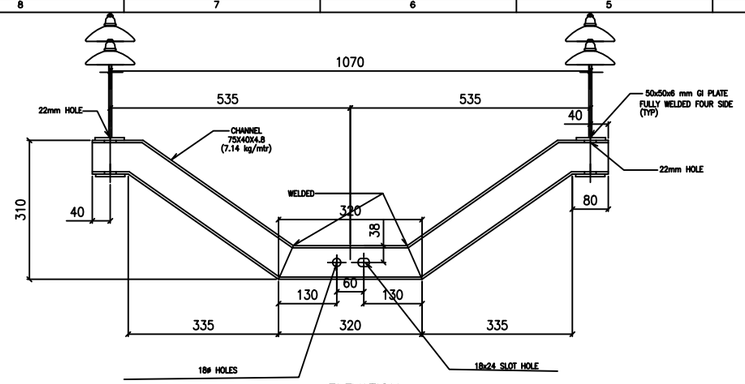
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



H I

11KV LINE SINGLE POLE STRUCTURE WITH V CROSSARM

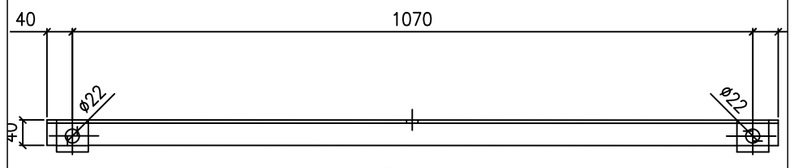
(SCALE 1:25)



ELEVATION

(SCALE 1:5)

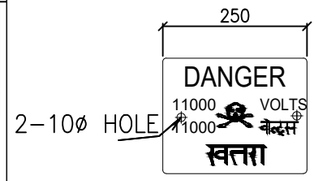
(SCALE 1:5)



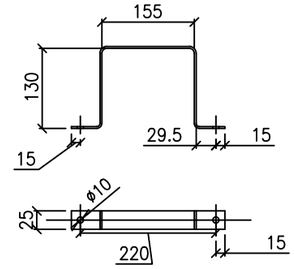
PLAN

11KV V-CROSS ARM(75x40x4.8)

(SCALE 1:5)

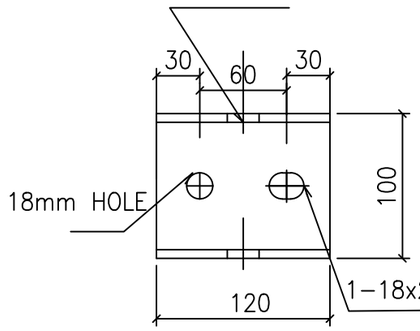


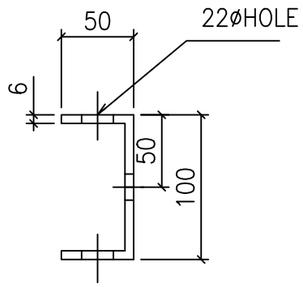
4 DANGER BOARD (250X220X3)X2NO.



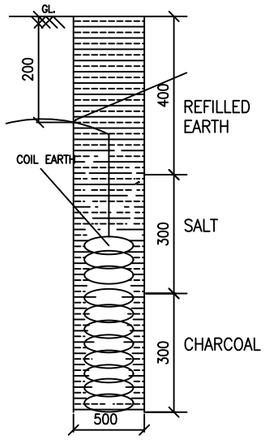
5 BACK CLAMP FOR DANGER BOARD(25X3)

2- 22mm HOLE FOR 11KV GI PIN

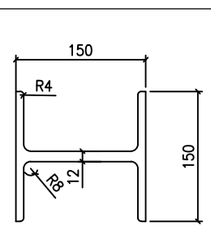




3 POLE TOP BRACKET(100x50x6)

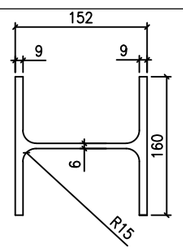


COIL EARTH PIT



RSJ 150X150

(SCALE 1:5)



WPB 160

(SCALE 1:5)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

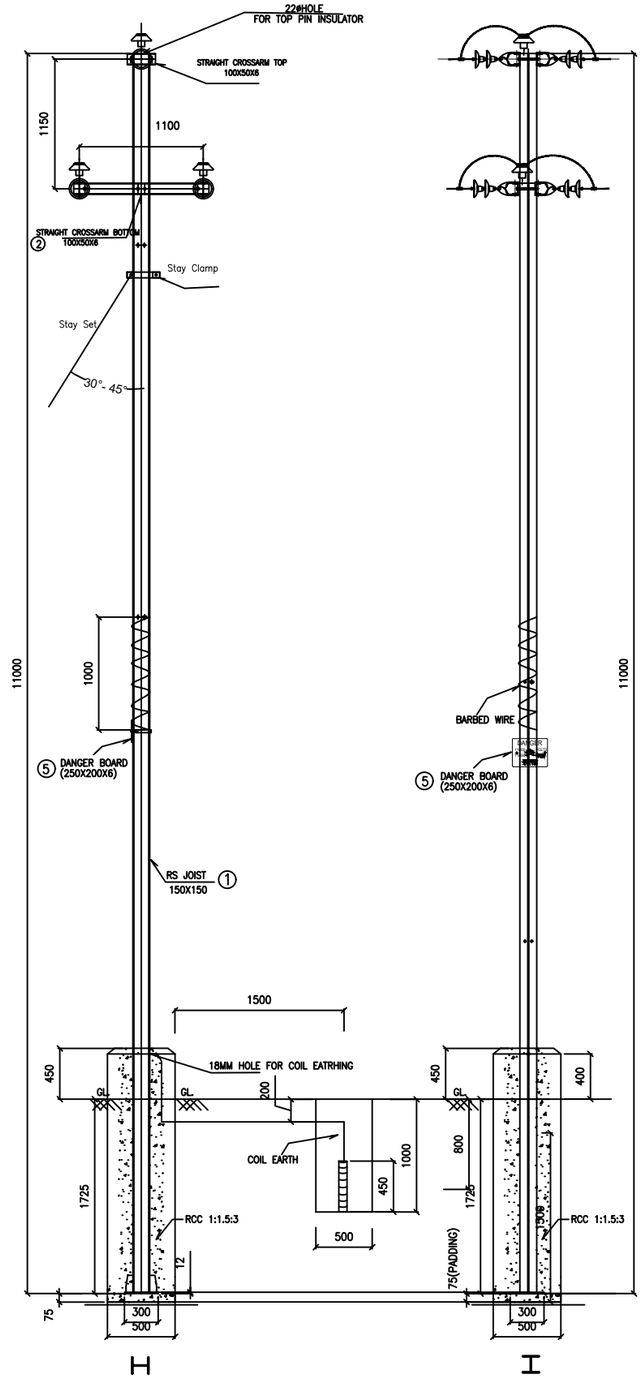
TITLE:-

11KV LINE SINGLE POLE WITH V CROSS ARM (with 11mtr. 150x150 RSJ or WPB 160)

	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

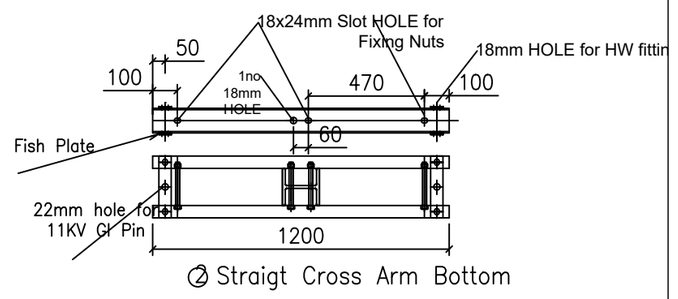
SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0003 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



11KV LINE WITH CUTPOINT 180 DEGREE SINGLE POLE STRUCTURE

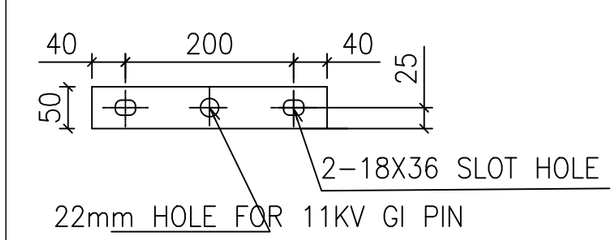
(SCALE 1:25)



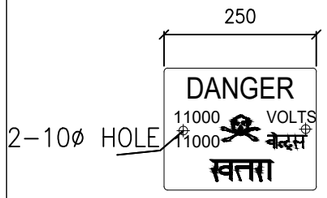
② Straigt Cross Arm Bottom

BOM OF GI ITEMS OF 11KV LINE CUT POINT 180 DEGREE

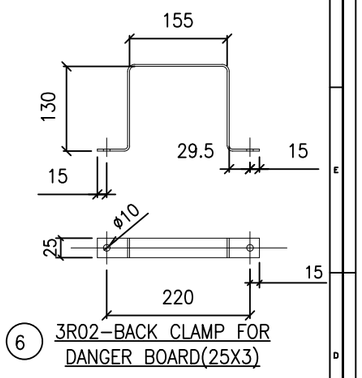
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	STRAIGHT CROSSARM BOTTOM	100X50X6 MM	CHANNEL	1200	2	9.56	11.472	22.944
3	FISH PLATE	50X6 MM	FLAT	280	8	2.36	0.661	5.286
4	STRAIGHT CROSSARM TOP	100X50X6 MM	CHANNEL	306	2	9.56	2.925	5.851
5	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.355	4.710
6	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.300	0.601
7	STAY CLAMP	50x8M	FLAT	551	2	3.14	1.730	3.460
						TOTAL WEIGHT FOR RSJ STRUCTURE		423.45
						TOTAL WEIGHT FOR WPB 160 STRUCTURE		377.69
A	BOLT & NUTS	M16		50	1		0.134	0.134
B	BOLT & NUTS	M16		90	3		0.187	0.561
C	BOLT & NUTS	M16		200	7		0.331	2.317
D	BOLT & NUTS	M8		50	2		0.002	0.004
E	FLAT WASHER	M16			22		0.014	0.308
F	SPRING WASHER	M16			22		0.009	0.198
G	FLAT WASHER	M8			4		0.005	0.02
H	SPRING WASHER	M8			4		0.002	0.008
							TOTAL WEIGHT	3.55



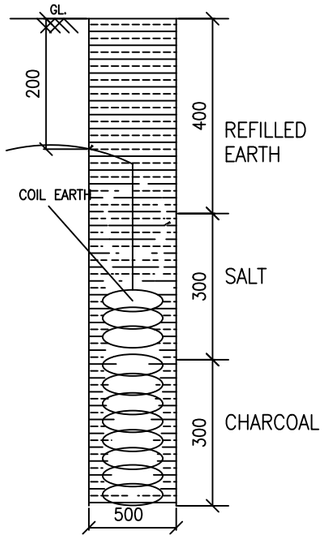
③ FISH PLATE(50x6)



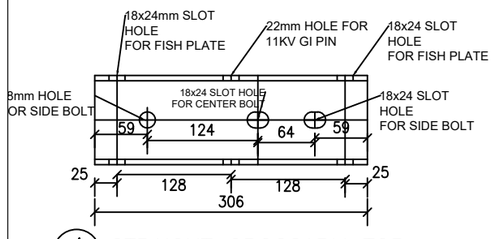
⑤ DANGER BOARD (250X220X3)X2NO.



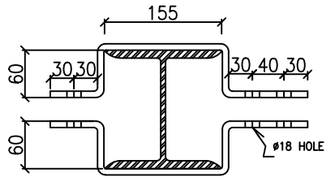
⑥ 3R02-BACK CLAMP FOR DANGER BOARD(25X3)



COIL EARTH PIT



④ STRAIGHT CROSSARM TOP (100x50x6)



Stay Clamp(50X8)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER CENTRAL ODISHA DISTRIBUTION LTD.

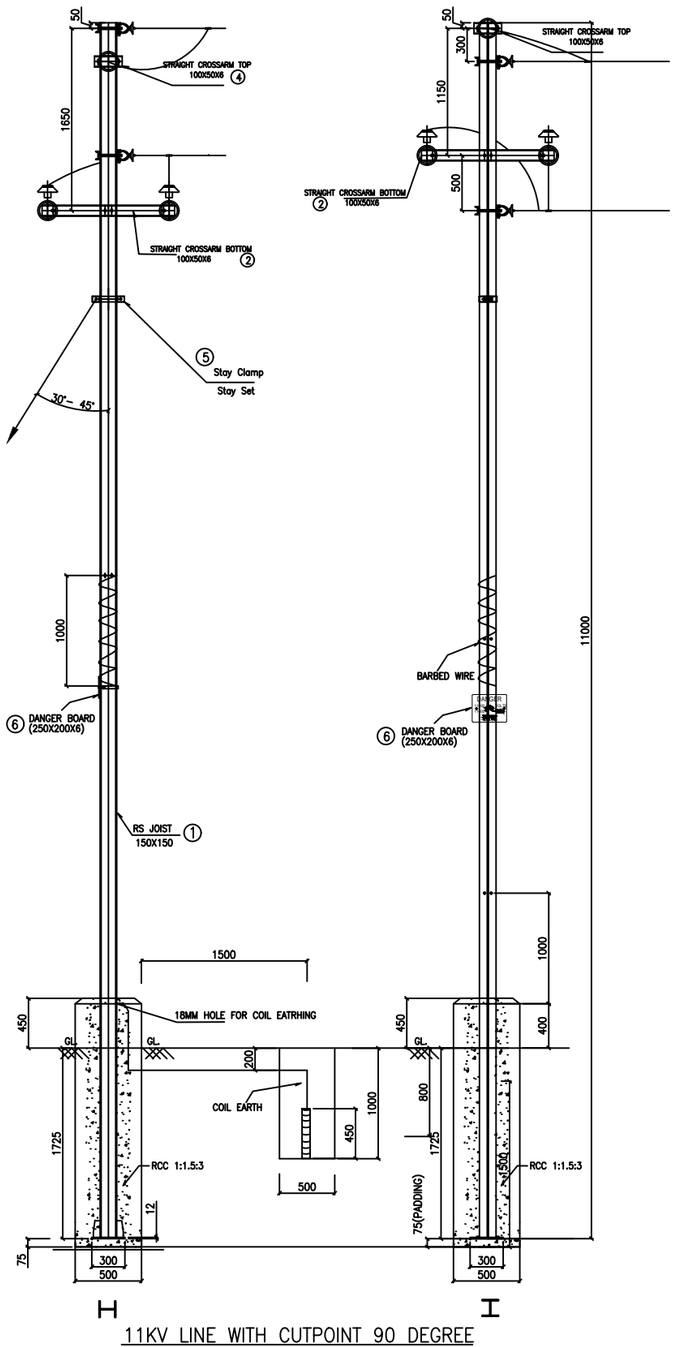
TITLE:-

11KV LINE SINGLE POLE CUT POINT 180 DEGREE(with 11mtr. 150x150 RSJ or WPB 160)

	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

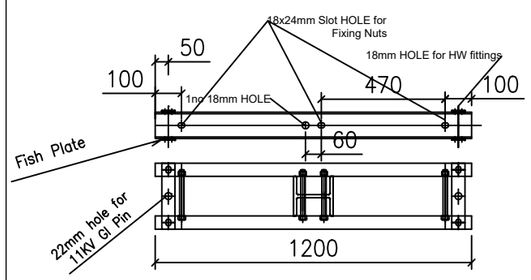
SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0004 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



11KV LINE WITH CUTPOINT 90 DEGREE SINGLE POLE STRUCTURE

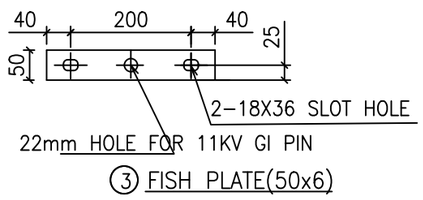
(SCALE 1:25)



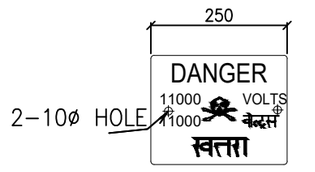
② Straigt Cross Arm Bottom

BOM OF GI ITEMS OF 11KV LINE CUT POINT 90 DEGREE

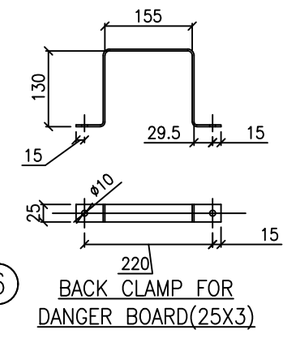
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	STRAIGHT CROSSARM BOTTOM	100X50X6 MM	CHANNEL	1200	4	9.56	11.472	45.888
3	FISH PLATE	50X6 MM	FLAT	280	8	2.36	0.661	5.286
4	STRAIGHT CROSSARM TOP	100X50X6 MM	CHANNEL	306	4	9.56	2.925	11.701
5	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.355	4.710
6	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.300	0.601
7	STAY CLAMP	50x8M	FLAT	551	2	3.14	1.730	3.460
							TOTAL WEIGHT FOR RSJ STRUCTURE	452.25
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	406.49
A	BOLT & NUTS	M16		50	1		0.134	0.134
B	BOLT & NUTS	M16		90	3		0.187	0.561
B	BOLT & NUTS	M16		140	4		0.256	1.024
C	BOLT & NUTS	M16		200	14		0.331	4.634
D	BOLT & NUTS	M8		50	2		0.02	0.04
E	FLAT WASHER	M16			44		0.014	0.616
F	SPRING WASHER	M16			44		0.009	0.396
G	FLAT WASHER	M 8			4		0.005	0.02
H	SPRING WASHER	M 8			4		0.002	0.008
							TOTAL WEIGHT	7.433



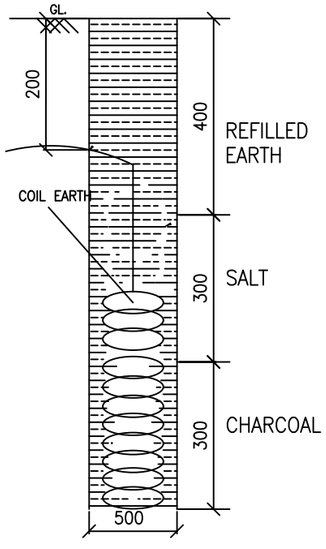
③ FISH PLATE(50x6)



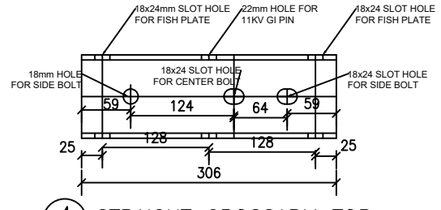
⑤ DANGER BOARD (250X220X3)X2NO.



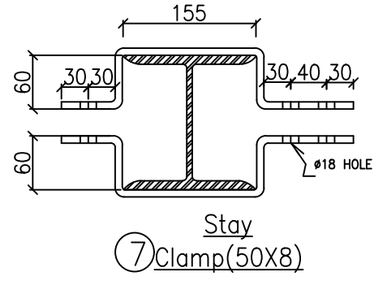
⑥ BACK CLAMP FOR DANGER BOARD(25X3)



COIL EARTH PIT



④ STRAIGHT CROSSARM TOP (100x50x6)



Stay ⑦ Clamp(50X8)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER CENTRAL ODISHA DISTRIBUTION LTD.

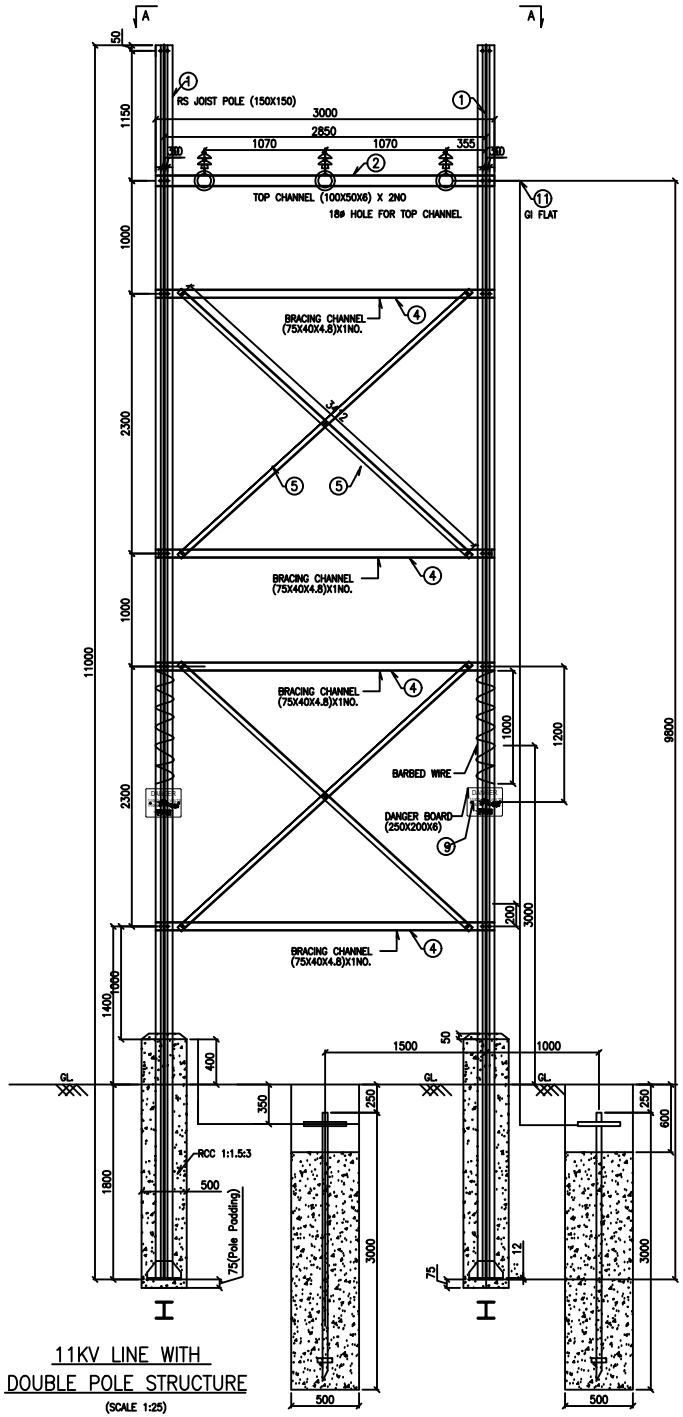
TITLE:-

11KV LINE SINGLE POLE CUT POINT 90 DEGREE(with 11mtr. 150x150 RSJ or WPB 160)

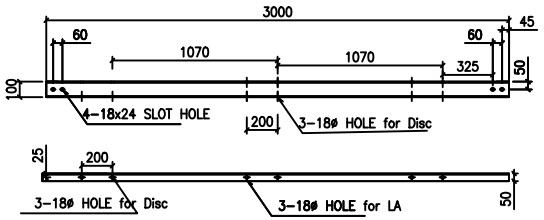
	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0005 REV NO:

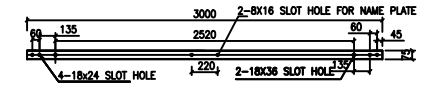
1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)



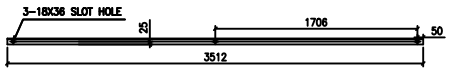
11KV LINE WITH DOUBLE POLE STRUCTURE
(SCALE 1:25)



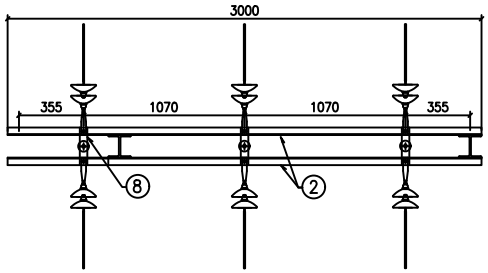
② DP TOP CHANNEL (100X50X6)



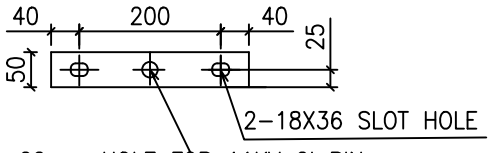
④ BRACING CHANNEL
(75x40x4.8 MM)



⑤ BRACING ANGLE (50X50X6)

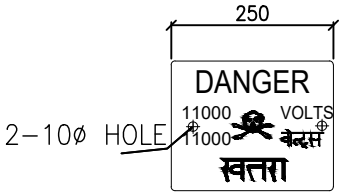


PLAN AT A-A

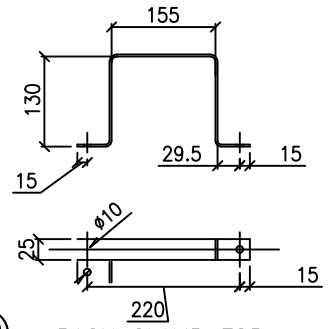


⑧ TOP CHANNEL CONNECTING FISH PLATE (50x6)

BOM OF GI ITEMS OF 11KV INTERPOSING LINE DP FOR EXISTING 9 MTR 11KV LINE								
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3000	2	9.56	28.68	57.36
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3000	4	7.14	21.42	85.68
5	BRACING ANGLE	50X50X6 MM	ANGLE	3512	4	4.50	15.80	63.216
8	FISH PLATE	50X6 MM	PLATE	280	6	2.36	0.66	3.96
9	DANGER BOARD	250X200X6 MM	PLATE	250	2	9.42	2.36	4.71
10	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	2	0.59	0.30	0.60
11	GI Flat	40x6 MM	FLAT	13000	1	1.90	5.32	24.70
12	PIPE EARTH		PIPE	3000	2			
							TOTAL WEIGHT FOR RSJ STRUCTURE	1001.43
							TOTAL WEIGHT FOR WPB 160 STRUCTURE	852.55
A	BOLT & NUTS	M16		50	40		0.134	5.36
B	BOLT & NUTS	M16		140	6		0.256	1.536
C	BOLT & NUTS	M16		200	0		0.331	0
D	BOLT & NUTS	M8		50	4		0.026	0.104
E	FLAT WASHER	M16			84		0.014	1.176
F	SPRING WASHER	M16			84		0.009	0.756
G	FLAT WASHER	M8			12		0.005	0.06
H	SPRING WASHER	M8			12		0.002	0.024
							TOTAL WEIGHT	9.016



⑨ DANGER BOARD (250X220X3)X2NO.



⑩ BACK CLAMP FOR DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER CENTRAL ODISHA DISTRIBUTION LTD.

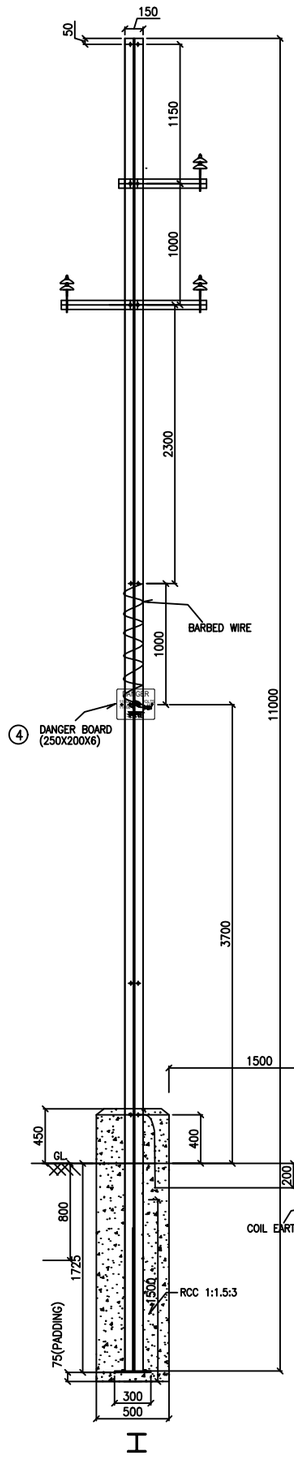
TITLE:-

11KV INTERPOSING LINE DP FOR EXISTING 9MTR 11KV LINE

	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

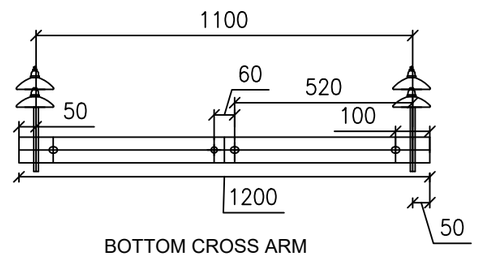
SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0007 REV NO:

1. All Dimensions are in MM & Weights in KG unless Specified 2. All items are GI (as per TS)

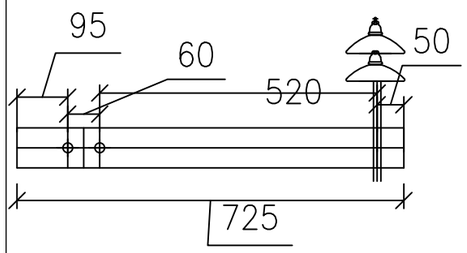


11KV SINGLE POLE CANTELEVER ARRANGEMENT FOR EXST. 9 MTR CKT LINE

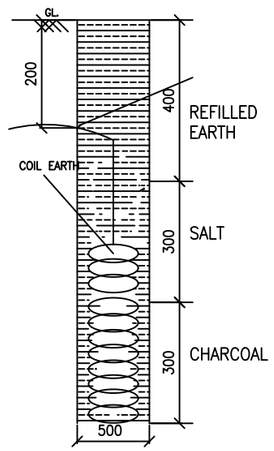
(SCALE 1:25)



BOTTOM CROSS ARM
75x40x4.8mm CHANNEL



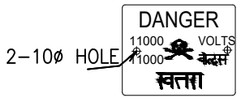
TOP CROSS ARM
75x40x4.8mm CHANNEL



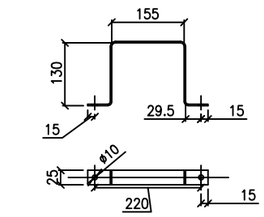
COIL EARTH PIT

BOM OF GI ITEMS FOR LINE POLE ON EXISTING 9MTR 11KV LINE

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM(Kg)	TOTAL WT./ARGMT(Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	1	34.6/30.44	380.6/334.84	380.6/334.84
2	BOTTOM CROSSARM	75X40X4.8 MM	CHANNEL	1200	1	7.14	8.568	8.568
3	TOP CROSS ARM	75X40X4.8 MM	CHANNEL	725	1	7.14	5.177	5.177
4	DANGER BOARD	250X200X6 MM	PLATE	250	1	9.42	2.355	2.355
5	BACK CLAMP FOR DANGER BOARD	25x3 MM	FLAT	510	1	0.59	0.300	0.300
						TOTAL WEIGHT FOR RSJ STRUCTURE		397.00
						TOTAL WEIGHT FOR WPB 160 STRUCTURE		351.24
A	BOLT & NUTS	M16		50	5		0.134	0.67
B	BOLT & NUTS	M16		120	0		0.229	0
C	BOLT & NUTS	M8		50	2		0.02	0.04
D	FLAT WASHER	M16			10		0.014	0.14
E	SPRING WASHER	M16			10		0.009	0.09
F	FLAT WASHER	M 8			4		0.005	0.02
G	SPRING WASHER	M 8			4		0.002	0.008
						TOTAL WEIGHT		0.968



4 DANGER BOARD (250X220X3)X2NO.



5 BACK CLAMP FOR DANGER BOARD(25X3)

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

TATA POWER
CENTRAL ODISHA DISTRIBUTION LTD.

TITLE:-

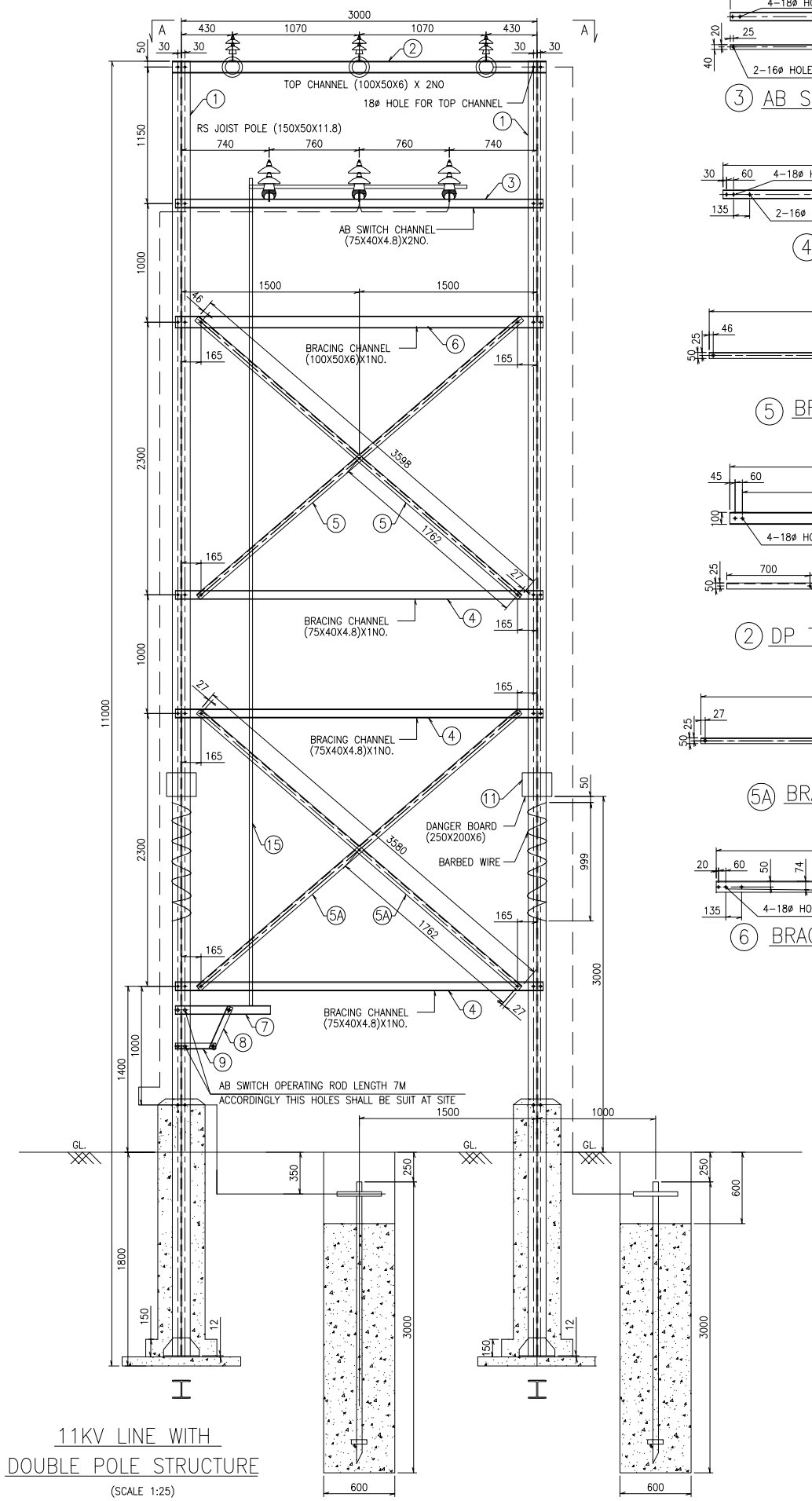
11KV INTERPOSING POLE HAVING CANTELEVER ARRANGEMENT FOR 9MTR EXISTING 11KV LINE

	NAME
DRAWN BY:	J SANGRAM, E&Q
CHECKED BY:	PHIROJ UTTARAY, E&Q K.C.BHARDWAJ, E&Q
APPROVED BY:	P GARG, E&Q
ISSUED BY:	PARVEEN VERMA,COS

SCALE : NTS | ISSUE DT: 05/07/2021 | DRAWING NO:TPCODL-MVD-0006 REV NO:

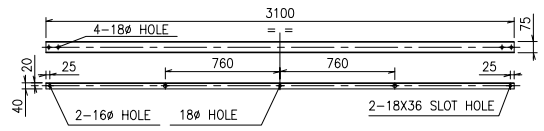
TITLE: 11KV LINE WITH RSJ 150X150/WPB 160 DOUBLE POLE STRUCTURE

DWG NO TCE.—



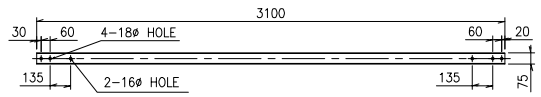
11KV LINE WITH DOUBLE POLE STRUCTURE

(SCALE 1:25)



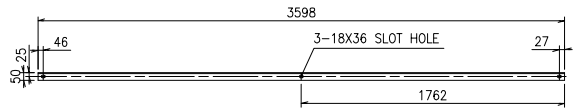
③ AB SWITCH MOUNTING CHANNEL

(75x40x4.8 MM)
(SCALE 1:25)



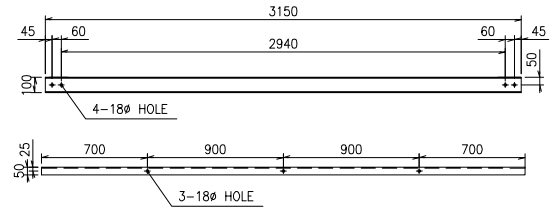
④ BRACING CHANNEL

(75x40x4.8 MM)
(SCALE 1:25)



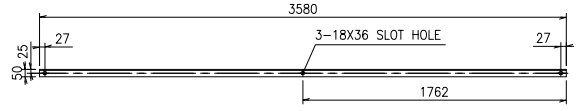
⑤ BRACING ANGLE (50X50X6)

(SCALE 1:25)



② DP TOP CHANNEL (100X50X6)

(SCALE 1:25)

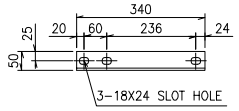


⑤A BRACING ANGLE (50X50X6)

(SCALE 1:25)

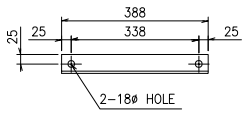
⑥ BRACING CHANNEL (100X50X6)

(SCALE 1:25)



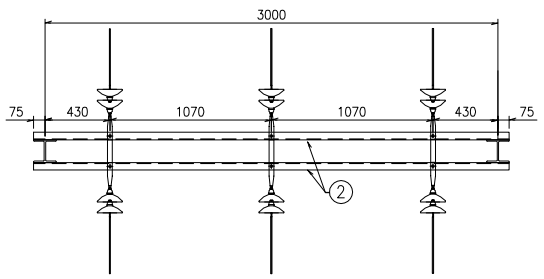
⑨ BASE ANGLE FOR DOWN PIPE

(SCALE 1:10)



⑧ DIAGONAL ANGLE FOR DOWN PIPE

(SCALE 1:10)

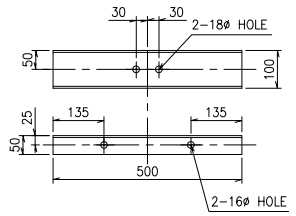


PLAN AT A–A

(SCALE 1:25)

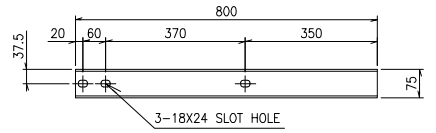
WEIGHT OF PARTS

ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT (Kg/m)	WT/ITEM (Kg)	TOTAL WT./ ARGMT (Kg)
1	RSJ POLE / WPB 160	150X150 MM	JOIST	11000	2	34.6/30.44	380.6/334.84	761.2/669.68
2	DP TOP CHANNEL	100X50X6 MM	CHANNEL	3150	2	9.56	30.11	60.23
3	AB SWITCH CHANNEL	75X40X4.8 MM	CHANNEL	3100	2	7.14	22.14	44.27
4	BRACING CHANNEL	75X40X4.8 MM	CHANNEL	3100	3	7.14	22.13	66.40
5	BRACING ANGLE	50X50X6 MM	ANGLE	3598	2	4.50	16.19	32.38
5A	BRACING ANGLE	50X50X6 MM	ANGLE	3580	2	4.50	16.11	32.22
6	BRACING CHANNEL	100X50X6 MM	CHANNEL	3100	1	9.56	29.64	29.64
7	CHANNEL SUPPORT FOR DOWN PIPE	75X40X4.8 MM	CHANNEL	800	1	7.14	5.712	5.712
8	DIAGONAL ANGLE FOR DOWN PIPE	50X50X6 MM	ANGLE	388	1	4.5	1.75	1.75
9	BASE ANGLE FOR DOWN PIPE	50X50X6 MM	ANGLE	340	1	4.5	1.53	1.53
10	AB SWITCH SIDE CHANNEL	100X50X6 MM	CHANNEL	500	2	9.56	4.78	9.56
11	DANGER BOARD	250X200X6 MM	PLATE		2	47.10	2.36	4.71
12	BASE PLATE	300X300X12 MM	PLATE		2	94.20	8.48	16.96
13	BASE STIFFNER PLATE	150X100X6MM	PLATE		4	47.10	0.83	2.83
14	BASE STIFFNER PLATE	150X60X6MM	PLATE		4	47.10	0.63	1.70
15	AB SWITCH OPERATING ROD	25 DIA	ROD	7000	1	3.85	26.95	26.95
						TOTAL WEIGHT FOR RSJ STRUCTURE		1098.04
						TOTAL WEIGHT FOR WPB 160 STRUCTURE		1006.52
A	BOLT & NUTS	M16		40	104		0.121	12.58
B	BOLT & NUTS	M16		120	8		0.246	1.97
C	BOLT & NUTS	M16		190	16		0.360	5.76
D	BOLT & NUTS	M8		50	24		0.029	0.696
E	FLAT WASHER	M16			128		0.014	1.792
F	SPRING WASHER	M16			128		0.009	1.152
G	FLAT WASHER	M8			24		0.005	0.12
H	SPRING WASHER	M8			24		0.002	0.048
							TOTAL WEIGHT	22.15



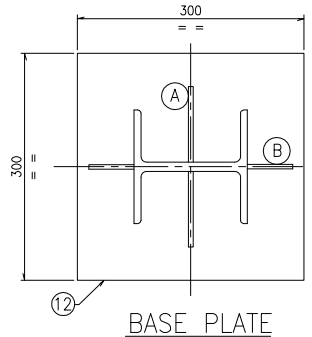
⑩ AB SWITCH SIDE CHANNEL

(100x50x6 MM)
(SCALE 1:10)



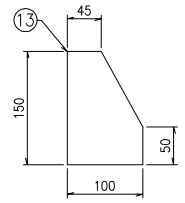
⑦ CHANNEL SUPPORT FOR DOWN PIPE

(SCALE 1:10)



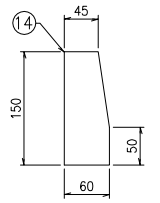
BASE PLATE

(300X300X12MM)
(SCALE 1:5)



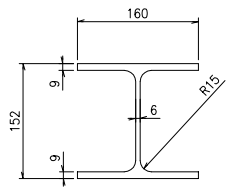
STIFFNER PLATE–A

(150X100X6MM)
(SCALE 1:5)



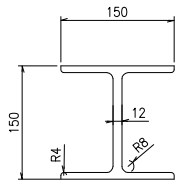
STIFFNER PLATE–B

(150X60X6MM)
(SCALE 1:5)



WPB 160

(SCALE 1:5)



RSJ 150X150

(SCALE 1:5)

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
2. ALL HOLES ARE ø18 MM UNLESS OTHERWISE SPECIFIED.
3. REFERENCE STANDARD– IS 2062, & IS–808

DO NOT SCALE | PRELIMINARY

TPCODL TP CENTRAL ODISHA DISTRIBUTION LIMITED

TP CENTRAL ODISHA DISTRIBUTION LIMITED

11KV LINE WITH RSJ 150X150/WPB 160 DOUBLE POLE STRUCTURE

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

FOR RO ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED				APPD	DATE
	CLEARED					CIVIL	ELEC	I&C	MECH		
DISC.	SIGNATURE	DATE									
CIVIL											
ELEC											
I&C											
MECH											

ISSUE	REVISIONS	DRN	CLEARED				APPD	DATE
			CIVIL	ELEC	I&C	MECH		

FILE NAME :

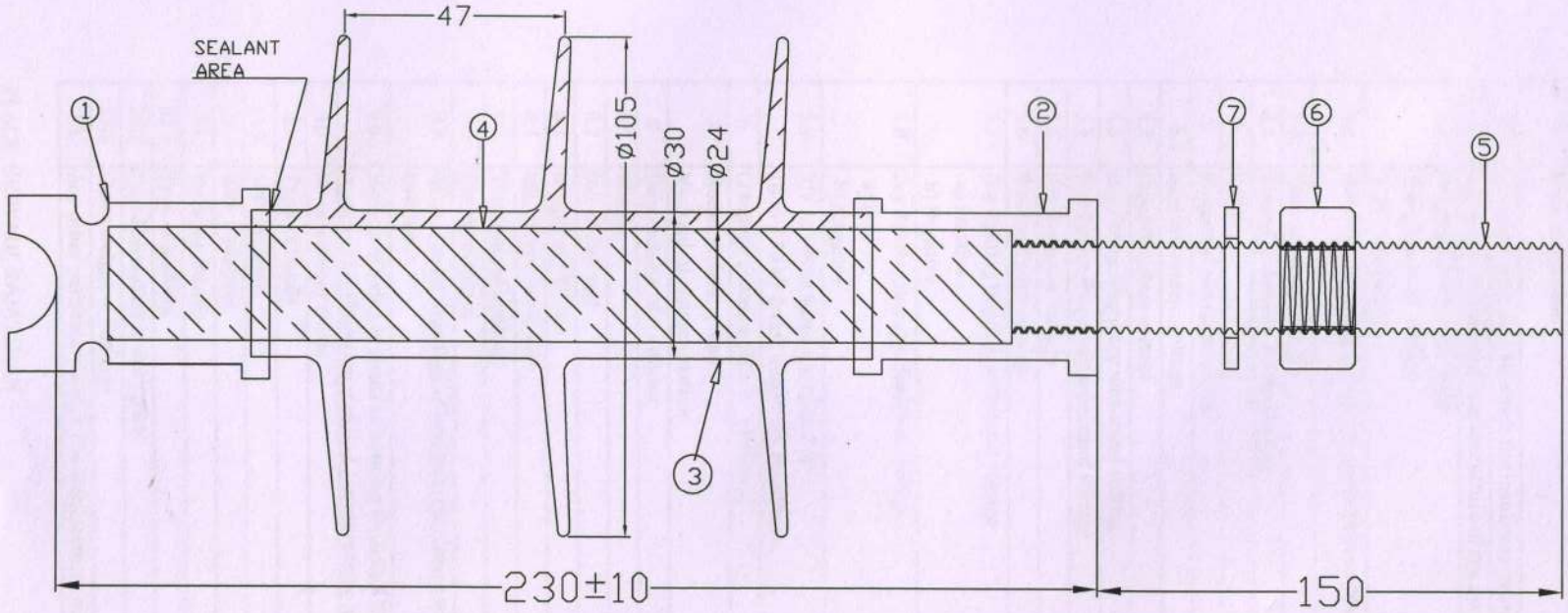
"P" (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK AT THE TOP RIGHT HAND CORNER OF THE TITLE BLOCK.

CONSTRUCTION / FABRICATION WORK IS PERMITTED ON "R" (RELEASED) ISSUES ONLY.

INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTRUCTION/ FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLDS' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION/FABRICATION WORK RELATED TO 'HOLDS'.

SCALE: AS SHOWN	APPROVED	DATE (RO ISSUE)	03/04/2021
		DATE (CURRENT ISSUE)	03/04/2021
DEL:CENTRE–DISC:EL			
DRN: RF			
CHD: SS	DWG NO TCE.————	ISSUE	-

SIZE–A1



ALL DIMENSIONS ARE IN "mm"

ITEM	DESCRIPTION	MATERIAL	QTY	REMARKS
1	UPPER FITTING	SGCI	1	
2	LOWER FITTING	SGCI	1	
3	HOUSING	SILICONE RUBBER	--	
4	CORE	FRP ROD	1	
5	STUD	M.S.	1	
6	NUT M-20	M.S./FORGED	1	
7	WASHER M-20	M.S./FORGED	1	

TECHNICAL CHARACTERISTICS

DIMENSIONS :		
1. CREEPAGE DISTANCE (Minimum)	---	320 mm
2. ARCING DISTANCE	---	165 mm
3. No of ø105mm SHEDS	---	3 SHEDS

MECHANICAL CHARACTERISTICS :		
1. SPECIFIED MECHANICAL LOAD	---	5KN

ELECTRICAL CHARACTERISTICS :		
1. NORMAL SYSTEM VOLTAGE	---	11kV
2. HIGHEST SYSTEM VOLTAGE	---	12kV
3. SYSTEM FREQUENCY	---	50HZ
4. WET 1 MINUTE POWER FREQUENCY WITHSTAND VOLTAGE(MIN)	---	35KV(rms)
5. DRY 1 MINUTE POWER FREQUENCY WITHSTAND VOLTAGE(MIN)	---	50kV(rms)
6. DRY LIGHTNING IMPULSE WITHSTAND VOLTAGE(MIN)	---	75kVp
7. VISIBLE DISCHARGE TEST VOLTAGE	---	9kV(rms)

NOTES :		
1. INSULATORS CONFORMS TO	---	IEC:61109
2. GALVANISATION CONFORMS TO	---	IS:2633
3. DIMENSION TOLERANCE :	---	AS PER IEC 61109/SPECIFICATION

	NAME	SIGNATURE	DATE
Drawn by			
Checked by			
App'd by			
Q.A			

PROJECTION: -

ADINATH INDUSTRIES AD

ADDRESS	E-45 (G-2), RIICO INDUSTRIAL AREA KHUSHKHERA, BHIWADI, ALWAR(Dt), RAJASTHAN	
TITLE	11KV 5KN COMPOSITE POLYMER PIN INSULATOR	A4
DRG NO.	AD-11KV-5KN-PIN-24 Rev.No '0'	DATE:- 09/04/2019
SCALE:1:1		SHEET 1 OF 1

GUARANTEED TECHNICAL PARTICULARS.

COMPOSITE INSULATOR UNIT

11KV(5KN)

Sr.No	Parameter Name		Parameter type
1	Type of insulator		11KV 5KN Composite Polymer Pin Insulator
2	Standard according to which the insulators manufactured and tested		IEC:61109
3	Name of material used in manufacture of the insulator with class/grade		
3.1	Material of core (FRP rod) i) E-glass or ECR-glass ii) Boron content		 ECR Glass Boron free
3.2	Material of housing & weather sheds (Silicon content by weight)		Silicone rubber. Minimum 30 % silicone Content by weight.
3.3	Material of end fittings		SGCI
3.4	Sealing compound for end fitting		Silicone sealant
4	Colour		Grey
5	**Electrical characteristics**		
5.1.	Nominal system voltage	KV (rms)	11
5.2	Highest system voltage	KV (rms)	12
5.3	Dry Power frequency withstand voltage	KV (rms)	70
5.4	Wet Power frequency withstand voltage	KV (rms)	35
5.5	Dry flashover voltage	KV (rms)	>70
5.6	Wet flash over voltage	KV (rms)	>35
5.7	Dry lighting impulse withstand voltage a) Positive b) Negative	 KV (peak) KV (peak)	 75 75
5.8	Dry lighting impulse flashover voltage a) Positive b) Negative	 KV (peak) KV (peak)	 95 95
5.9	RIV at 1 MHz when energized at 10 kV/ 30 kV (rms) under dry condition	 Micro volts	Less than 100
6	Creepage distance (Min.) (320mm)	(mm)	320
7	Minimum failing load Mechanical characteristics:	 KN	5
8	**Dimensions of insulator**		
8.1	Weight	Kg	0.95(Approx)
8.2	Dia. of FRP rod:	mm	24
8.3	Length of FRP rod	mm	198
8.4	Dia. of weather sheds	mm	105
8.5	Thickness of housing	mm	3
8.6	Dry arc distance	mm	165
8.7	Dimensioned drawings of insulator (including weight with tolerances in weight) enclosed.		Yes
9.0.	Method of fixing of sheds to housing (Specify): Single mould or Modular construction (Injection molding / compression molding)		Single mould./Injection molding
10	No of weather sheds		3
11	**Type of sheds**		
11.1	Aerodynamic		Yes
11.2	With underribs		No
12	**Packing details**		
12.1	Type of packing		Corrugated box.
12.2	No. of insulators in each pack		24
12.3	Gross weight of package	Kg	23 (Approx)
13	Any other particulars which the Manufacturer may like to give		No

PLACE: BHIWADI, RAJASTHAN

SIGNATURE

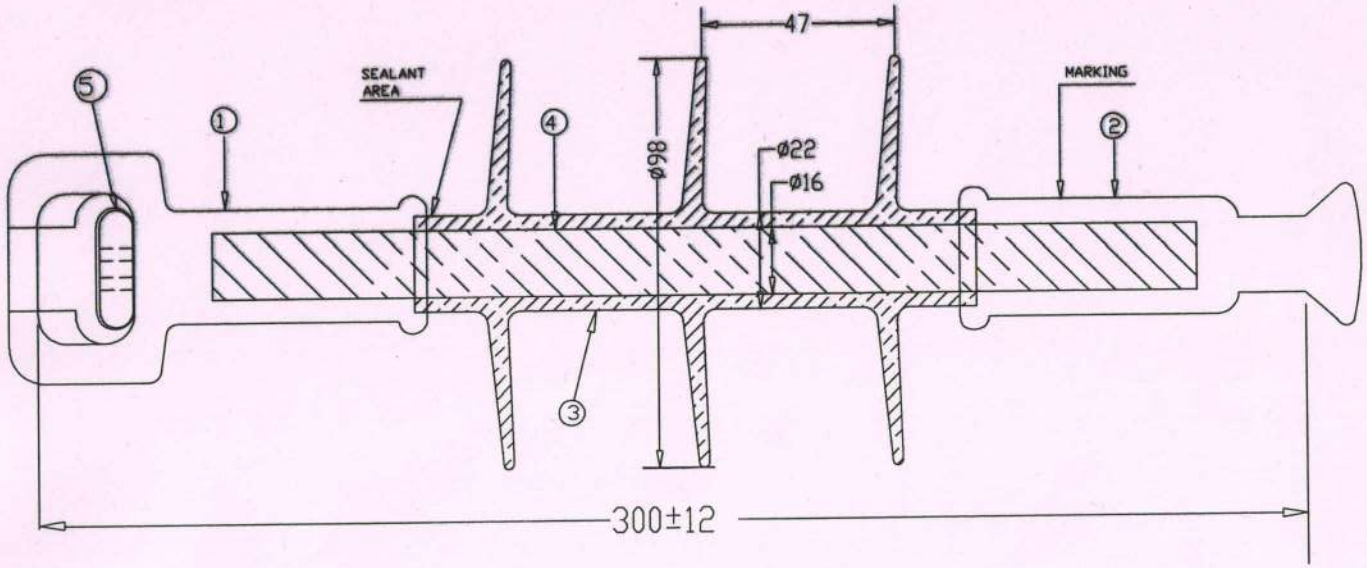
NAME IN FULL : **KAMALESH SARKAR**

DESIGNATION/ STATUS IN THE FIRM

TECHNICAL MANAGER

COMPANY SEAL

Adinath Industries E45, G2 Auth. Signatory



ALL DIMENSIONS ARE IN 'mm'

TECHNICAL CHARACTERISTICS

DIMENSIONS :		
1. CREEPAGE DISTANCE (Minimum)	---	320 mm
2. ARCING DISTANCE (Minimum)	---	165 mm
3. No of ø98mm SHEDS	---	3 SHEDS

MACHANICAL CHARACTERISTICS :		
1. SPECIFIED MECHANICAL LOAD	---	70KN
2. ROUTINE TEST LOAD	---	35KN

ELECTRICAL CHARACTERISTICS :		
1. NORMAL SYSTEM VOLTAGE	---	11kV
2. HIGHEST SYSTEM VOLTAGE	---	12kV
3. SYSTEM FREQUENCY	---	50HZ
4. WET 1 MINUTE POWER FREQUENCY WITHSTAND VOLTAGE(MIN)	---	35kV(rms)
5. DRY 1 MINUTE POWER FREQUENCY WITHSTAND VOLTAGE(MIN)	---	50kV(rms)
6. DRY LIGHTNING IMPULSE WITHSTAND VOLTAGE(MIN)	---	75kVp
7. VISIBLE DISCHARGE TEST VOLTAGE	---	9kV(rms)

NOTES :		
1. INSULATORS CONFORMS TO	---	IEC:61109
2. GALVANISATION CONFORMS TO	---	IS:2633
3. DIMENSION TOLERANCE :	---	AS PER IEC 61109

ITEM	DESCRIPTION	MATERIAL	QTY	REMARKS
1	SOCKET FITTING	SGCI/MCI/FORGED	1	
2	BALL FITTING	SGCI/MCI/FORGED	1	
3	HOUSING	SILICONE RUBBER	--	
4	CORE	FRP ROD	1	
5	W-CLIP	S.S	1	

	NAME	SIGNATURE	DATE
Drawn by			
Checked by			
App'd by			
Q.A			

Authorised Signatory

PROJECTION: -

ADINATH INDUSTRIES AD

ADDRESS	E-45 (G-2), RIICO INDUSTRIAL AREA KHUSHKHERA, BHIWADI, ALWAR(Dt), RAJASTHAN	
TITLE:	11 kV 70KN COMPOSITE POLYMER INSULATOR (B&S)	A4
DRG NO.	AD-11KV-70KN-INS Rev.No '0'	DATE:- 01/08/2015
SCALE:1:1		SHEET 1 OF 1

GUARANTEED TECHNICAL PARTICULARS OF 11 KV POLYMER DISC INSULATORS B&S TYPE

Sl. No.	Description	11KV(70 kN)
1.	Name of Manufacturer:.	Adinath Industries
2.	Address:	
	(a) registered Office:	31 Rajendra Park, New Delhi
	(b) Factory:	E-45(G2), RIICO Industrial Area, Khushkhera, Bhiwadi – 301019, Dist.Alwar (Rajasthan
3.	Type of Insulators	Polymeric Disc(B&S)
4.	Standard specification to which the Insulators manufactured	IEC:61109
5.	Name of material used in manufacture of the Insulator (with class / grade)	
(a)	Material of core rod	ECR Glass Boron free
(b)	Material of Housing & weather sheds (silicon content by weight)	Silicone rubber. Minimum 30 % silicone Content by weight.
(c)	Material of end fittings	SGCI
(d)	Sealing compound for end fitting	Silicone sealant
6.	Colour of Insulator	Gray
7.	**Electrical Characteristics:**	
(a)	Nominal system Voltage (KV rms)	11
(b)	Highest System Voltage (KV rms)	12
(c)	Dry power frequency withstand (KV rms)	50
(d)	Wet power frequency withstand (KV rms)	35
(e)	Dry flash over voltage (KV rms)	>50
(f)	Wet flash over voltage (KV rms)	>35
(g)	Dry lighting impulse withstand voltage	
	(a) Positive	75
	(b) Negative	75
(h)	Dry lighting impulse flashover voltage	
	(a) Positive (KV peak)	>75
	(b) Negative (KV peak)	>75
(i)	RIV at 1 MHz when energized at 10kV /30 kV(rms) under dry condition (microvolt)	Less than 100

Adinath Industries
Authorised Signatory

(j)	Creepage distance (min) mm	320
8.	**Mechanical Characteristics:**	
	Minimum failing load (KN)	70
9.	**Dimensions of Insulator:**	
i.	Weight (Kg.)	1.0(Approx.)
ii.	Dia of FRP rod (mm)	16
iii.	Length of FRP rod (mm)	232
iv.	Dia of weather sheds (mm)	98
v.	Thickness of housing (mm)	3
vi.	Dry arc distance (mm)	165
10.	Dimensioned drawings of Insulator (including weight with	Yes
11.	Method of fixing of sheds to housing specify):- single mould or	Single mould.
12.	No. of weather sheds	3
13.	Type of sheds	
	(i) Aerodynamic	Yes
	(ii) With under ribs	No
14.	Packing details	
	(a) Type of packing.	Corrugated box.
	(b) No. of Insulators in each pack	24
	(c) Gross weight of package	24.0 Kgs(Approx.)
15.	Any other particulars which the bidder may like to give.	No

PLACE: NEW DELHI

DATE : 14.09.2016

Adinath Industries Authorised Signatory

SIGNATURE OF TENDERER

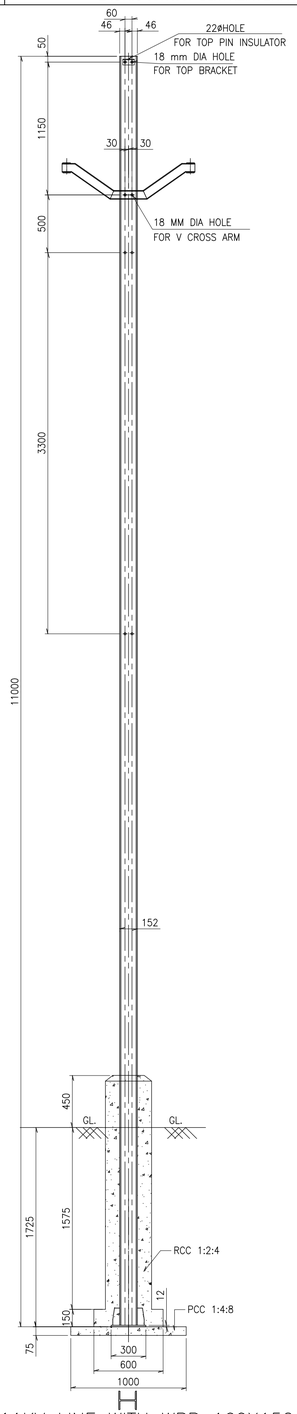
NAME IN FULL : **PARDEEP KUMAR**

DESIGNATION/ STATUS IN THE FIRM
SR. MANAGER (TENDER DEPT.)

COMPANY SEAL

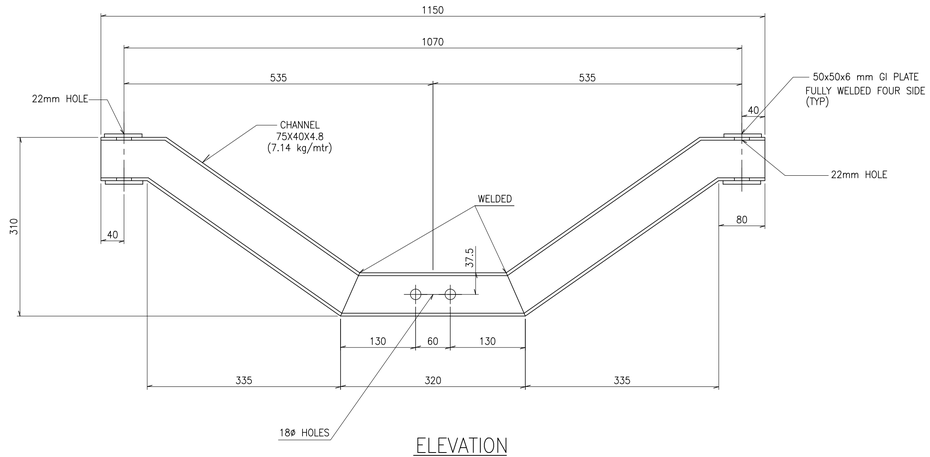
TITLE: 11KV LINE WITH WPB 160X152 SINGLE POLE STRUCTURE

DWG NO TCE.---



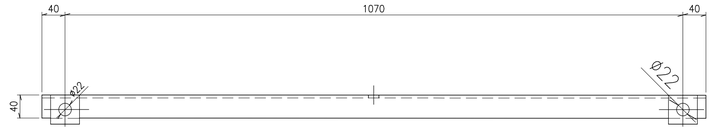
11KV LINE WITH WPB 160X152
SINGLE POLE STRUCTURE

(SCALE 1:25)



ELEVATION

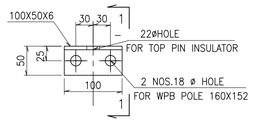
(SCALE 1:5)



PLAN

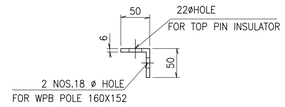
11KV V-CROSS ARM(75x40x4.8)

(SCALE 1:5)



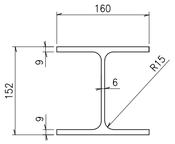
POLE TOP BRACKET

(SCALE 1:5)



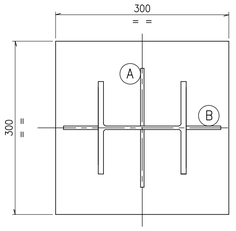
SECTION 1-1

(SCALE 1:5)



WPB 160

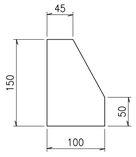
(SCALE 1:5)



BASE PLATE

(300X300X12MM)

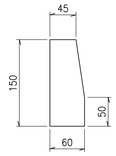
(SCALE 1:5)



STIFFNER PLATE-A

(150X100X6MM)

(SCALE 1:5)



STIFFNER PLATE-B

(150X60X6MM)

(SCALE 1:5)

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
2. ALL HOLES ARE ø18 MM UNLESS OTHERWISE SPECIFIED.
3. REFERENCE STANDARD- IS 2062, & IS-808

FOR RO ISSUE ONLY			ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE
	CLEARED					CIVIL	ELEC	I&C	MECH			
DISC.	SIGNATURE	DATE										
CIVIL												
ELEC												
I&C												
MECH												

ISSUE	REVISIONS	DRN	CLEARED					APPD	DATE
			CIVIL	ELEC	I&C	MECH			

FILE NAME :

'P' (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK AT THE TOP RIGHT HAND CORNER OF THE TITLE BLOCK.

CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY.

INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTRUCTION/ FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLDS' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION/FABRICATION WORK RELATED TO 'HOLDS'.

DO NOT SCALE | PRELIMINARY

TPCODL
TP CENTRAL ODISHA DISTRIBUTION LIMITED

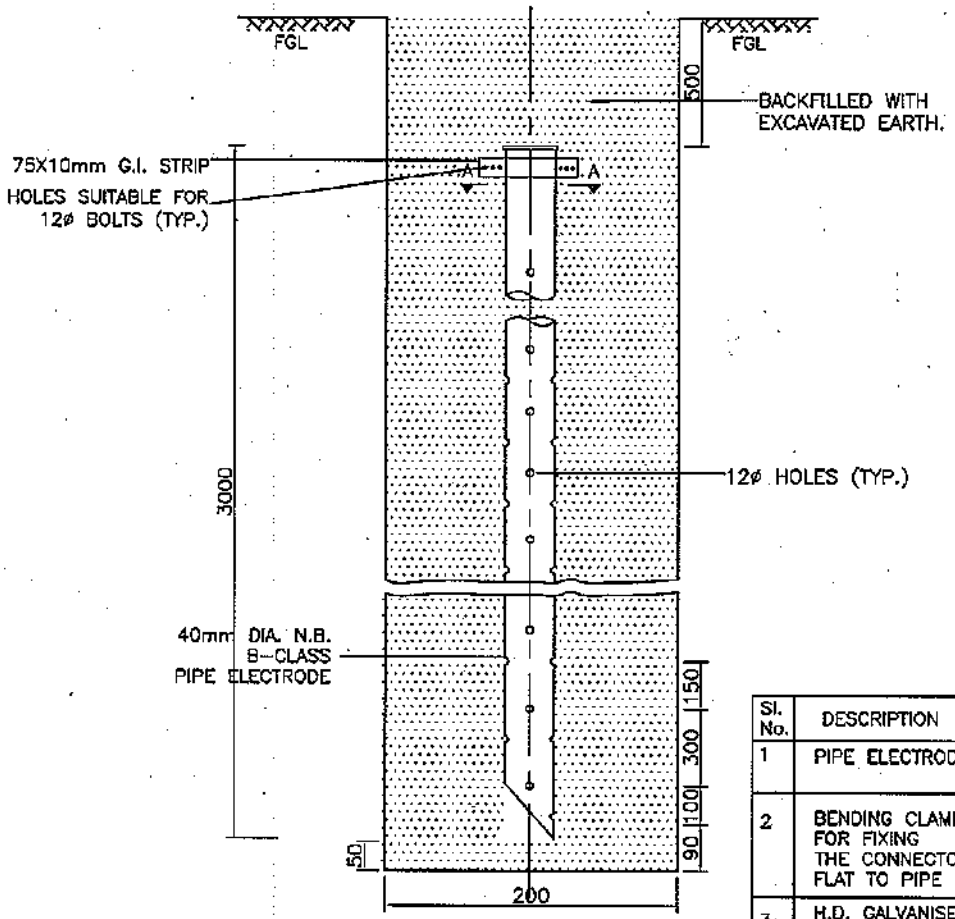
TP CENTRAL ODISHA DISTRIBUTION LIMITED

11KV LINE WITH WPB 160X152 SINGLE POLE STRUCTURE

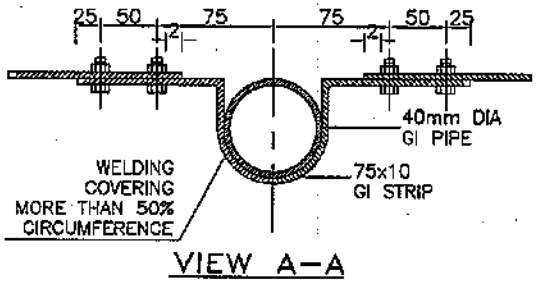
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: AS SHOWN	APPROVED	DATE (RO ISSUE) 31/03/2021
DEL.CENTRE-DISC:EL		DATE (CURRENT ISSUE) 31/03/2021
DRN: RF		
CHD: SS	DWG NO TCE.----------	ISSUE -

SIZE-A1



Sl. No.	DESCRIPTION	MATERIAL	QTY.
1	PIPE ELECTRODE	40 N.B. CLASS-B PERFORATED GI PIPE ELECTRODE-3000mm	1 NO.
2	BENDING CLAMP FOR FIXING THE CONNECTOR FLAT TO PIPE	75MMX10MMX150MM LONG G.I. FLAT	1 NO.
3	H.D. GALVANISED BOLTS, NUTS & WASHERS	12øX35 LONG BOLT NUT AND WASHER ALL GALVANISED	8 NO.S



VIEW A-A

LEGEND:-

NOTES:-

1. All dimensions are in mm.
2. All necessary hardware required for installation of electrode shall be provided by bidder.
3. Minimum distance required between two consecutive earthing pits shall not be less than 3.0 mtrs.
4. Galvanising must be done after welding.
5. After providing holes the hot-dip galvanising to be done for the pipe.

REFERENCES:-

REVISION STATUS:-

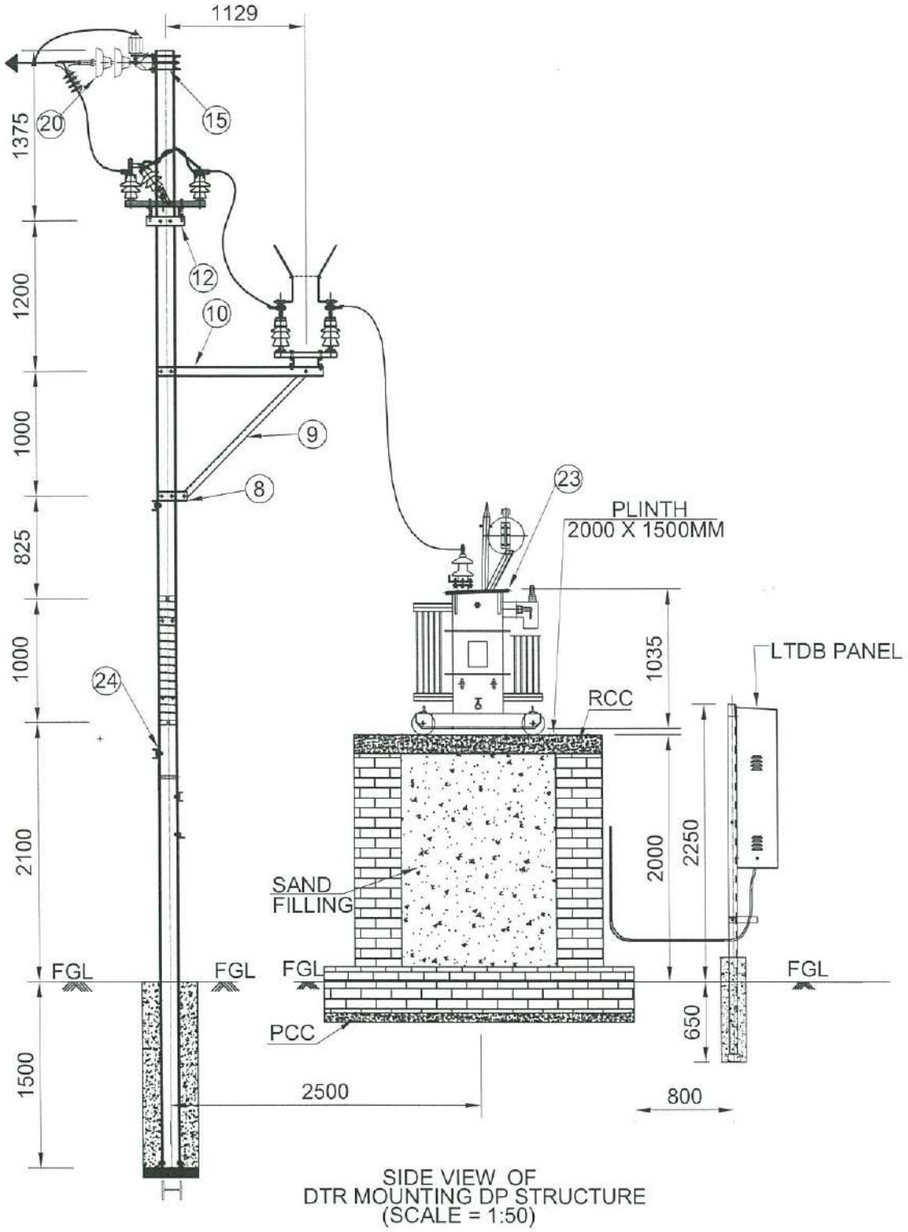
DATE	REV. NO.	REVISION	DSN.	CHK.	APPD.	ISSUED
	2					
	1					
20.04.14	0	Issued for manufacturing purpose				

TATA POWER-DDL

TATA POWER DELHI DISTRIBUTION LIMITED
(A TATA POWER AND DELHI GOVERNMENT JOINT VENTURE)
GRID SUB STATION BUILDING, HUDSON LINES
KINGSWAY CAMP, DELHI-110009

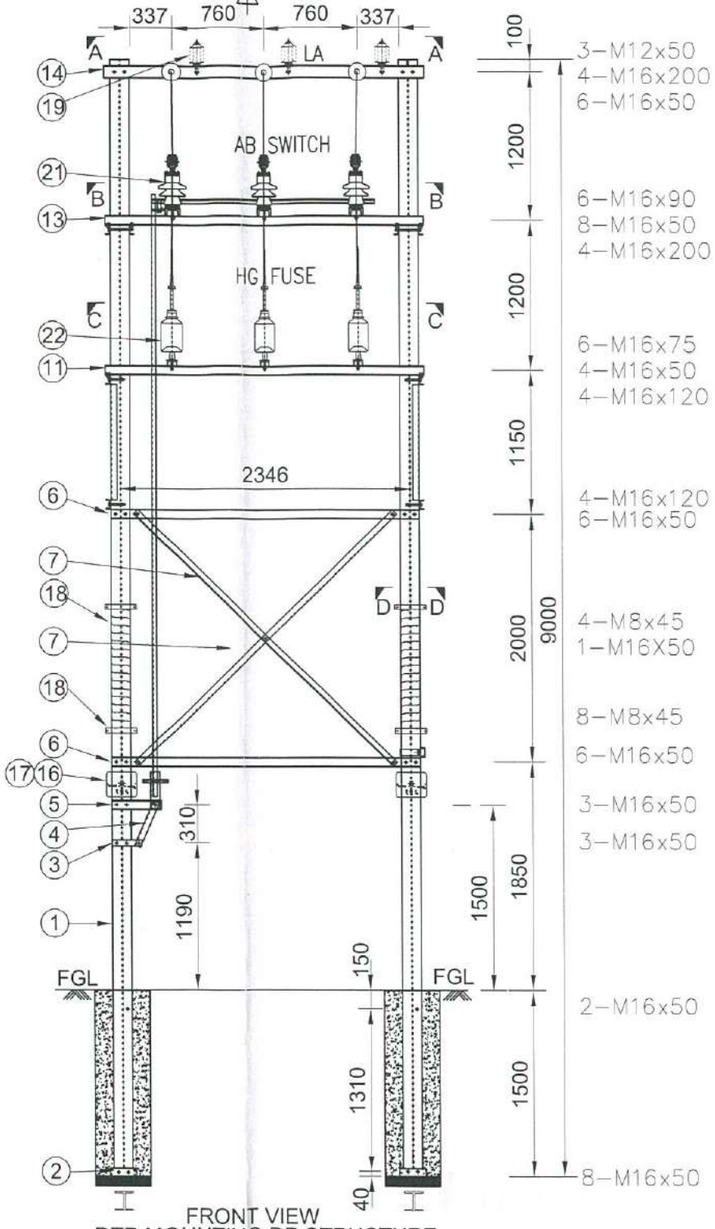
PROJECT:- MISCELLANEOUS

DESIGN	YBM/KK	TITLE:-	TYPICAL DETAILS OF 40mm ø PIPE EARTH ELECTRODE FOR 11kV & LT DISTRIBUTION
DRAWN	RKP		
CHECKED	SRC		
APPD.	CRD	SHEET 1 OF 1	DRAWING NO. TPD-S-132-E-096
SCALE	NTS		REV. 0



SIDE VIEW OF
DTR MOUNTING DP STRUCTURE
(SCALE = 1:50)

VIEW 'B-B'
(SCALE- 1:20)



FRONT VIEW
DTR MOUNTING DP STRUCTURE
(SCALE = 1:50)

NOTES:-

1. ALL DIMENSION ARE IN MM UN LESS SPECIFIED.
2. DIMENSION AND DETAILS SHOWN FOR DTR FOUNDATION IS INDICATIVE ONLY AND FINAL DETAIL WILL BE SHOWN IN SEPARATE CIVIL DRAWING.
3. ANCHORING ARRANGEMENT OF DTR WILL BE DONE AT SITE SUIT THE REQUIREMENT.
4. HEIGHT OF DTR SHOWN IS FOR 250KVA DTR AND AS PER MANUFACTURER DRAWING.
5. WEIGHT OF DTR SHOWN (IN SH.3 OF 4) ARE AS PER MANUFACTURER DRAWING.
6. FOR LTDB DETAILS REFER VENDOR (WUNDER) DRG NO.
   - 250 kVA LTDB ------ DRG NO. WCSPL/LTDB250KVA/OPTCL/01
   - 315 kVA LTDB ------ DRG NO. WCSPL/LTDB315KVA/OPTCL/01
   - 500 kVA LTDB ----- DRG NO. WCSPL/LTDB500KVA/OPTCL/01.
7. FOR BOQ. AND OTHER DETAILS REFER SHT. 2, 3 & 4 OF 4.
8. HEIGHT OF LTDB FIXING CHANNEL WILL BE AS PER REQUIREMENT AND TO SUIT THE PANEL DIMENSIONS.
9. FOR 250,315&500 KVA DTR LTDB TYPICAL INSTALLATION DETAIL & BOQ REFER DRG. NO IPDS/CESU/S&W/DTR/11KV/109

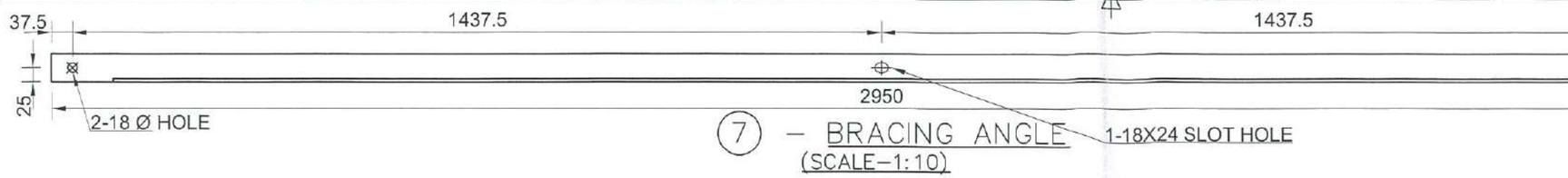
Approved
17.6.17

STATUS:
03.06.2017- REVISION 2 ISSUED FOR APPROVAL.

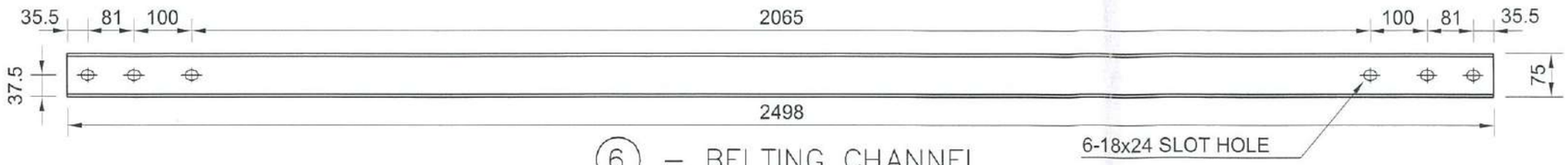
REV.NO	DATE	DESCRIPTION	PREPARED		CHECKED		APPROVED	
2	03.06.17	REVISED AS PER MOM DATED 12.04.2017	SP		RNB		RNB	
1	27-4-17	REVISED INCORPORATING THE LTDB FIXING ARRANGEMENT AND DETAILS 1,2,3 &4.	TKC		RNB		RNB	

PROJECT	ELECTRIFICATION WORKS IN CESU UTILITY OF ODISHA UNDER INTEGRATED POWER DEVELOPMENT SCHEME (PKG.- 01)
LOA NO.	OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/SUPPLY- 42 DATED 25.10.2016. OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/ERECTION - 43 DATED 25.10.2016.
CLIENT	ODISHA POWER TRANSMISSION CORPORATION LIMITED
PMA	केन्द्रीय विद्युत अनुसंधान संस्थान Central Power Research Institute
CONTRACTOR	STERLING AND WILSON PVT. LTD., KOLKATA

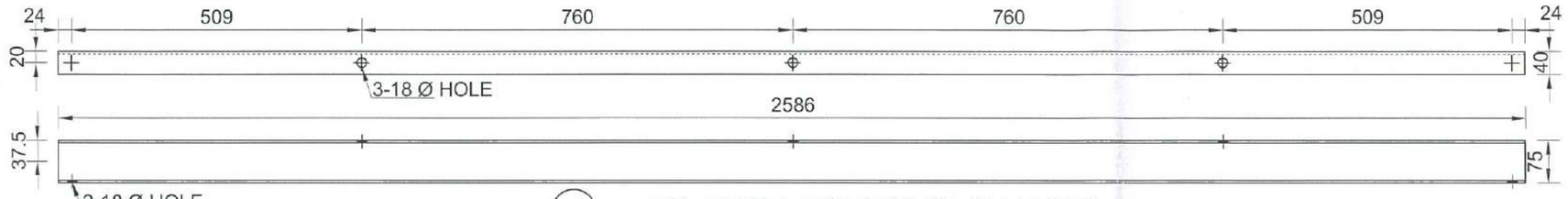
	NAME	SIGN	DATE	G.A FOR INSTALLATION OF 250KVA/315KVA & 500KVA DTR,HG FUSE, AB SWITCH ON 9MTR LONG RSJ POLE		
DRAWN	S.K.B		11.04.17			
CHECKED	RNB		11.04.17			
APPROVED	RNB		11.04.17	SCALE: AS NOTED	SHEET	REV.
CONTRACTOR DRG. NO.: K2016EL004A-05-DRG-104					01 OF 04	2
DRG. NO.: IPDS/CESU/S&W/DTR/11KV/104					DRG. SIZE- A3	



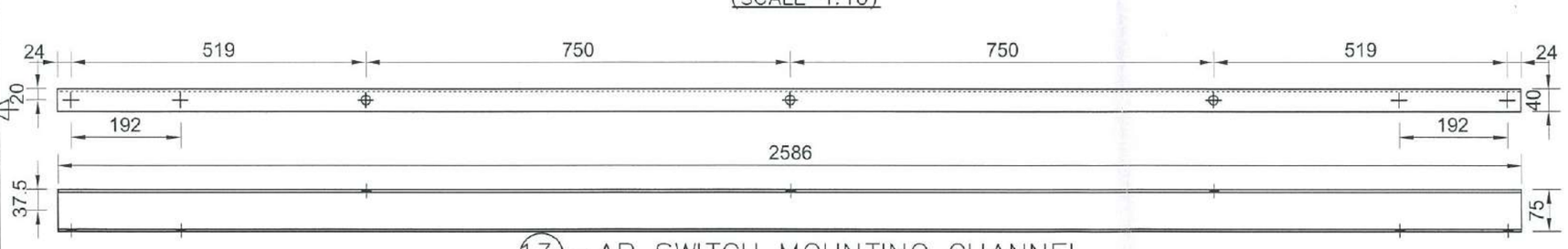
(7) – BRACING ANGLE
(SCALE–1:10)



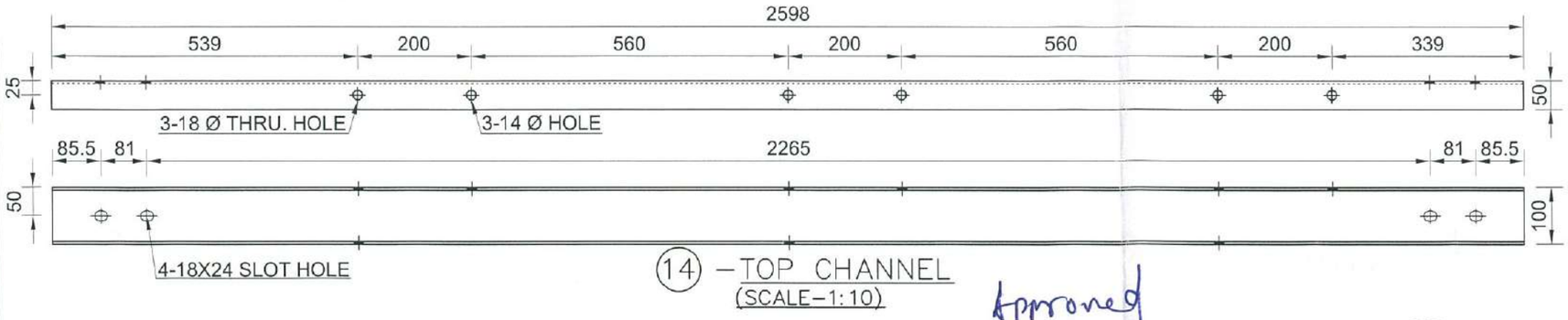
(6) – BELTING CHANNEL
(SCALE–1:10)



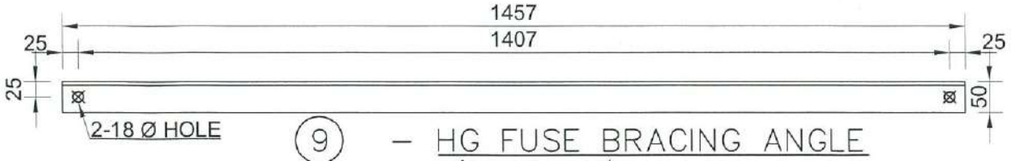
(11) – HG FUSE MOUNTING CHANNEL
(SCALE–1:10)



(13) – AB SWITCH MOUNTING CHANNEL
(SCALE–1:10)

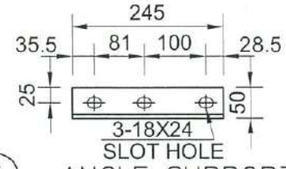


(14) – TOP CHANNEL
(SCALE–1:10)

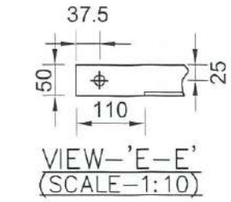


(9) – HG FUSE BRACING ANGLE
(SCALE–1:10)

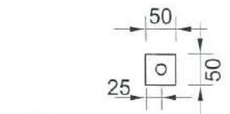
Approved
17.6.17



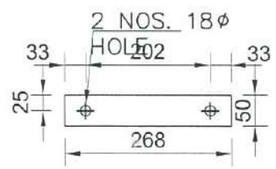
(3) – ANGLE SUPPORT FO OPERATING PIPE
(SCALE–1:10)



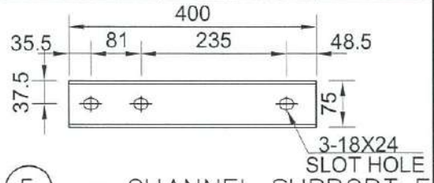
VIEW–'E–E'
(SCALE–1:10)



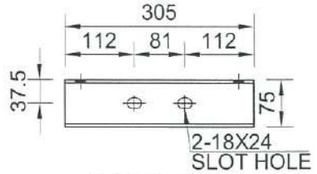
(4) – PLATE WASHE
(SCALE–1:10)



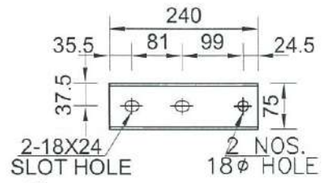
(15) – FISH PLATE
(SCALE–1:10)



(5) – CHANNEL SUPPORT F OPERATING HANDLE
(SCALE–1:10)



(12) – SUPPORT CHHANEL F AB SWITCH FIXING CHHANI
(SCALE–1:10)



(8) – HG FUSE SUPF CHANNEL FOR BAS
(SCALE–1:10)

STATUS:
03.06.2017- REVISION 2 ISSUED FOR APPROVAL.

REV.NO	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
2	03.06.17	REVISED AS PER MOM DATED 12.04.2017	SP	RNB	RNB
1	27-4-17	REVISED INCORPORATING THE LTDB FIXING ARRANGEMENT AND DETAILS 1,2,3 &4.	TKC	RNB	RNB

PROJECT	ELECTRIFICATION WORKS IN CESU UTILITY OF ODISHA UNDER INTEGRATED POWER DEVELOPMENT SCHEME (PKG.- 01)
LOA NO.	OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/SUPPLY- 42 DATED 25.10.2016. OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/ERECTION - 43 DATED 25.10.2016.
CLIENT	ODISHA POWER TRANSMISSION CORPORATION LIMITED
PMA	केन्द्रीय विद्युत अनुसंधान संस्थान Central Power Research Institute
CONTRACTOR	STERLING AND WILSON PVT. LTD., KOLKATA

	NAME	SIGN	DATE
DRAWN	S.K.B		11.04.17
CHECKED	RNB		11.04.17
APPROVED	RNB		11.04.17

G.A FOR INSTALLATION OF 250KVA/315KVA & 500KVA DTR,HG FUSE, AB SWITCH ON 9MTR LONG RSJ POLE

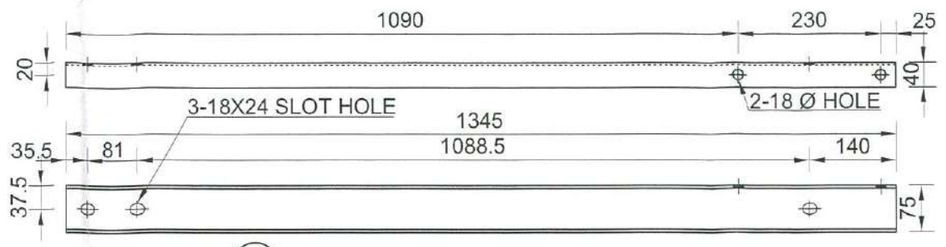
SCALE: AS NOTED | SHEET 02 OF 04 | REV. 2

CONTRACTOR DRG. NO.: K2016EL004A-05-DRG-104

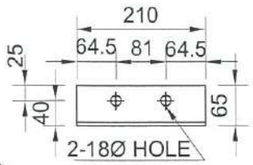
DRG. NO.: IPDS/CESU/S&W/DTR/11KV/104 | DRG. SIZE- A3

WEIGHT OF PARTS

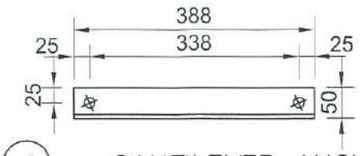
ITEM NO	DESCRIPTION	SECTION	MATERIAL	LENGTH (mm)	QTY. (NOS.)	WT. (kg/m)	WT./ITEM (kg)	TOTAL WT./ ARGMT. (kg)
1.	RS J POLE FOR DP STRUCTURE DTR MOUNTING	152X152MM	RS JOIST	9000	2 NOS	37.1		
2.	BASE CLEAT FOR RSJ POLE	65X65X6MM	ANGLE	210	4 NOS	5.8	1.218	4.872
3.	ANGLE SUPPORT FOR AB SWITCH OPERATING PIPE	50X50X6MM	ANGLE	245	1 NO	4.5	1.103	1.103
4.	CANTILEVER ANGLE FOR OPERATING PIPE AB SWITCH	50X50X6MM	ANGLE	388	1 NO	4.5	1.746	1.746
5.	CHANNEL SUPPORT FOR AB SWITCH OPERATING HANDLE	75X40X4.8MM	CHANNEL	400	1 NO	7.14	2.856	2.856
6.	BELTING CHANNEL	75X40X4.8MM	CHANNEL	2498	2 NOS	7.14	17.835	35.67
7.	BRACING ANGLE	50X50X6MM	ANGLE	2950	2 NOS	4.5	13.275	26.550
8.	HG FUSE SUPPORT CHANNEL FOR BASE	75X40X4.8MM	CHANNEL	240	2 NOS	7.14	1.714	3.427
9.	HG FUSE BRACING ANGLE	50X50X6MM	ANGLE	1457	2 NOS	4.5	6.557	13.113
10.	HG FUSE SUPPORT CHANNEL	75X40X4.8MM	CHANNEL	1345	2 NOS	7.14	9.603	19.207
11.	HG FUSE MOUNTING CHANNEL	75X40X4.8MM	CHANNEL	2586	2 NOS	7.14	18.464	36.928
12.	SUPPORT CHANNEL FOR AB SWITCH FIXING CHANNEL	75X40X4.8MM	CHANNEL	305	4 NOS	7.14	2.178	8.711
13.	AB SWITCH MOUNTING CHANNEL	75X40X4.8MM	CHANNEL	2586	2 NOS	7.14	18.464	36.928
14.	TOP CHANNEL	100X50X6MM	CHANNEL	2598	2 NOS	9.56	24.837	49.674
15.	FISH PLATE	50X8MM	FLAT	268	6 NOS	3.1	0.830	4.980
16.	DANGER BOARD				2 NOS			
17.	DANGER BOARD BACK CLAMP	30X3MM	FLAT	536	2 NOS	0.701	0.376	0.751
18.	CLAMP FOR FIXING OF ANTI CLIMBING DEVICE	40X5MM	FLAT	398	8 NOS	1.58	0.629	5.031
19	LA				3 NOS			
20.	DISC INSULATER WITH ATTACHING HARDWARE				3 NOS			
21.	AB SWITCH				1 SET			
22.	HG FUSE				1 SET			
23.	250KVA/315KVA/500KVA TRANSFORMER				1 NO			
24.	PLATE WASHER	50X6MM	PLATE	50	2 NOS	2.4	0.120	0.240
				TOTAL WEIGHT AS PER DRAWINGS				251.787
				TOTAL WEIGHT AS PER BOQ				522.200
A	3-BOLTED (M-16) PG CLAMP SUITABLE FOR 148SQ MM AAAC AT 11kV SIDE				3			
B	NUTS, BOLT & WASHER	M16		200	08		0.37594	3.00752
C	NUTS, BOLT & WASHER	M16		120	08		0.24631	1.97048
D	NUTS, BOLT & WASHER	M16		90	06		0.19841	1.19046
E	NUTS, BOLT & WASHER	M16		75	06		0.17606	1.05636
F	NUTS, BOLT & WASHER	M16		50	45		0.13624	6.67576
G	NUTS, BOLT & WASHER	M12		50	03		0.07299	0.21897
H	NUTS, BOLT & WASHER	M8		45	12		0.02671	0.32052
				TOTAL WEIGHT				13.9



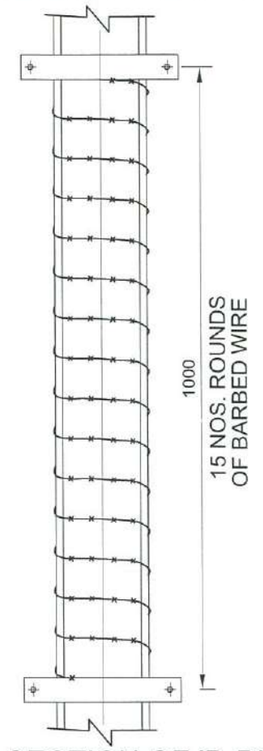
(10) – HG FUSE SUPPORT CHANNEL
(SCALE–1:10)



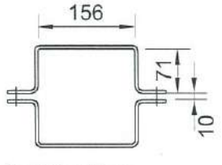
(2) – RSJ POLE BASE CI
(SCALE–1:10)

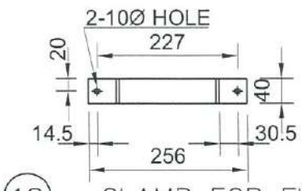


(4) – CANTILEVER ANGLE OPERATING PIPE AB SWI
(SCALE–1:10)



SECTION OF 'D-D'
(SCALE-1:10)

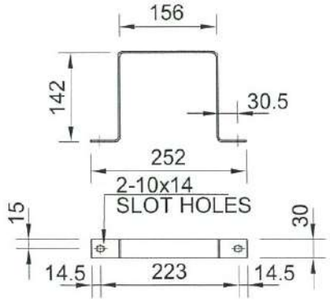




(18) – CLAMP FOR FIXING ANTICLIMBING DEVICE
(SCALE–1:10)

Approved

17.6.17



(17) BACK CLAMP FOR DANGER BOARD
(SCALE- 1:10)

STATUS:
03.06.2017- REVISION 2 ISSUED FOR APPROVAL.

REV.NO	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
2	03.06.17	REVISED AS PER MOM DATED 12.04.2017	SP	RNB	RNB
1	27-4-17	REVISED INCORPORATING THE LTDB FIXING ARRANGEMENT AND DETAILS 1,2,3 &4.	TKC	RNB	RNB

PROJECT	ELECTRIFICATION WORKS IN CESU UTILITY OF ODISHA UNDER INTEGRATED POWER DEVELOPMENT SCHEME (PKG.- 01)
LOA NO.	OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/SUPPLY- 42 DATED 25.10.2016. OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/ERECTION - 43 DATED 25.10.2016.
CLIENT	ODISHA POWER TRANSMISSION CORPORATION LIMITED
PMA	केन्द्रीय विद्युत अनुसंधान संस्थान Central Power Research Institute
CONTRACTOR	STERLING AND WILSON PVT. LTD., KOLKATA

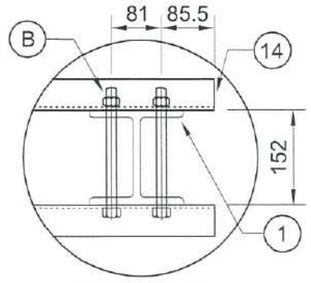
	NAME	SIGN	DATE
DRAWN	S.K.B		11.04.17
CHECKED	RNB		11.04.17
APPROVED	RNB		11.04.17

G.A FOR INSTALLATION OF 250KVA/315KVA & 500KVA DTR,HG FUSE, AB SWITCH ON 9MTR LONG RSJ POLE

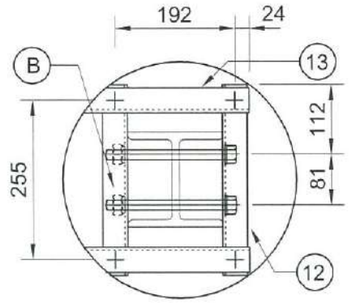
SCALE: AS NOTED | SHEET 03 OF 04 | REV. 2

CONTRACTOR DRG. NO.: K2016EL004A-05-DRG-104

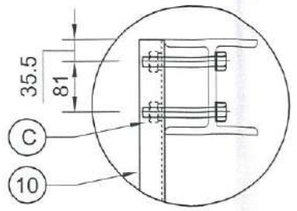
DRG. NO.: IPDS/CESU/S&W/DTR/11KV/104 | DRG. SIZE- A3



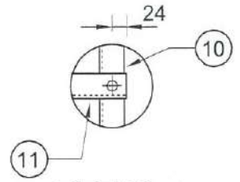
DETAIL-1
(SCALE- 1:10)



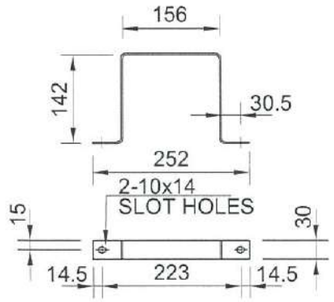
DETAIL-2
(SCALE- 1:10)



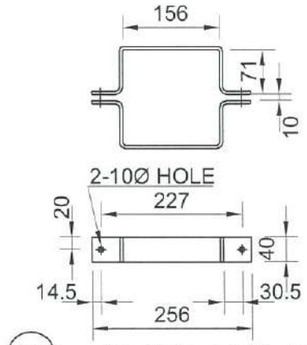
DETAIL-3
(SCALE- 1:10)



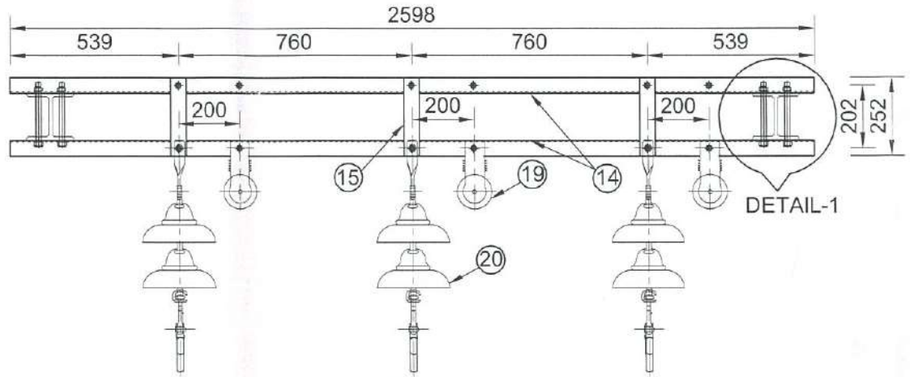
DETAIL-4
(SCALE- 1:10)



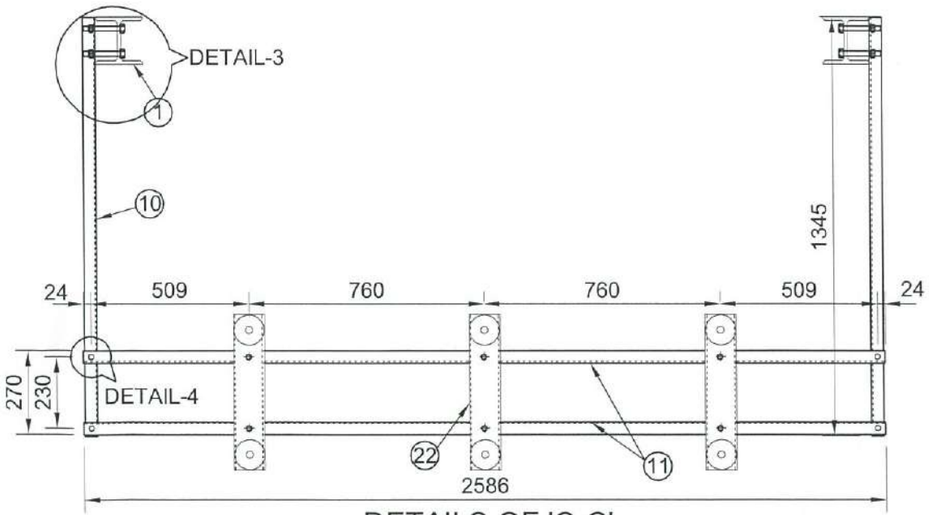
17 BACK CLAMP FOR DANGER BOARD
(SCALE- 1:10)



18 – CLAMP FOR FIXING ANTICLIMBING DEVICE
(SCALE–1:10)



VIEW 'A-A'
(SCALE- 1:20)



DETAILS OF 'C-C'
(SCALE- 1:20)

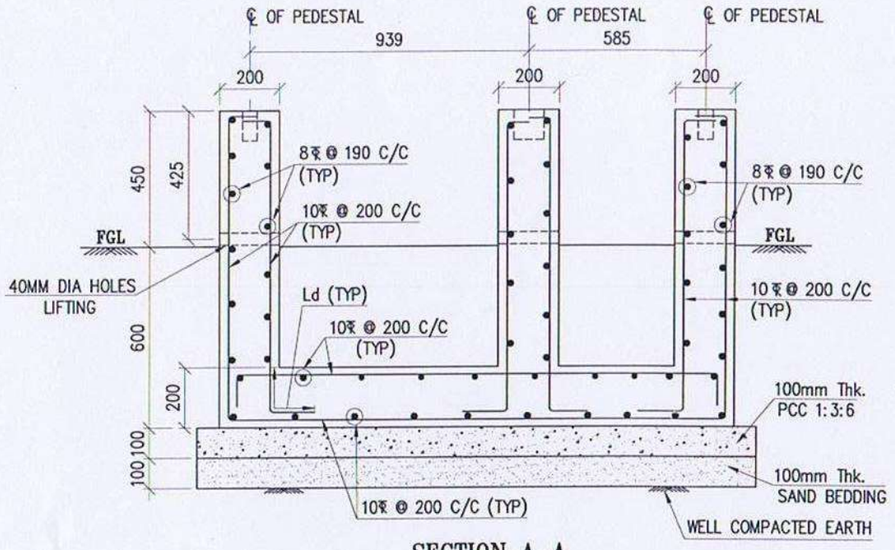
Approved
17.6.17

STATUS:
03.06.2017- REVISION 2 ISSUED FOR APPROVAL.

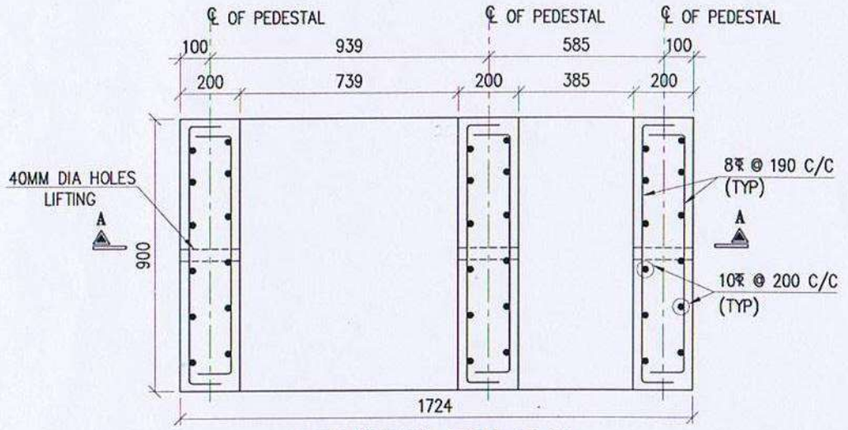
REV.NO	DATE	DESCRIPTION	PREPARED		CHECKED		APPROVED	
2	03.06.17	REVISED AS PER MOM DATED 12.04.2016	SP		RNB		RNB	
1	27-4-17	REVISED INCORPORATING THE LTDB FIXING ARRANGEMENT AND DETAILS 1,2,3 &4.	TKC		RNB		RNB	

PROJECT	ELECTRIFICATION WORKS IN CESU UTILITY OF ODISHA UNDER INTEGRATED POWER DEVELOPMENT SCHEME (PKG.- 01)
LOA NO.	OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/SUPPLY- 42 DATED 25.10.2016. OPTCL/PMU/IPDS/LOA/CESU/01/102/2016/ERECTION - 43 DATED 25.10.2016.
CLIENT	ODISHA POWER TRANSMISSION CORPORATION LIMITED
PMA	केन्द्रीय विद्युत अनुसंधान संस्थान Central Power Research Institute
CONTRACTOR	STERLING AND WILSON PVT. LTD., KOLKATA

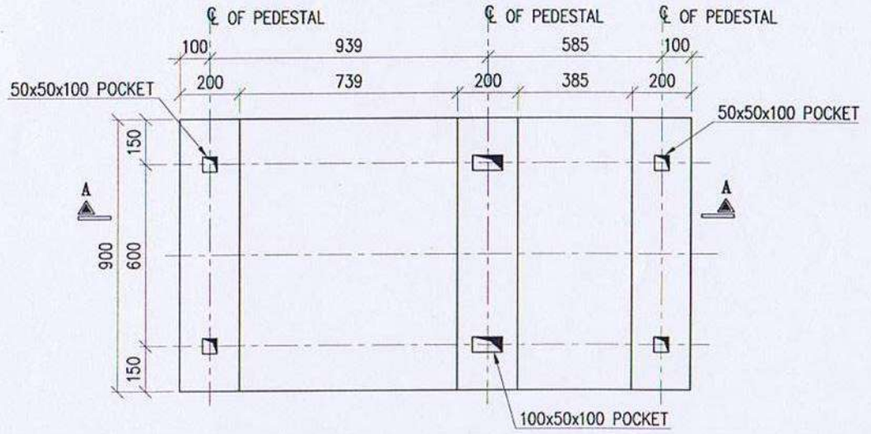
	NAME	SIGN	DATE	G.A FOR INSTALLATION OF 250KVA/315KVA & 500KVA DTR,HG FUSE, AB SWITCH ON 9MTR LONG RSJ POLE		
DRAWN	S.K.B		11.04.17			
CHECKED	RNB		11.04.17			
APPROVED	RNB		11.04.17	SCALE: AS NOTED	SHEET	REV.
CONTRACTOR DRG. NO.: K2016EL004A-05-DRG-104					04 OF 04	2
DRG. NO.: IPDS/CESU/S&W/DTR/11KV/104					DRG. SIZE- A3	



SECTION A-A



RMU (3WAY) WALL PLAN



RMU (3WAY) FOUNDATION PLAN

LEGEND:-

——— · ———	– CENTER LINE
FGL	– FINISHED GROUND LEVEL
℄	– CENTER LINE
Ld	– DEVELOPMENT LENGTH
TYP	– TYPICAL

REINFORCEMENT IS DENOTED AS :
10ϕ @ 200 C/C
- SPACING OF BAR IN mm
- HYSD BARS CONFORMING TO IS:1786
- DIA OF BAR IN mm

REFERENCE DRAWING:-

1. REFER DRG No. 502-8458-9 OF M/S SIEMENS & APPROVED BY PRDC.
2. REFER DRG No. 502-6934-3 OF M/S SIEMENS.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. FGL CORRESPONDS TO FINISHED GROUND LEVEL.
3. ALL RCC USED SHALL BE OF GRADE M30 (DESIGN MIX)
4. LEAN CONCRETE SHALL BE OF GRADE 1:3:6 (P.C.C)
5. CLEAR COVER TO REINFORCEMENT SHALL BE = 40MM.
6. THE FOUNDATION SHALL BE PLACED ON COMPACTED EARTH.
7. ALL REINFORCEMENT STEEL SHALL BE HYSD (Fe 500) CONFORMING TO IS:1786/TMT BARS(EQUIVALENT GRADE)
8. LAP ANCHOR LENGTH/DEVOLEPMENT LENGTH FOR REINFORCEMENT SHALL BE 50 TIMES THE DIAMETER OF THE BAR.
9. MINIMUM NET SAFE BEARING CAPACITY IS CONSIDERED AS 6 T/sq.m.(min) AT FOUNDING LEVEL.
10. MINOR ADJUSTMENTS MAY BE DONE AT SITE IN CONSULTATION WITH ENGINEER IN-CHARGE

TOTAL QUANTITY = 18Nos.

APPROVED
07.07.16
PROJECT MANAGER
ADVANCE SCRIPS
PRDC, BHUBANESWAR

CHECKED BY	SIGN	DATE
ARCHITECTURE	–	–
CIVIL & STRUCTURAL	–	–
PLUMBING & SANITARY	–	–
MECHANICAL	–	–
ELECTRICAL	–	–
INSTRUMENTATION	–	–

REV. No	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
C	REVISED AS PER EQUIPMENT DETAILS	TRP 21.07.16	RA 21.07.16	SV 21.07.16	DA 21.07.16
B	REVISED AS PER PRDC COMMENTS	TRP	RA	SV	DA
A	ISSUED FOR APPROVAL	TRP 23.03.16	RA 23.03.16	SV 24.03.16	DA 24.03.16

REVISIONS

L&T Construction
Power Transmission & Distribution

CLIENT : ODISHA POWER TRANSMISSION CORPORATION LIMITED (OPTCL)

CONSULTANT : POWER RESEARCH & DEVELOPMENT CONSULTANTS PVT. LTD. (PRDC)

PROJECT : UNDERGROUND CABLING SYSTEM IN FOUR MAIN LANES AND CONNECTING ROADS OF BHUBANESWAR CITY (SACHIVALAYA MARG, BIDYUT MARG, JANAPATH AND CUTTACK ROAD WITH CONNECTING ROADS RAJAPATH,GOPABANDHU MARG , PATEL MARG) UNDER ADVANCE SCRIPS ON EPC CONTRACT BASIS

SUPPLIER / CONTRACTOR :

JOB No. : 015187-C-SY

	NAME	SIGN	DATE
DSGN	TRP	TRP	23.03.16
DRWN	RA	RA	23.03.16
CHKD	SV	SV	24.03.16
APPD	DA	DA	24.03.16

TITLE : DETAIL OF PRECAST 11kV RMU FOUNDATION (3WAY)

SCALE 1:20

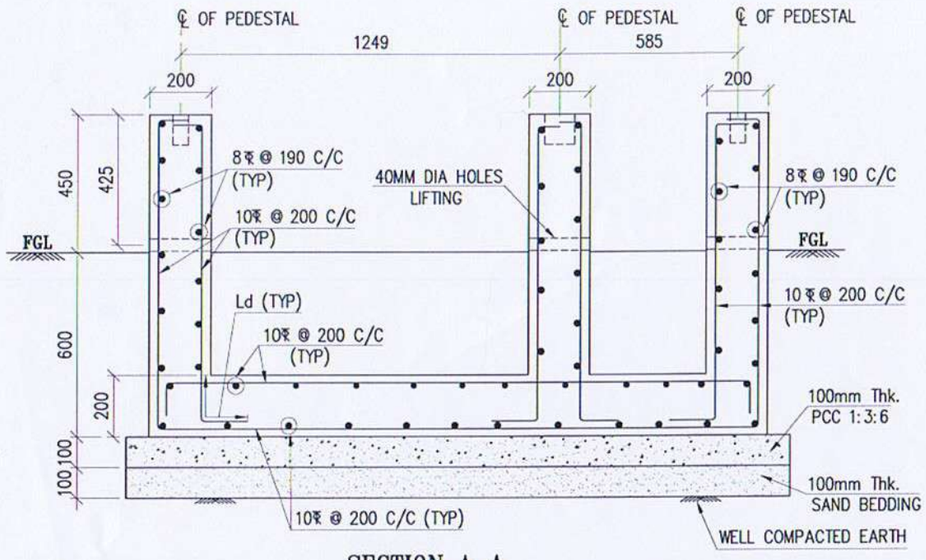
PROJECTION

DRG. No. O 1 5 1 8 7 – C – S Y – S Y – F N – 1 0 2 8 SHEET 01 OF 04

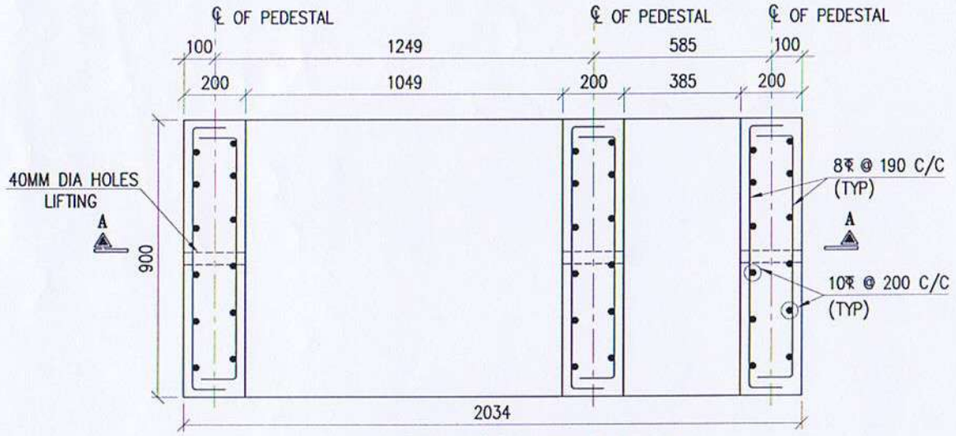
SIZE A3 REV. C

RELEASED FOR ☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☑ APPROVAL ☐ CONSTRUCTION

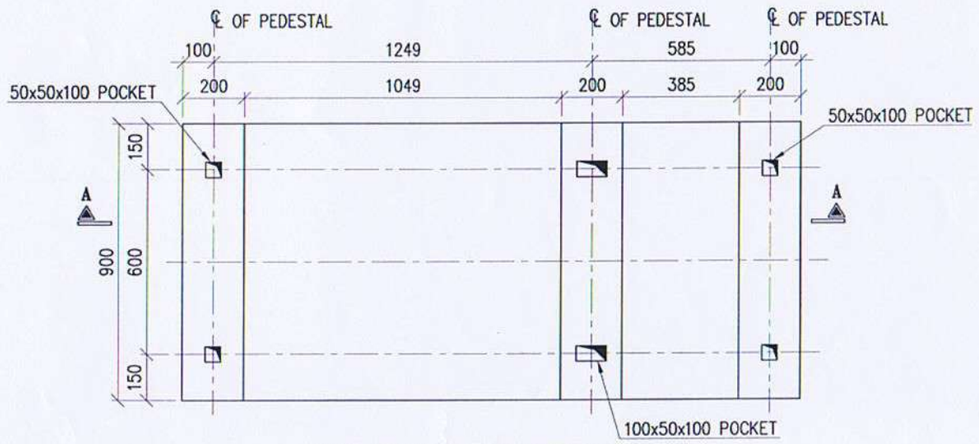
E:\SCRIPS BHUBANESWAR\CIVIL\RMU FOUNDATION\015187-C-SY-SY-FN-1028-01-04-C.dwg



SECTION A-A



RMU (4WAY) WALL PLAN



RMU (4WAY) FOUNDATION PLAN

LEGEND:-

———	– CENTER LINE
FGL	– FINISHED GROUND LEVEL
℄	– CENTER LINE
Ld	– DEVELOPMENT LENGTH
TYP	– TYPICAL

REINFORCEMENT IS DENOTED AS :
10ϕ @ 200 C/C
- SPACING OF BAR IN mm
- HYSD BARS CONFORMING TO IS:1786
- DIA OF BAR IN mm

REFERENCE DRAWING:-

1. REFER DRG No. 502-8583-9 OF M/S SIEMENS & APPROVED BY PRDC.
2. REFER DRG No. 502-6953-3 OF M/S SIEMENS.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. FGL CORRESPONDS TO FINISHED GROUND LEVEL.
3. ALL RCC USED SHALL BE OF GRADE M30 (DESIGN MIX)
4. LEAN CONCRETE SHALL BE OF GRADE 1:3:6 (P.C.C)
5. CLEAR COVER TO REINFORCEMENT SHALL BE = 40MM.
6. THE FOUNDATION SHALL BE PLACED ON COMPACTED EARTH.
7. ALL REINFORCEMENT STEEL SHALL BE HYSD (Fe 500) CONFORMING TO IS:1786/TMT BARS(EQUIVALENT GRADE)
8. LAP ANCHOR LENGTH/DEVOLEPMENT LENGTH FOR REINFORCEMENT SHALL BE 50 TIMES THE DIAMETER OF THE BAR.
9. MINIMUM NET SAFE BEARING CAPACITY IS CONSIDERED AS 6 T/sq.m.(min) AT FOUNDING LEVEL.
10. MINOR ADJUSTMENTS MAY BE DONE AT SITE IN CONSULTATION WITH ENGINEER IN-CHARGE

TOTAL QUANTITY = 56Nos.

APPROVED
07.09.16
PROJECT MANAGER
ADVANCE SCRIPS
PRDC, BHUBANESWAR

REV. No	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
C	REVISED AS PER EQUIPMENT DETAILS	TRP 21.07.16	RA 21.07.16	TRP 21.07.16	DA 21.07.16
B	REVISED AS PER PRDC COMMENTS	TRP	RA	SV	DA
A	ISSUED FOR APPROVAL	TRP 23.03.16	RA 23.03.16	SV 24.03.16	DA 24.03.16

REVISIONS

L&T Construction
Power Transmission & Distribution

CLIENT : ODISHA POWER TRANSMISSION CORPORATION LIMITED (OPTCL)

CONSULTANT : POWER RESEARCH & DEVELOPMENT CONSULTANTS PVT. LTD. (PRDC)

PROJECT : UNDERGROUND CABLING SYSTEM IN FOUR MAIN LANES AND CONNECTING ROADS OF BHUBANESWAR CITY (SACHIVALAYA MARG, BIDYUT MARG, JANAPATH AND CUTTACK ROAD WITH CONNECTING ROADS RAJAPATH,GOPABANDHU MARG , PATEL MARG) UNDER ADVANCE SCRIPS ON EPC CONTRACT BASIS

SUPPLIER / CONTRACTOR :

JOB No. : 015187-C-SY

	NAME	SIGN	DATE
DSGN	TRP	TRP	23.03.16
DRWN	RA	RA	23.03.16
CHKD	SV	SV	24.03.16
APPD	DA	DA	24.03.16

TITLE : DETAIL OF PRECAST 11kV RMU FOUNDATION (4WAY)

SCALE 1:20

PROJECTION

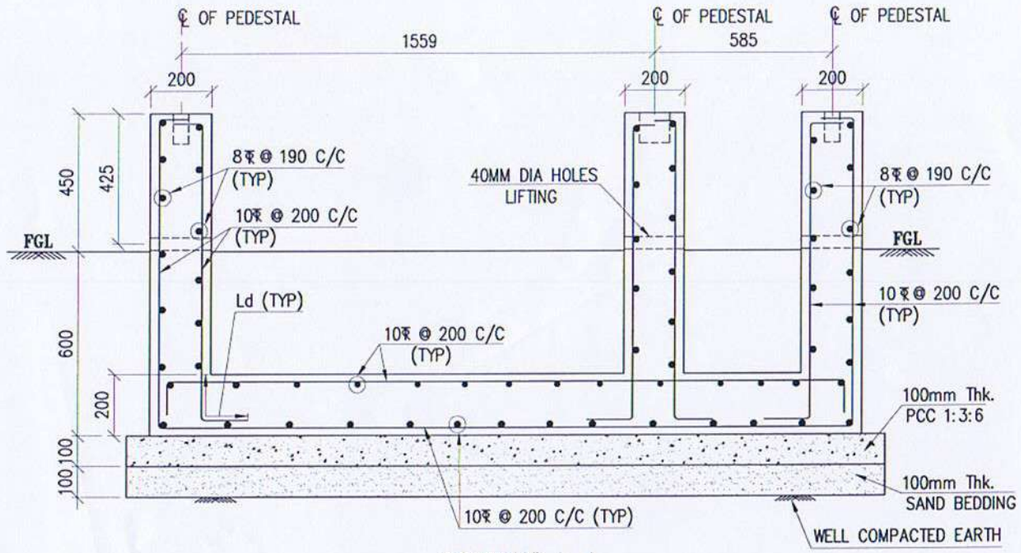
CHECKED BY	SIGN	DATE
ARCHITECTURE	–	–
CIVIL & STRUCTURAL	–	–
PLUMBING & SANITARY	–	–
MECHANICAL	–	–
ELECTRICAL	–	–
INSTRUMENTATION	–	–

DRG. No. 015187-C-SY-SY-FN-1028 SHEET 02 OF 04

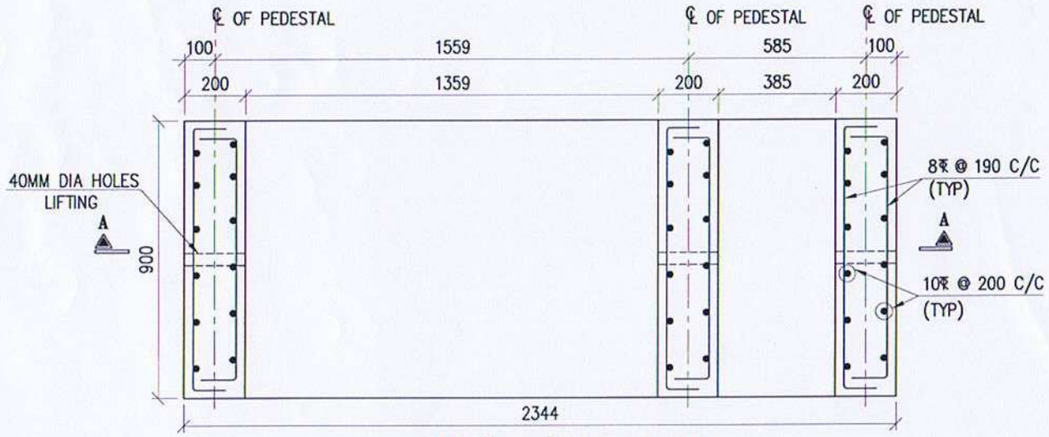
SIZE A3 REV. C

RELEASED FOR ☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☑ APPROVAL ☐ CONSTRUCTION

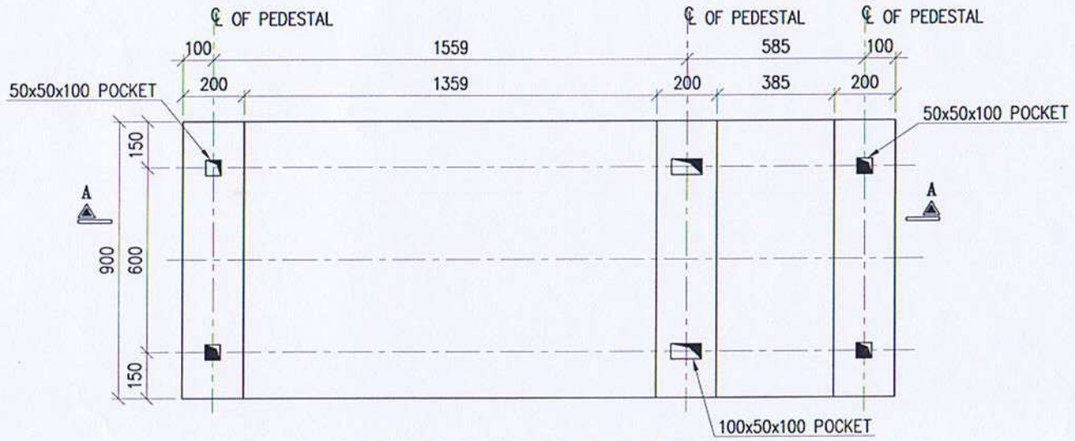
E:\SCRIPS BHUBANESWAR\CIVIL\RMU FOUNDATION\015187-C-SY-SY-FN-1028-02-04-C.dwg



SECTION A-A



RMU (5WAY) WALL PLAN



RMU (5WAY) FOUNDATION PLAN

LEGEND:-

——·——	– CENTER LINE
FGL	– FINISHED GROUND LEVEL
℄	– CENTER LINE
Ld	– DEVELOPMENT LENGTH
TYP	– TYPICAL

REINFORCEMENT IS DENOTED AS :
10ϕ @ 200 C/C
- SPACING OF BAR IN mm
- HYSD BARS CONFORMING TO IS:1786
- DIA OF BAR IN mm

REFERENCE DRAWING:-

1. REFER DRG No. 502-8462-9 OF M/S SIEMENS & APPROVED BY PRDC.
2. REFER DRG No. 502-6931-3 OF M/S SIEMENS.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. FGL CORRESPONDS TO FINISHED GROUND LEVEL.
3. ALL RCC USED SHALL BE OF GRADE M30 (DESIGN MIX)
4. LEAN CONCRETE SHALL BE OF GRADE 1:3:6 (P.C.C)
5. CLEAR COVER TO REINFORCEMENT SHALL BE = 40MM.
6. THE FOUNDATION SHALL BE PLACED ON COMPACTED EARTH.
7. ALL REINFORCEMENT STEEL SHALL BE HYSD (Fe 500) CONFORMING TO IS:1786/TMT BARS(EQUIVALENT GRADE)
8. LAP ANCHOR LENGTH/DEVOLEPMENT LENGTH FOR REINFORCEMENT SHALL BE 50 TIMES THE DIAMETER OF THE BAR.
9. MINIMUM NET SAFE BEARING CAPACITY IS CONSIDERED AS 6 T/sq.m.(min) AT FOUNDING LEVEL.
10. MINOR ADJUSTMENTS MAY BE DONE AT SITE IN CONSULTATION WITH ENGINEER IN-CHARGE

TOTAL QUANTITY = 29Nos.

APPROVED
07.09.16
PROJECT MANAGER
ADVANCE SCRIPS
PRDC, BHUBANESWAR

CHECKED BY	SIGN	DATE
ARCHITECTURE	–	–
CIVIL & STRUCTURAL	–	–
PLUMBING & SANITARY	–	–
MECHANICAL	–	–
ELECTRICAL	–	–
INSTRUMENTATION	–	–

REV. No	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
C	REVISED AS PER EQUIPMENT DETAILS				
B	REVISED AS PER PRDC COMMENTS	TRP 21.07.16	RA 21.07.16	TRP 21.07.16	DA 21.07.16
A	ISSUED FOR APPROVAL	TRP 23.03.16	RA 23.03.16	SV 24.03.16	DA 24.03.16

REVISIONS

L&T Construction
Power Transmission & Distribution

CLIENT : ODISHA POWER TRANSMISSION CORPORATION LIMITED (OPTCL)

CONSULTANT : POWER RESEARCH & DEVELOPMENT CONSULTANTS PVT. LTD. (PRDC)

PROJECT : UNDERGROUND CABLING SYSTEM IN FOUR MAIN LANES AND CONNECTING ROADS OF BHUBANESWAR CITY (SACHIVALAYA MARG, BIDYUT MARG, JANAPATH AND CUTTACK ROAD WITH CONNECTING ROADS RAJAPATH,GOPABANDHU MARG , PATEL MARG) UNDER ADVANCE SCRIPS ON EPC CONTRACT BASIS

SUPPLIER / CONTRACTOR :

JOB No. : 015187-C-SY

	NAME	SIGN	DATE
DSGN	TRP	TRP	23.03.16
DRWN	RA	RA	23.03.16
CHKD	SV	SV	24.03.16
APPD	DA	DA	24.03.16

TITLE : DETAIL OF PRECAST 11kV RMU FOUNDATION (5WAY)

SCALE 1:20

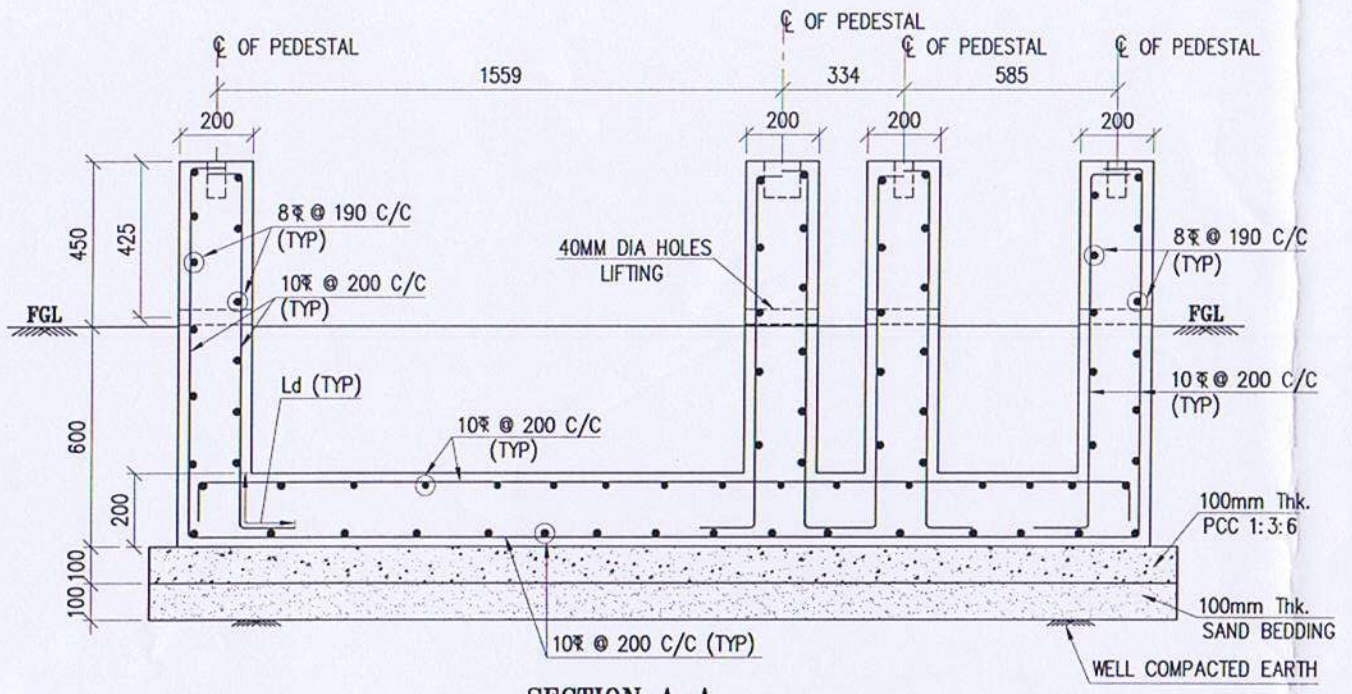
PROJECTION

DRG. No. 015187-C-SY-SY-FN-1028 SHEET 03 OF 04

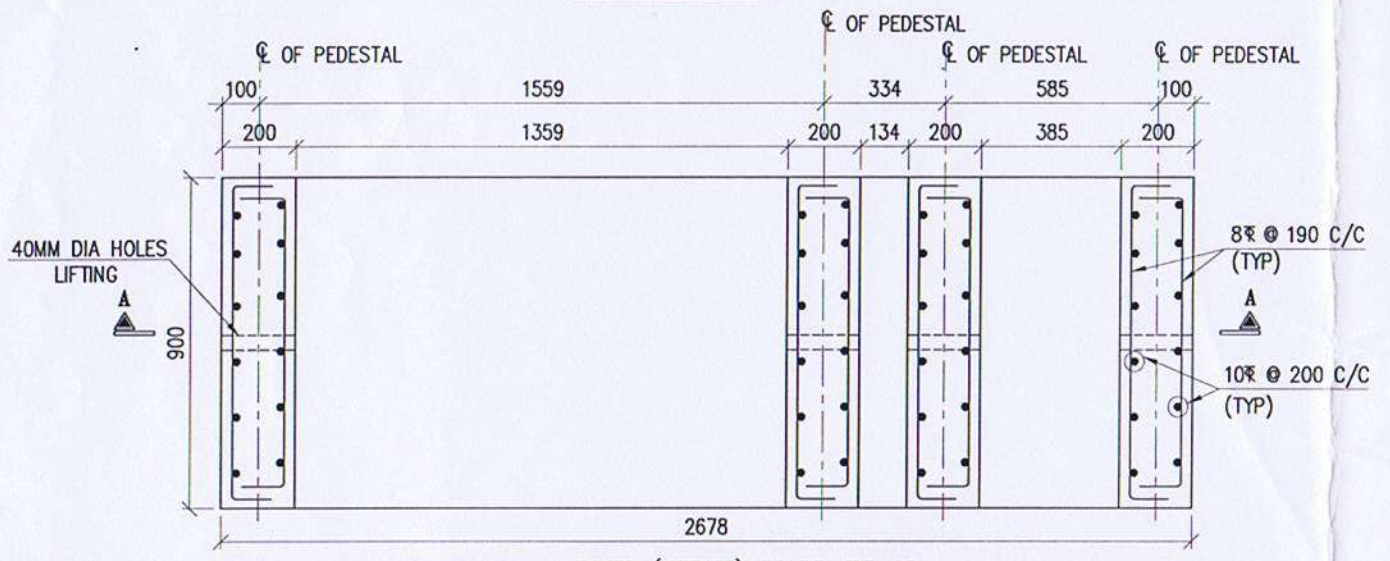
SIZE A3 | REV. C

RELEASED FOR ☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☑ APPROVAL ☐ CONSTRUCTION

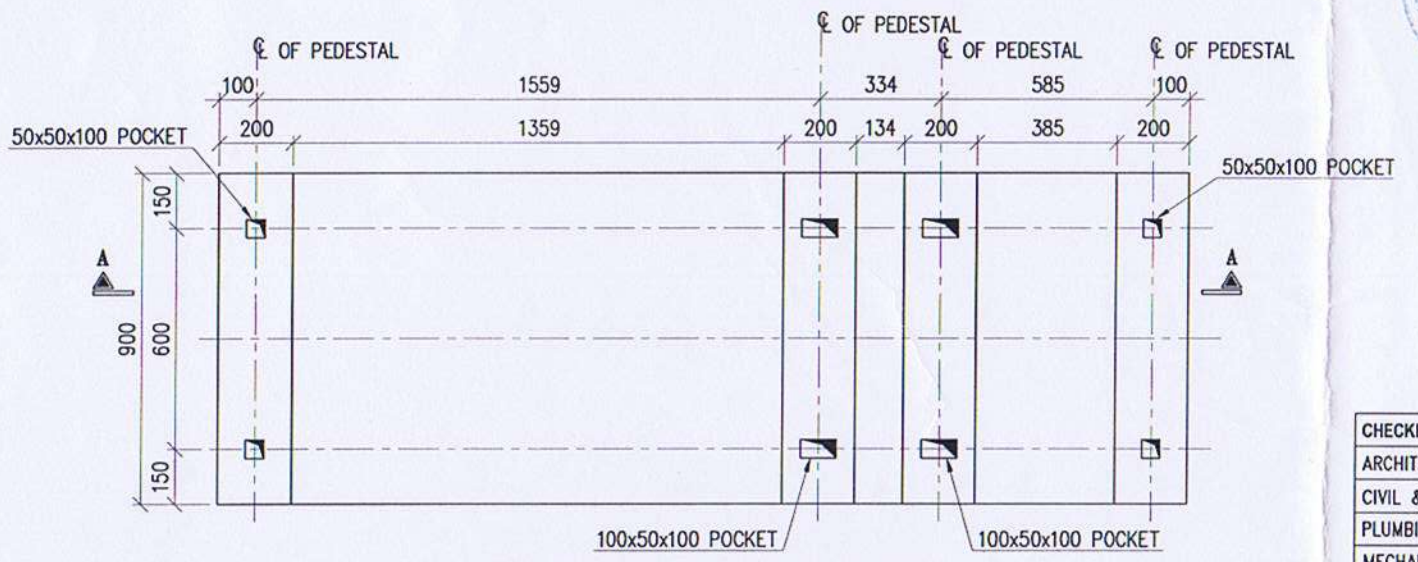
E:\SCRIPS BHUBANESWAR\CIVIL\RMU FOUNDATION\015187-C-SY-SY-FN-1028-03-04-C.dwg



SECTION A-A



RMU (6WAY) WALL PLAN



RMU (6WAY) FOUNDATION PLAN

LEGEND:-

——— - ———	– CENTER LINE
FGL	– FINISHED GROUND LEVEL
℄	– CENTER LINE
Ld	– DEVELOPMENT LENGTH
TYP	– TYPICAL

REINFORCEMENT IS DENOTED AS :
10ϕ @ 200 C/C
- SPACING OF BAR IN mm
- HYSD BARS CONFORMING TO IS:1786
- DIA OF BAR IN mm

REFERENCE DRAWING:-

1. REFER DRG No. 502-8703-9 OF M/S SIEMENS & APPROVED BY PRDC.

NOTES:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. FGL CORRESPONDS TO FINISHED GROUND LEVEL.
3. ALL RCC USED SHALL BE OF GRADE M30 (DESIGN MIX)
4. LEAN CONCRETE SHALL BE OF GRADE 1:3:6 (P.C.C)
5. CLEAR COVER TO REINFORCEMENT SHALL BE = 40MM.
6. THE FOUNDATION SHALL BE PLACED ON COMPACTED EARTH.
7. ALL REINFORCEMENT STEEL SHALL BE HYSD (Fe 500) CONFORMING TO IS:1786/TMT BARS(EQUIVALENT GRADE)
8. LAP ANCHOR LENGTH/DEVOLEPMENT LENGTH FOR REINFORCEMENT SHALL BE 50 TIMES THE DIAMETER OF THE BAR.
9. MINIMUM NET SAFE BEARING CAPACITY IS CONSIDERED AS 6 T/sq.m.(min) AT FOUNDING LEVEL.
10. MINOR ADJUSTMENTS MAY BE DONE AT SITE IN CONSULTATION WITH ENGINEER IN-CHARGE

TOTAL QUANTITY = 2Nos.

APPROVED
01.09.16
PROJECT MANAGER
ADVANCE SCRIPS
PRDC, BHUBANESWAR

23/8/16

CHECKED BY	SIGN	DATE
ARCHITECTURE	–	–
CIVIL & STRUCTURAL	–	–
PLUMBING & SANITARY	–	–
MECHANICAL	–	–
ELECTRICAL	–	–
INSTRUMENTATION	–	–

REV. No	DESCRIPTION	DESIGNED	DRAWN	CHECKED	APPROVED
C	REVISED AS PER EQUIPMENT DETAILS				
B	REVISED AS PER PRDC COMMENTS	TRP 21.07.16	RA 21.07.16	TRP 21.07.16	DA 21.07.16
A	ISSUED FOR APPROVAL	TRP 23.03.16	RA 23.03.16	SV 24.03.16	DA 24.03.16

REVISIONS

L&T Construction
Power Transmission & Distribution

CLIENT : ODISHA POWER TRANSMISSION CORPORATION LIMITED (OPTCL)

CONSULTANT : POWER RESEARCH & DEVELOPMENT CONSULTANTS PVT. LTD. (PRDC)

PROJECT : UNDERGROUND CABLING SYSTEM IN FOUR MAIN LANES AND CONNECTING ROADS OF BHUBANESWAR CITY (SACHIVALAYA MARG, BIDYUT MARG, JANAPATH AND CUTTACK ROAD WITH CONNECTING ROADS RAJAPATH,GOPABANDHU MARG , PATEL MARG) UNDER ADVANCE SCRIPS ON EPC CONTRACT BASIS

SUPPLIER / CONTRACTOR :

JOB No. : 015187-C-SY

	NAME	SIGN	DATE
DSGN	TRP	TRP	23.03.16
DRWN	RA	RA	23.03.16
CHKD	SV	SV	24.03.16
APPD	DA	DA	24.03.16

TITLE : DETAIL OF PRECAST 11kV RMU FOUNDATION (6WAY)

SCALE 1:20

PROJECTION

DRG. No. O 1 5 1 8 7 – C – S Y – S Y – F N – 1 0 2 8

SHEET 04 OF 04

SIZE A3 REV. C

RELEASED FOR ☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☑ APPROVAL ☐ CONSTRUCTION

E:\SCRIPS BHUBANESWAR\CIVIL\RMU FOUNDATION\015187-C-SY-SY-FN-1028-04-04-C.dwg

CONTENTS

1.	SCOPE	This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site, performance of danger plates.
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. The danger plate shall comply with the Indian Standard IS 2551- 1982
3.	CLIMATIC CONDITIONS OF THE INSTALLATION	The service conditions shall be as follows: 1. Maximum altitude above sea level 1,000m 2. Maximum ambient air temperature 50°C 3. Maximum daily average ambient air temperature 35°C 4. Minimum ambient air temperature 0°C 5. Maximum relative humidity 95% 6. Average number of thunderstorm days per annum (isokeraunic level) 70 7. Average number of rainy days per annum 120 8. Average annual rainfall 150cm 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) 11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr. environmentally, some of the regions, where the work will take place includes 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 12. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

<table>
<tr><td>4.</td><td>GENERAL TECHNICAL REQUIREMENTS</td><td>
<table>
<tr><th></th><th>DESCRIPTION</th><th>UNITS</th><th>REQUIREMENTS</th></tr>
<tr><td>1.</td><td>Plate material</td><td></td><td>Mild steel</td></tr>
<tr><td>2.</td><td>Plate thickness, min</td><td>Mm</td><td>1.6</td></tr>
<tr><td>3.</td><td>Front side paint</td><td></td><td>Vitreous enameled white</td></tr>
<tr><td>4.</td><td>Letters / figure / skull / cross bones colour</td><td></td><td>Red color</td></tr>
<tr><td>5.</td><td>Rear side of plate</td><td></td><td>Enameled</td></tr>
<tr><td>6.</td><td>Dimension</td><td>mm</td><td>250x200</td></tr>
<tr><td>7.</td><td>Corners of the plate</td><td></td><td>Rounded off</td></tr>
</table>
</td></tr>
<tr><td>5.</td><td>GENERAL CONSTRUCTIONS</td><td>5.1. Dimensions:
5.1.1 For 415V, 11kV, and 33kV voltage installations: 250x200mm (see figure given in Annexure).
5.1.2 All letterings shall be centrally spaced. The dimensions of the letters, figures and their respective positions shall be as given in figure. The size of each letter in the word in each language, and the spacing between them for purposes of scribing shall be so chosen that they are uniformly written in the space earmarked for them.
5.1.3 The corners of the plate shall be rounded off.
5.1.4 The locations of the fixing holes shall be left to the choice of the user.

LANGUAGES ENGLISH: for denoting in English, the type of lettering recommended is as shown in the figure.
Local Language: for denoting in Local Language, the type of lettering recommended is as shown in the figure.</td></tr>
<tr><td>6.</td><td>NAME PLATE AND MARKING</td><td>The essential information that would be necessary to identify the manufacturer of the danger board plates shall be marked, in such a manner and position on the plates that it does not interfere with the other information.
The danger board plates shall also be marked with ISI certification mark.
“PROPERTY OF TPCODL, BUBANESHWAR” to be written in blue color (PANTONE 300C) along with the logo.</td></tr>
</table>

7.	TESTS	**General** 7.0.1 In order to ensure that the notice plates conform to this specification, the following essential tests are specified. The number of samples to be tested shall be as agreed to between the supplier and the user. 7.0.2 the following shall constitute the tests: a) Visual examination b) Dimensional check, and c) Test for weather proofness. 7.1 Visual Examination : The samples of notice shall be examined visually for conformity to the various requirements of this standard in respect of the works and letters used their relative positive and size. The colour of the paint used shall be visually compared with the signal red colour as specified in IS:5-1978 7.2 Dimensional Check : The dimension of the plate, its thickness and the size of lettering, figures, etc. shall conform generally to the stipulations in 5.1.2 to 5.1.4 7.3 Tests for weather proofness : For the purpose of verifying colour retention of the vitreous enamel coatings, the method of test specified in IS 8709-1977 shall apply.
8	TYPE TEST CERTIFICATES	Supplies shall be tested and five duly attested/certified copies of test certificates for respective items shall be submitted for approval and issuing Material Dispatch Clearance Certificate called MDCC.
9.	PRE-DISPATCH INSPECTION	A) TESTS: the material shall be subjected to following tests: 1) Visual Inspection B) The Material shall be subject to inspection by a duly authorized representative of the TPCODL, Bhubaneshwar. 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, Bhubaneshwar. Following documents shall be sent along with material: a. Test reports b. MDCC issued by TPCODL, Bhubaneshwar

		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, Bhubaneshwar 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 & Contracts department
11.	GUARANTEE	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser
12.	PACKING	Suppliers shall ensure that all the 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.
13.	TENDER SAMPLE	As and when required.
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.
15.	TESTING FACILITIES	Supplier/Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.
16.	MANUFACTURING ACTIVITIES	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order

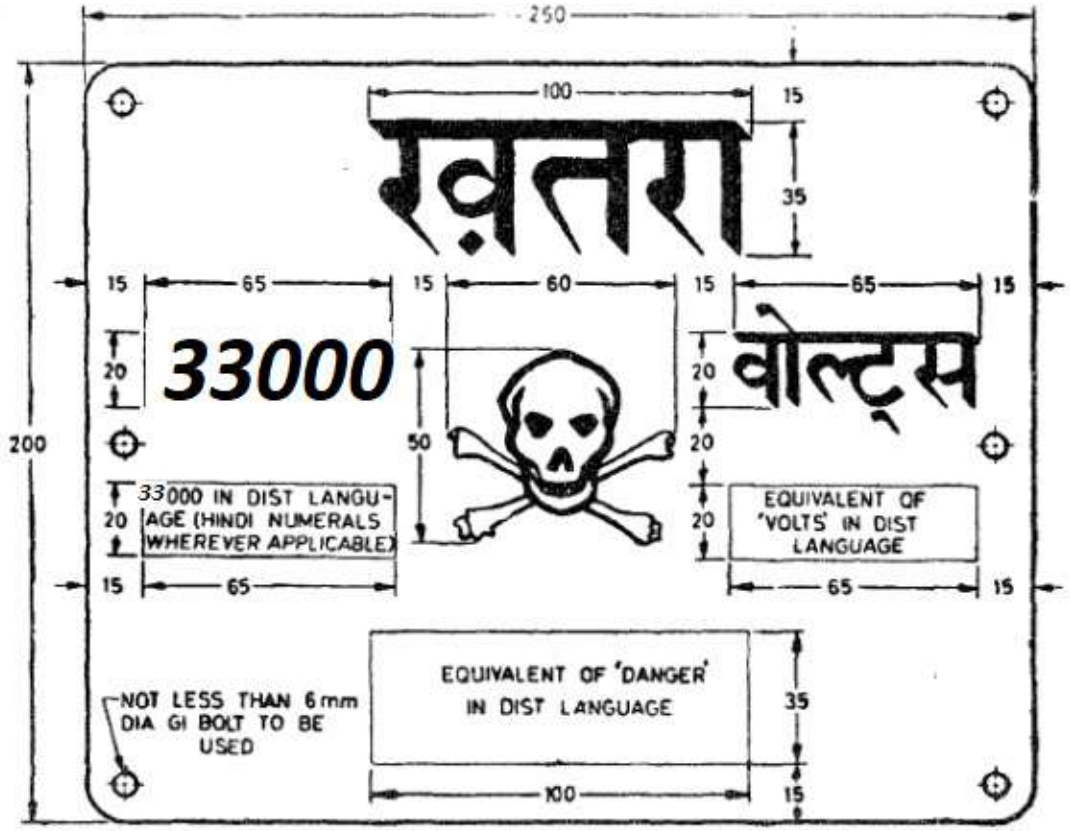
<table>
<tr><td>17.</td><td>SPARES, ACCESSORIES AND TOOLS</td><td>The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of danger board plate along with the installation procedure</td></tr>
<tr><td>18.</td><td>DRAWINGS AND DOCUMENTS</td><td>Following documents shall be prepared based on TPCODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:
a) Completely filled in Technical Particulars.
b) General description of the equipment and all components including brochures.
c) Type test Certificates.
d) Experience List.

After the after of the contract, four (4) copies of the drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and shall subsequently provide four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, test certificates shall be submitted after the final approval of the same to the purchaser.</td></tr>
<tr><td>19.</td><td>GENERAL TECHNICAL PARTICULARS</td><td>
<table>
<tr><th>S. No.</th><th>DESCRIPTION</th><th>UNITS</th><th>REQUIREMENTS</th></tr>
<tr><td>1.</td><td>Plate material</td><td></td><td rowspan="8">To be furnished by the bidder</td></tr>
<tr><td>2.</td><td>Plate thickness, min</td><td>mm</td></tr>
<tr><td>3.</td><td>Front side paint</td><td></td></tr>
<tr><td>4.</td><td>Letters/ figure/skull/cross bones colour</td><td></td></tr>
<tr><td>5.</td><td>Rear side of plate</td><td></td></tr>
<tr><td>6.</td><td>Dimension</td><td>mm</td></tr>
<tr><td>7.</td><td>Corners of the plate</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>20.</td><td colspan="2">SCHEDULE OF DEVIATIONS
<u>(TO BE ENCLOSED WITH TECHNICAL BID)</u>

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:
<table>
<tr><th>S. No</th><th>Clause No.</th><th>Details of deviation with justifications</th></tr>
<tr><td></td><td></td><td></td></tr>
</table>
We confirm that there are no deviations apart from those detailed above.

Seal of the Company:</td></tr>
</table>

ANNEXURE



NOTE 1 — All letterings should be centrally spaced.

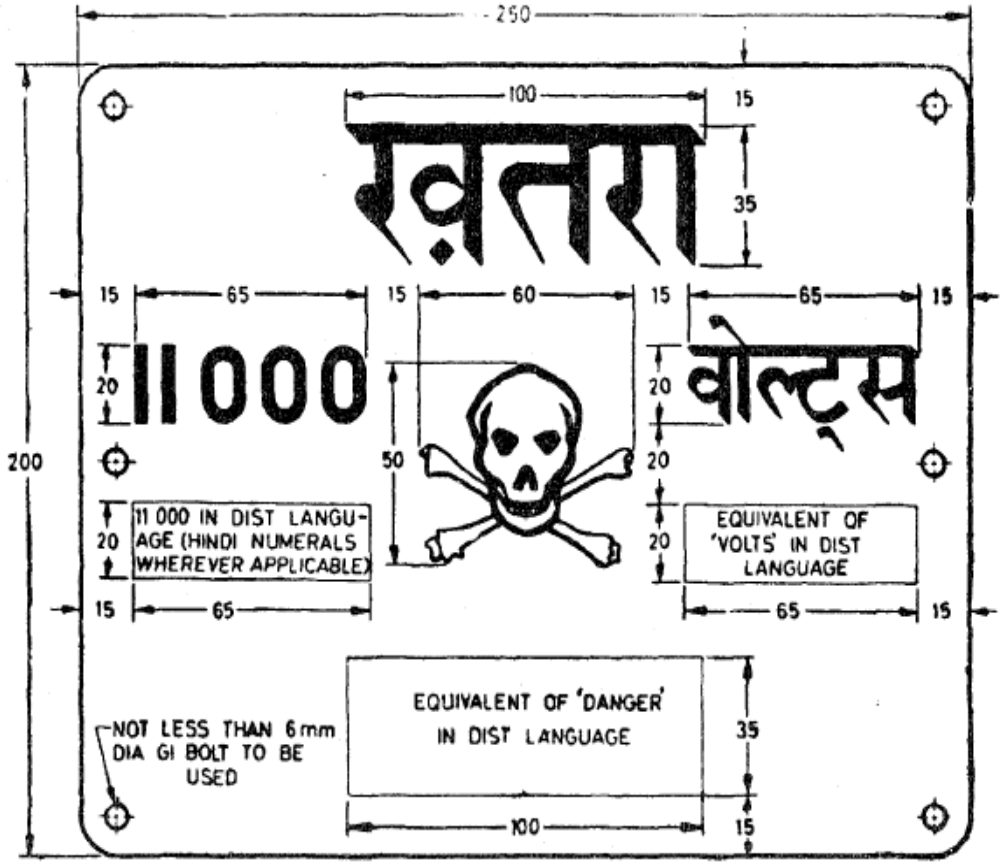
NOTE 2 — The dimensions for the words in district language are mainly for guidance, however, care should be taken to space them centrally between the edges and the area of the skull and bones.

NOTE 3 — The location of the fixing holes shall be left to the choice of the user.

NOTE 4 — 33 000 volts is just specimen, actual voltage is to be inserted for different system voltages.

NOTE 5 — The corners of the plates should be rounded off.

All dimensions in millimetres.



NOTE 1 — All letterings should be centrally spaced.

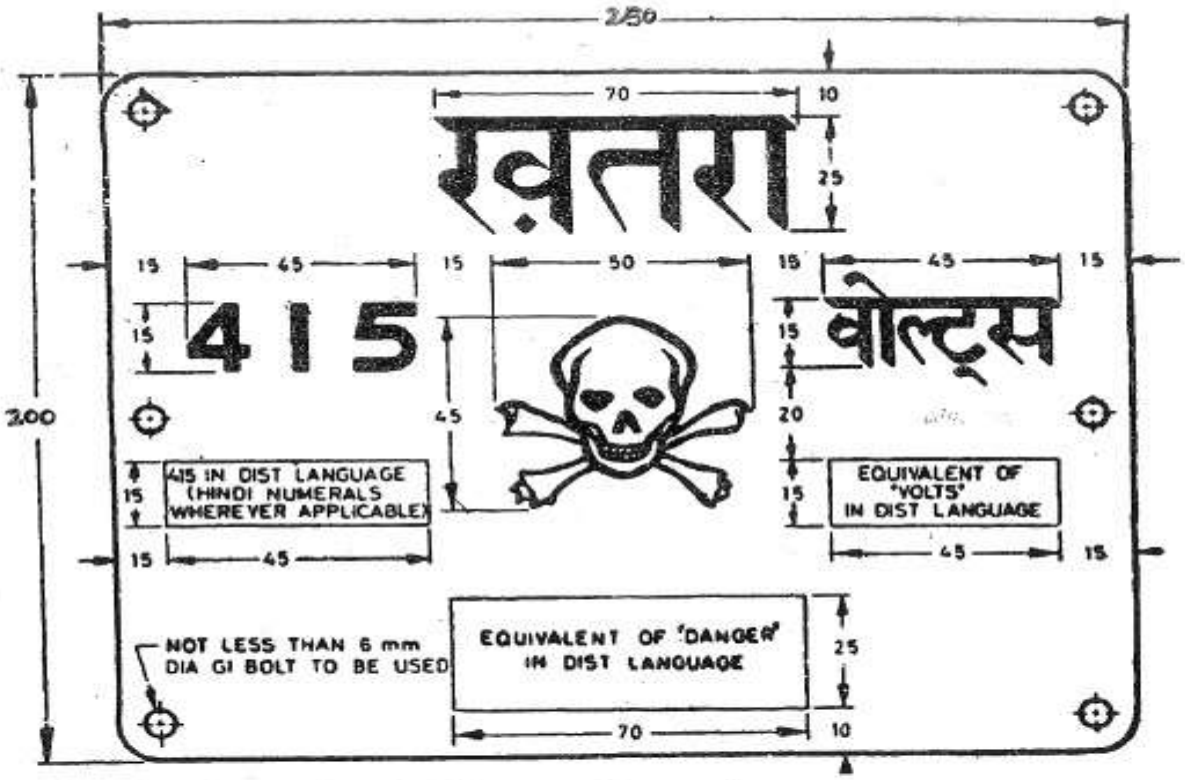
NOTE 2 — The dimensions for the words in district language are mainly for guidance, however, care should be taken to space them centrally between the edges and the area of the skull and bones.

NOTE 3 — The location of the fixing holes shall be left to the choice of the user.

NOTE 4 — 11 000 volts is just specimen, actual voltage is to be inserted for different system voltages.

NOTE 5 — The corners of the plates should be rounded off.

All dimensions in millimetres.



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NOTE 3 — The location of the fixing holes shall be left to the choice of the user.

NOTE 4 — The corners of the plates should be rounded off.

All dimensions in millimetres.

Sample pics of danger boards

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-GEN-4005

Specification Name : GALVANISED IRON (GI) FLATS OF DIFFERENT SIZES

Ranjan Kumar Sahoo	SATYA PRASAD NAYAK	SHANTAPRIYA JENA	JYOTIPRAKASH MOHANTY	Shailendra Kumar Jaiswal	SHIRISH SHARAD DIKAY
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPSODL	TPCODL	TPNODL	TPWODL	TPSODL	TPSODL
22-12-2022	22-12-2022	22-12-2022	22-12-2022	22-12-2022	22-12-2022

TPCODL TPNODL TPWODL TPSODL	**Document No:** ENG-GEN-4005 **Document Title:** GALVANISED IRON (GI) FLATS OF DIFFERENT SIZES

CONTENTS

1.0	**SCOPE**	This specification covers technical requirements of design, manufacturing, testing, Inspection, Supply & transportation of Hot dip Galvanised Iron (GI) Flat 25X3 MM, 25X4 MM, 25X6 MM, 50X6 MM, 75X10 MM, 90X6 MM at TPCODL/TPNODL/TPSODL/TPWODL stores/site.
2.0	**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 confirm to the regulations of the local Statutory authorities: • IS 1239 (Part1): Specification for Steel Tubes, Tubulars & other wrought steel fittings. • IS 1239 (Part2): Specification for Steel Tubes, Tubulars & other steel fittings. • IS 228: Method for chemical analysis of steels. • IS 4736 : Specification for Hot dip zinc coating on mild steel tubes • IS 4759: Specification for Hot dip zinc coating on structural steel and other allied products. • IS 1387: General requirements for the supply of metallurgical materials. • IS 1608: Mechanical testing of metals-Tensile Strength. • IS 4711: Methods for sampling of steel pipes, tubes and fittings. • IS 4740: Code of practice for packaging of steel tubes. • IS 10748: Hot rolled steel strip for welded tubes & pipes. • IS 12278: Method for ring tensile test on metallic tubes. • IS 3043-1987: Code of practice for earthing. • IS 1367: Technical supply conditions for threaded steel fastners. • IS 14394: Industrial fastners-Nuts of product GradeC- Hot Dip Galvanised. • IS 2016:-1997: Specification for plain washers. • IS 1730-1989: Steel plates, sheets, strips and flats for structural • And general engineering purpose-Dimensions • IS 814-2004: covered electrodes for manual metal Arc welding • of carbon and carbon Manganese steel- specification. • IS: 2629(1966)- Recommended practice for hot dip galvanized of Iron Earthing Strips • IS: 2633(1972)- Methods of testing weight, thickness & uniformity of coating on hot dip galvanized articles. • IS: 5358(1969)- Specification for hot dip galvanized coating on fastness I • IS:3203-Specification for Electroplating • IS: 4759(1968)- IS: 4759(1968) • IS 2062 **In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.*

3.0 CLIMATIC CONDITIONS OF INSTALLATION

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

TPCODL/TPNODL/TPSODL/TPWODL 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.

4.0 GENERAL TECHNICAL REQUIREMENTS

MATERIAL

Supplier has to purchase raw materials (MS Flat) as per relevant IS at his own cost.

The zinc required for galvanizing shall be quality Zn-99.95% or better Zinc grade & shall confirm to IS and its latest amendments.

The Supplier shall make his own arrangement for procurement before the commissioning of work, sufficient quantity of electrolytic zinc of proper quality for galvanizing. The Supplier shall however not link the delivery period with the supply of zinc. TPCODL/TPNODL/TPSODL/TPWODL is at liberty to have sample of zinc used and to test in any laboratory at his own cost and reject the particular supply, is found below standard.

All raw materials required for galvanizing etc. and for complete execution of work shall be stocked in adequate quantities by the Supplier to ensure that the progress of work is not hampered.

SL. NO.	TECHNICAL PARTICULARS	Requirement
1	Material	Hot-Dip Galvanized Flat
2	Relevant Standard	IS: 2062, IS: 2633, IS: 2629, IS: 4759
3	Make	SAIL, TATA Steel, ESSAR, JSW Steel and TATA steel BSL
4	Grade of Steel	E 250 A
5	Minimum Tensile Strength in Mpa	410
6	Yield Stress in Mpa	250
7	Percentage Elongation (Min.) at Gauge Length	23%
8	Bend Test (Internal Dia)	Min-2t
9	Mass of Zinc Coating	705 gm/m^2
10	Zinc Coating Thickness & No of Dips	100 Micron (6 Dip)
11	Chemical composition	Grade: E 250 A (As per IS: 2062)
12	Standard length of supply	6 Metre Long
13	Tolerances	As per IS 1852 latest Amendment

5.0 GENERAL CONSTRUCTION

GI Flat intended for different use in electricity distribution utility. The zinc coating shall be uniform. The materials shall be strictly from approved vendors' i.e. SAIL, TATA Steel, ESSAR, JSW Steel and TATA steel BSL & Billets(grade E250) with re rolling shall be allowed for mentioned MAKE. Documentary evidence certifying the raw material lifted from the approved vendor, which should not be less than the ordered quantity. Similarly the zinc for galvanization shall be procured from Hindustan zinc LTD. or Vedanta LTD. And the firm shall submit the documentary evidence certifying not less than the ordered quantity of zinc lifted from the approved vendor. The hot dip galvanization shall be done only after the all fabrication and welding done. The nut bolt, & washers provided shall be as per relevant IS.

5.1 Mass of the Flats are as follows:-

a) 25X3 mm: - 0.589kg/m

b) 25X4 mm: - 0.785kg/m

c) 25X6 mm: - 1.18kg/m

d) 50x6 mm: - 2.36kg/m

e) 75x10 mm: -5.89kg/m

f) 90x6 mm: -4.24kg/m

5.2 Chemical Composition

Chemical composition for Fe 410 WA Grade

a)C - 0.23% Max

b)Mn - 1.5% Max

c)S - 0.045% Max

d)P - 0.045%Max

e)SI - 0.40% Max

f) CE (Carbon Equivalent)- 0.42%

5.3 Galvanization:

All flats 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.

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.
6.0	**NAME PLATE AND MARKING**	The body of the device shall be appropriately marked with "TPCODL/TPNODL/TPSODL/TPWODL" , Manufacture's name or trademark and Year of Manufacturing. at suitable location such that it is permanent and does not harm the body of the device.
7.0	**TESTS**	All routine, acceptance & type tests shall be carried out in accordance with the relevant IS.
7.i)	**TYPE TEST**	The following tests shall constitute the type tests and shall be carried out as per IS: 1239 Part-1: 2004(Latest Amendment) 1)Test for Mechanical Properties (As per 1239 Part-1: 2004 or Latest Amendment clause no.14.1 & 14.1.1) • Percentage of Elongation. • Tensile strength. 2) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1) 3) Chemical composition. (As per 1239 Part-1: 2004 or Latest Amendment clause no.6.1.1)
7.ii)	**ROUTINE/ ACCEPTANCE TEST**	The following tests shall be got conducted in presence of TPCODL/TPNODL/TPSODL/TPWODL representative as per IS: 1239 Part-1: 2004 (Latest Amendment) on the samples taken from the offered lot material for the purpose of acceptance of that lot of material. 1) Dimension of GI Flat. (As per IS 1239 Part-1: 2004 clause No.9.1 a&b)-Test shall be performed. 2) Chemical composition (Manufacturer's Test Certificate for raw material-Document Review only.) 3) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1)-Test shall be performed. 4) Test for mechanical properties (Manufacturer's Test Certificate for raw material-Document Review only.) 5) Galvanizing/Electroplating test 6) Visual Inspection test to confirm products free from any defects
8.0	**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/ NABL accredited 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/TPNODL/TPSODL/TPWODL .

9.0	**PRE DISPATCH INSPECTION**	The Material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPSODL/TPWODL . Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPCODL/TPNODL/TPSODL/TPWODL 's representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPSODL/TPWODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPNODL/TPSODL/TPWODL . The pre-dispatch inspection shall be carried out as per annexure-IV Following documents shall be sent along with material a) Test reports b) MDCC issued by TPCODL/TPNODL/TPSODL/TPWODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan h) Other Documents (as applicable)
10.0	**INSPECTION AFTER RECEIPT AT STORES**	The material received at TPCODL/TPNODL/TPSODL/TPWODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to each QA and Plant Engineering group.
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 12 months from the date of commissioning or 18 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 time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.
12.0	**PACKING**	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.
13.0	**TENDER SAMPLE**	Samples to be provided as required to TPCODL/TPNODL/TPSODL/TPWODL

		Engineering Dept.
14.0	**TRAINING**	Not Applicable
15.0	**QUALITY CONTROL**	The bidder shall have a prove track of not less than 10 years in GI Flat in manufacturing and servicing in national or international market. 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.
16.0	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards.
17.0	**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.
18.0	**SPARES ACCESSORIES AND TOOLS**	To be provided by BA
19.0	**DRAWINGS AND DOCUMENTS**	Constructional drawings are attached as annexure-I, annexure-II, annexure-III should be followed for fabrication. Following documents shall be prepared based on TPCODL/TPNODL/TPSODL/TPWODL specifications and statutory requirements with complete BOM and shall be submitted with the bid: 1. Completely filled in Technical Particulars along with Size and weight/sq.m of G.I. Flat, Standard Length, Galvanization Process, Galvanization thickness 2. General description of the equipment and all components including brochures. 3. Bill of Material 4. Type test Certificates 5. Experience List. After award of order Soft of all the drawing, GTP, test certificates shall be submitted for the final approval of the same to the purchaser. Following Drawings/Documents shall be submitted after the award of the contract:

Sl. No	Description	For Approval	For Review Information	Final Submission
1	General Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of the component.		√	√
4	Instructions for use		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√
7	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

20.0	**GUARANTEED TECHNICAL PARTICULARS**	Clause wise compliance shall be provided by bidders

21.0	**SCHEDULE OF DEVIATIONS**	**(TO BE ENCLOSED WITH THE 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 TPCODL/TPNODL/TPSODL/TPWODL 's specifications:

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

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

Seal of the Company:

Signature
Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-GEN-4006

Specification Name : GI EARTHING PIPE

Ranjan Kumar Sahoo	SATYA PRASAD NAYAK	SHANTAPRIYA JENA	JYOTIPRAKASH MOHANTY	Shailendra Kumar Jaiswal	SHIRISH SHARAD DIKAY
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPSODL	TPCODL	TPNODL	TPWODL	TPSODL	TPSODL
21-12-2022	21-12-2022	22-12-2022	22-12-2022	22-12-2022	22-12-2022

CONTENTS

1. SCOPE:

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

2. APPLICABLE STANDARDS:

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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

TPCODL/TPNODL/TPSODL/TPWODL 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 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/mm²	320 N/mm²	320 N/mm²
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:4736, IS: 2633, IS: 2629	IS:4736, IS: 2633, IS: 2629	IS:4736, IS:2633, IS: 2629
14	Dimension of clamp	50 x 6 GI flat	50 x 6 GI flat	50 x 6 GI flat
15	Weight of Pipe (As per IS 1239 Part-1(2004)	4.37Kg/Mtr.	6.19Kg/Mtr.	14.5Kg/Mtr.
16	Center of Hole	150mm	150mm	150mm

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 with thickness up to 6 mm, the minimum mass of zinc coating in accordance with IS: 6745, shall be 400g/mm2. 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/TPNODL/TPSODL/TPWODL
b) Manufacture's name or trademark
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) 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/NABL Accredited 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/TPNODL/TPSODL/TPWODL.

9. PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material.

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

10. INSPECTION AFTER RECEIPT AT STORE:

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

11. GUARANTEE:

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

12. PACKING:

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

13. TENDER SAMPLE:

Not Applicable

14. QUALITY CONTROL:

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

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

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

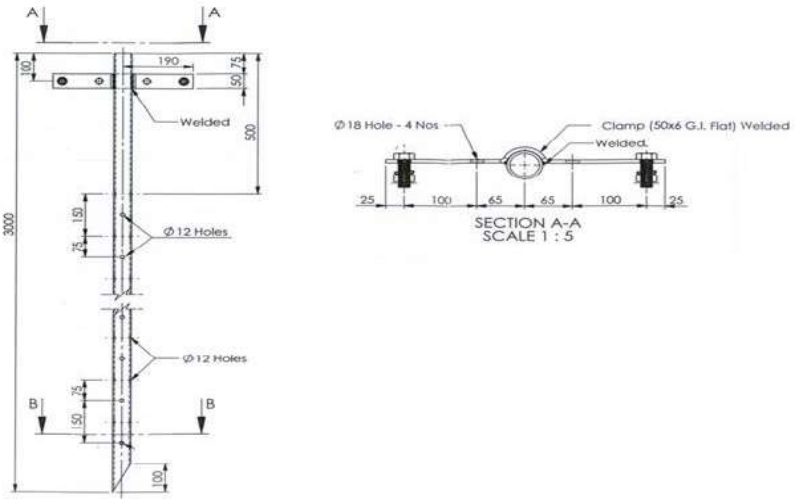
17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

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

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



NOTE: - The drawing is for tender purpose only.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:-

SL. No	TECHNICAL PARTICULAR	TO BE FURNISHED BY THE BIDDER		
1	Diameter of earthing Pipe	40 mm dia	50 mm dia	100 mm dia
2	Standard			
3	Material			
4	Make			
5	Class			
6	Outdoor diameter			
7	Wall thickness			
8	% of Elongation			
9	Tensile strength			
10	Length of pipe earthing			
11	Dimensions of holes			

12	Tolerance on dimensions/weight			
13	Galvanizing shall confirm			
14	Dimension of clamp			

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-GEN-4009

Specification Name : Technical Specification For WPB Pole (11MTR & 13MTR)

SANTOSH KUMAR PATRA	SATYA PRASAD NAYAK	SHANTAPRIYA JENA	Ranjan Kumar Sahoo	ANUP JAWASE	VARUN BHATNAGAR
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPWODL	TPCODL	TPNODL	TPSODL	TPWODL	TPWODL
08-02-2023	09-02-2023	14-02-2023	14-02-2023	15-02-2023	17-02-2023

CONTENTS

1. SCOPE:

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

2. APPLICABLE STANDARDS:

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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

TPCODL/ TPNODL/ TPWODL/ TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed 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	Length of Joist in mtr.	11mtr / 13mtr
2	Make	SAIL/TATA/ RINL/JINDAL/JSW **(Billet with re rolling not allowed)**
3	Weight in kg/m with ±2.5% Tolerance	30.44
4	Sectional Area (cm^2)	38.8
5	Flange slope in deg	90
6	Cutting length tolerance	100 mm (no negative tolerance)
7	Depth(D) of Section (mm) with ±3.0 mm Tolerance	152
8	Width(B) of Flange (mm) with ±3.0 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 (R) (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	Zxx (cm^3)	220.1
B	Zyy(cm^3)	76.9
15	GI Base Plate in mm	300 x 300 x 12
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	2t (Shall not crack)

Sl. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
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, IS 4759
22	The zinc coating (Min 705 gms per sq.mt & Min. 100 Micron at every point) 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 in Dip Test process for WPB Pole	Min 705 gms per sq.mt & Min. 100 Micron at every point with 6 Dips
23	Fabrication	1. Hole as per GA drawing provided by TPCODL/TPNODL/TPWODL/TPSODL 2. Arc welding to be used for fabrication / jointing of Base plate & stiffener to the pole
24	Embossing (non-erasable	ISI Mark, WPB 160, Manufacturer Name/ Trade Mark.
25	Stencil Marking (non-erasable) is made on mid-section of each WPB Poles to be supplied to TPCODL/TPNODL/TPWODL/TPSODL	TPCODL/TPNODL/TPWODL/TPSODL, P.O No and Date of Manufacturing
26	Depth of Plantation Marking (Red Colour)	A strip of 20-30 mm shall be painted with oil paint of red colour, on all over of the pole at a planting depth

5. GENERAL CONSTRUCTIONS/REQUIREMENTS:

The Wide Parallel Beam support structures shall be fabricated from mild steel, grade A and in lengths dictated by design parameters. Supplier has to supply Baseplate with dimension 300mm x 300mm x 12mm thickness along with Stiffener 150x60x6 (flange) & 150x100x6 (web). Complete fabrication drawing shall be submitted for approval. Holes should be as per GA drawing provided by TPCODL/TPNODL/TPWODL/TPSODL. 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, JSW & TATA (Billet with re rolling not allowed).

5.1 Galvanization:

WPB Pole 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. However, high tensile steel nuts, bolts and spring washer shall be electro galvanized.

b) The zinc coating (Min 705 gms per sq.mt & Min. 100 Micron at every point) 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) The threads of all galvanized bolts and screwed rods shall be cleared of spelter by spinning or brushing. A die shall not be used for cleaning the threads unless specifically approved by the Engineer in Charge. All nuts shall be galvanized. The threads of nuts shall be cleaned with a tap and the threads oiled.

f) Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.

g) After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to test as 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 mid-section of each WPB Poles to be supplied to TPCODL/TPNODL/TPWODL/TPSODL under this Tender.

a) ISI Mark

b) WPB 160

c) E-350 A

d) Manufacturer Name/ Trade Mark

Stencil Marking (non-erasable) is made on mid-section of each WPB Poles to be supplied to TPCODL/TPNODL/TPWODL/TPSODL.

a) "TPCODL/TPNODL/TPWODL/TPSODL"
b) P.O No and Date of Manufacturing
c) Depth of planting (A strip of 20-30 mm shall be painted with oil paint of red colour, on all over of the pole at a planting depth.)

7. TESTS CERTIFICATE:

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,
i) Test in respect of Hot Dip Galvanization i.e., (Thickness of zinc coating in microns, Mass of Zinc Coating)

7.2 ROUTINE TESTS

Same as Acceptance Test

7.3 TYPE TESTS

ii) Chemical Composition
iii) Mechanical Properties
iv) Test in respect of Hot Dip Galvanization i.e., (Thickness of zinc coating in microns, Mass of Zinc Coating)

8. TESTS:

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/Approved Government Labs by Tata Odisha Discoms 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/TPNODL/TPWODL/TPSODL.

9. PRE DISPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. Inspection may be made at any stage of manufacture at the option of the TPCODL/TPNODL/TPWODL/TPSODL 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 TPCODL/TPNODL/TPWODL/TPSODL's representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPWODL/TPSODL 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 TPCODL/TPNODL/TPWODL/TPSODL. Following documents shall be sent along with material

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

10. INSPECTION AFTER RECEIPT AT STORES:

The material received at TPCODL/TPNODL/TPWODL/TPSODL Store/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 "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 ACTIVITIES:

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) Signed & stamped copy of clause-wise compliance on Technical Specification & Schedule of 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.

e) Signed & stamped copy of pre-bid queries.

19. GUARANTEED TECHNICAL PARTICULARS:

Bidder shall have to comply & submit clause wise compliance of this specification.

20. SCHEDULE OF DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL BID)

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

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

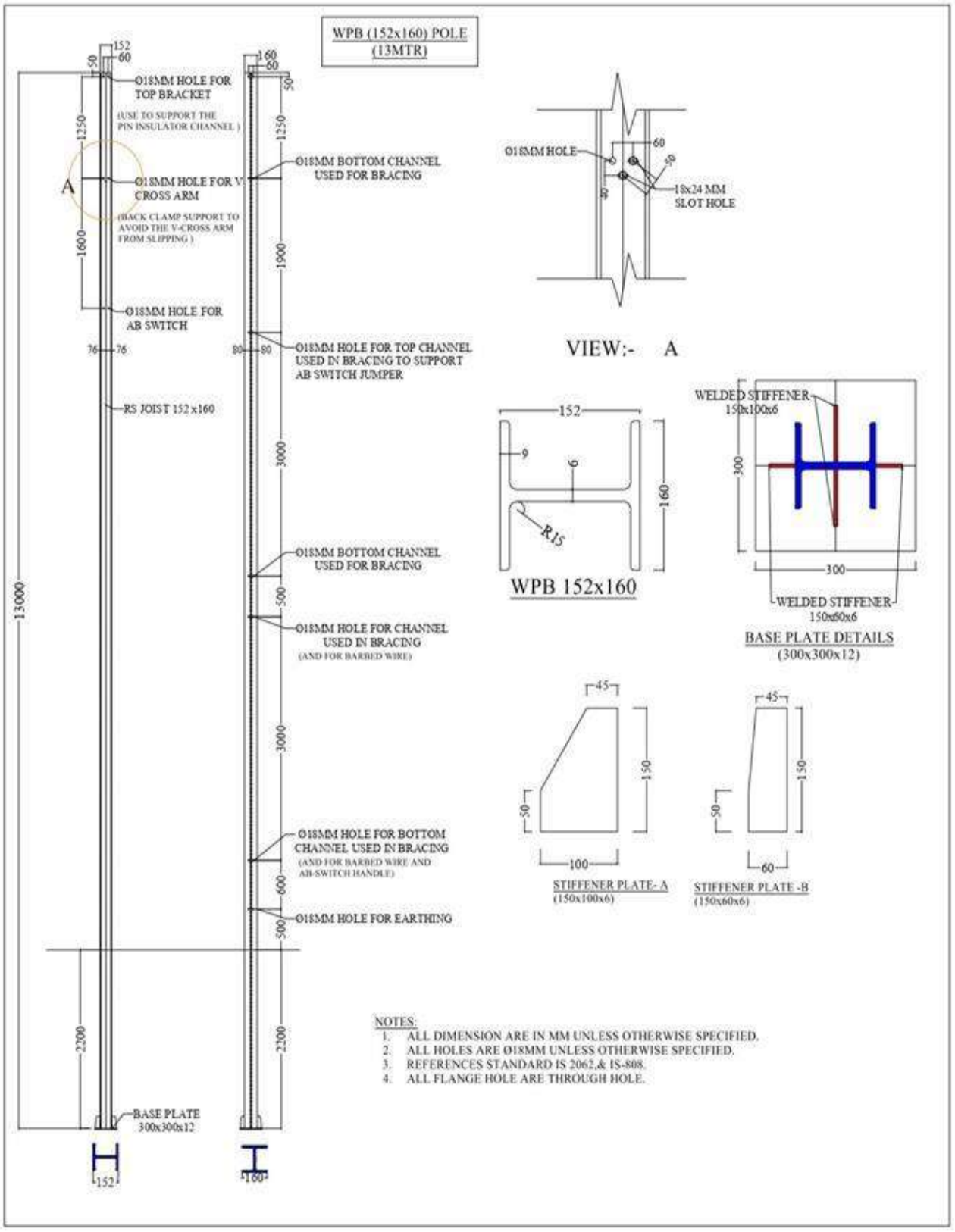
We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

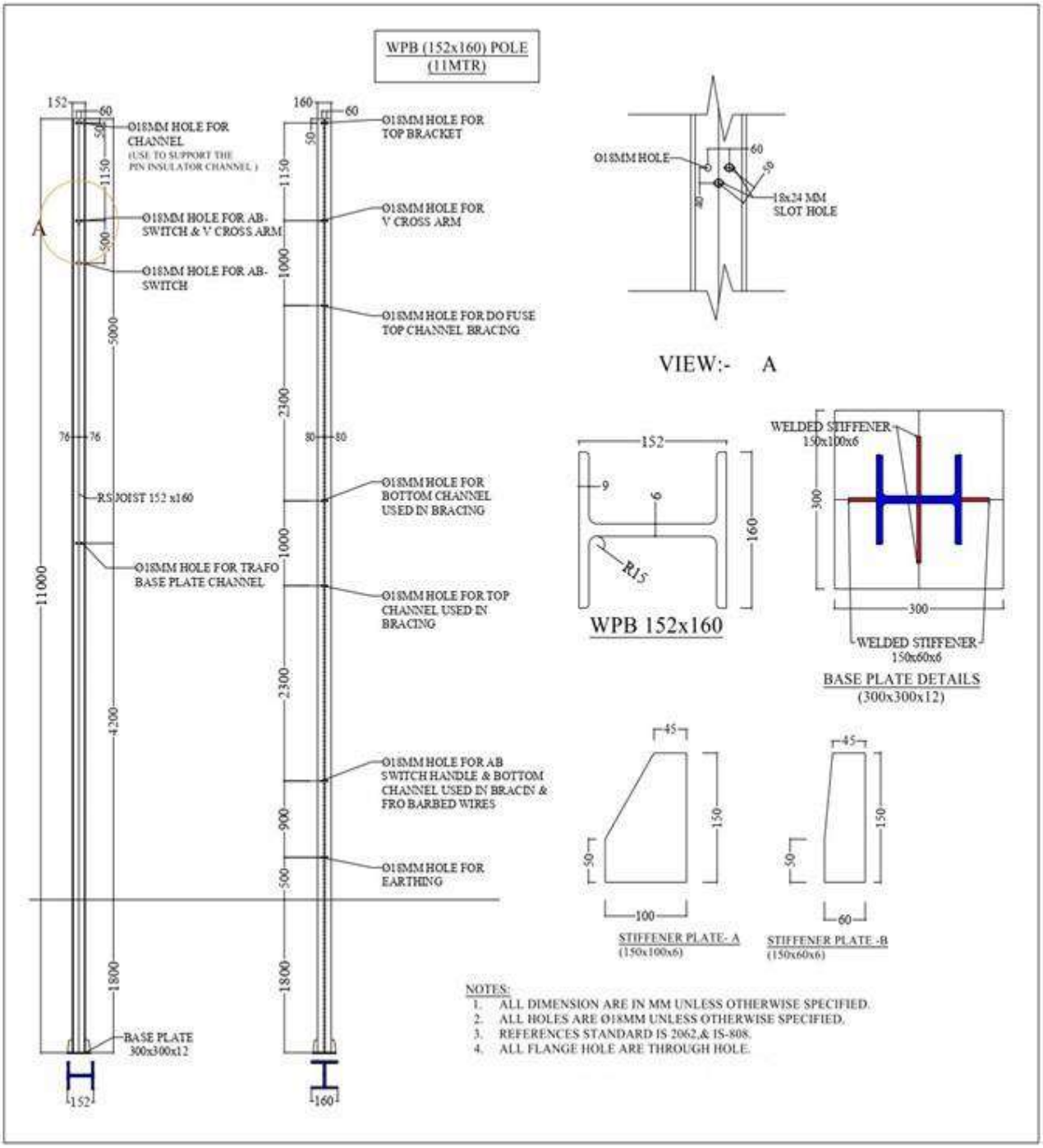
Signature

Designation

The shown drawing shall be indicative in nature & will be finalized during detailed engineering**:**



The shown drawing shall be indicative in nature & will be finalized during detailed engineering:



CONTENTS

1. SCOPE:

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

2. APPLICABLE STANDARDS:

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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

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

TPCODL/TPNODL/TPSODL/TPWODL 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 details	Hot-Dip Galvanized Nut, Bolt & Washer
2	Material	Carbon steel
3	Relevant Standard	IS:1363, IS 1367, IS: 2633, IS: 2629.
4	Grade of Steel	5.6
5	Mass of Zinc Coating	As per IS 1367 Part XIII
6	Zinc Coating Thickness	As per IS 1367 Part XIII
7	Chemical Properties	C:-0.13-0.55 Max P:-0.05 Max S:- 0.06 Max B:-0.003 Max
8	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 TPCODL/TPNODL/TPSODL/TPWODL 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 TPCODL/TPNODL/TPSODL/TPWODL.

9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPSODL/TPWODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPCODL/TPNODL/TPSODL/TPWODL representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPSODL/TPWODL or its authorized

representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPNODL/TPSODL/TPWODL.

Following documents shall be sent along with material.

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

10. INSPECTION AFTER RECEIPT AT STORE:

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

11. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 12 months from the date of commissioning or 18 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

12. PACKING:

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

taken at site.

13. TENDER SAMPLE:

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

14. QUALITY CONTROL:

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

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

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

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

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

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

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:-

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY BIDDER
1	Material	
2	Relevant Standard	

3	Grade of Steel	
4	Mass of Zinc Coating	
5	Zinc Coating Thickness	
6	Chemical Properties	
7	Tensile Load	

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

CONTENTS

1. SCOPE

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

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

2. APPLICABLE STANDARDS

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

SL.NO.	CONDTIONS	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.

TPCODL/TPNODL/TPSODL/ TPWODL service area **has heavy saline conditions along the coast and High cyclonic Intensity winds with speed up to 300 Km ph**. 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) 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 withIS-2629-1985 and shall satisfy the tests mentioned in IS: 2633-1986. Fasteners shall

withstand four dips while spring washers shall withstand three dips of one-minute duration in the standard Preece test. Other galvanized materials shall be guaranteed to withstand at least six successive dips each lasting one minute under the Standard Preece test for galvanizing.

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

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE		
1	Type	**B&S type**		
2	Ultimate Strength	70 KN (3 Bolted)	90 KN (4 Bolted)	120 KN (4 Bolted)
3	Suitable for conductor Size	AAAC-80 Sq mm, 100 Sq mm	AAAC-148 Sq mm	AAAC-232 Sq mm
4	Slip strength of tension clamp	95% of UTS	95% of UTS	95% of UTS
5	Referred IS Standard	IS 2486	IS 2486	IS 2486
6	Material Used			
a)	Cross Arm Strap	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
b)	Ball Eye	16mm Forged Steel	20mm Forged Steel	20mm Forged Steel
c)	Socket Eye	16 mm Forged Steel	20mm Forged Steel	20mm 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	Electro-galvanized	Electro-galvanized	Electro-galvanized
j)	Plain Washer	Mild Steel (HDG)	Mild Steel (HDG)	Mild Steel (HDG)
k)	Zn confirming to grade	IS 209	IS 209	IS 209
m)	Size of U Bolt	M16	M16	M16
7	Galvanizing	Min 705 g/sq meter/100 microns 6 dips	Min 705 g/sq meter/100 microns 6 dips	Min 705 g/sq meter/100 microns 6 dips
8	Tolerance	+/-5%	+/-5%	+/-5%

5. GENERAL CONSTRUCTIONS:

5.1 Fittings for Strain Insulators with clamp

i) Cross arm strap confirming to IS 2486 (Part 2). Forged Steel ball eye for attaching the socket end of the Disc insulator to the cross arm strap. Dimensions shall be in accordance with IS: 2486 (Part-2) unless otherwise specified.

ii) Cross-arm straps shall be manufactured from MS Flat hot dip galvanized and to connect the cross-arm/bracket of the structure at one end and the Ball Clevis at the other end.

iii) It should be complete with hexagonal bolts, nuts, spring washers and Cotter pin at the threaded end to lock the unit. Minimum Threaded portion of the bolt shall be 30mm.

iv) Aluminum alloy thimble socket made of permanent high strength aluminum alloy for attaching the disc insulator at one end and for accommodating the loop of conductor at the other end. The thimble socket shall be attached to the disc insulator with the help of locking pin as per the dimensions given in IS:2486 (Part 2).

v) The tension hardware with three bolts and four bolts strain hardware shall have minimum slip strength not less than 95% of the strength of respective conductor.

vi) All forgings & castings shall be of good finish and free from flaws or any other defects which may cause decrement of efficiency while in operation. The edges on the outside of the fittings such as at the ball socket & holes and the grooves shall be smooth & rounded. Sharp radius of curvature, ridges etc. which may lead to localized pressure or cause damage to the conductors in service shall be avoided. The clamp shall permit the conductor to slip before the failure of conductor occurs.

vii) All parts of different fittings which provide for interconnection shall be made such that sufficient clearance is provided at the connection point to ensure free movement. All ball and socket connections shall be free in this manner, but care shall be taken that too much clearance between ball and socket is avoided.

viii) All ferrous fittings and the parts other than those of stainless steel, shall be galvanized. Small fittings like spring washers, nuts, etc. should be electro-galvanized-Coating thickness as per IS: 1573.

ix) The nominal dimensions of the ball and sockets, ball eye and cross-arm straps are as per the IS:2486 (Part 2).

5.2 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/TPNODL/TPWODL/TPSODL"

7. TESTS

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

7.1 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

7.2 ROUTINE TESTS

i) Visual Examination Test

ii) Mechanical Routine Test

7.3 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. TPCODL/ TPWODL/ TPNODL/ TPSODL. TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report under exceptional circumstances after due diligence/ scrutiny by DISCOM. 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/TPNODL/TPWODL/TPSODL.

9. PRE DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to

the places of manufacture to TPCODL/TPNODL/TPWODL/TPSODL's representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPWODL/TPSODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/ TPNODL/ TPWODL/ TPSODL.

Following documents shall be sent along with material.

<<<

a) Test reports
b) MDCC issued by TPCODL/TPNODL/TPWODL/TPSODL
c) 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/TPNODL/TPWODL/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 timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

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

12. PACKING:

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

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 bidder shall get the approved drawing and GTP before start of manufacturing activity. The successful bidder will have to submit details of the offered design & components for approval as per specification. CAT-A/CAT-B is mandatory to start manufacturing.

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.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS

Bidder to submit completely clause wise compliance of this specification.

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2007

Specification Name : ENG-ELC-006- TECHNICAL SPECIFICATION FOR 11KV XLPE ARMOURED CABLE- R1

JYOTIPRAKASH MOHANTY	SHANTAPRIYA JENA	SATYA PRASAD NAYAK	Ranjan Kumar Sahoo	VARUN BHATNAGAR	VARUN BHATNAGAR
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPWODL	TPNODL	TPCODL	TPSODL	TPWODL	TPWODL
10-12-2022	10-12-2022	12-12-2022	12-12-2022	13-12-2022	13-12-2022

CONTENTS

1. SCOPE:

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

Inclusive sizes: -

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

2. APPLICABLE STANDARDS:

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

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

SL.NO.	CONDTIONS	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.

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 thedry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4. GENERAL TECHNICAL REQUIREMENTS:

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

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

5. GENERAL CONSTRUCTION:

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

All material used in the manufacturing of cables shall be new and shall be selected as the best available for the intended use.

The rating factors for variation in ground and air temperature, depth of laying, thermal resistivity of soil and different laying configuration of cables shall be provided by the Bidder.

5.1 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 ofconductor mm2	95	120	150	185	300	400	630	1000
6	Min. number ofstrands	15	15	15	30	30	53	53	53
7	Max. DC resistance@ 20 deg C (Ohm/km)	0.32	0.25	0.206	0.164	0.1	0.08	0.047	0.03
8	Conductor Short circuit current ratingfor 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 ofconductor (kg/km/core)	244	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 anduniformity	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

5.2 Conductor Screen:

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)

5.3 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.

5.4 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:** **3 CORE CABLE: -** 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. **1 CORE CABLE: - NA** 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

5.5 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.	

5.6 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 *pressure extruded* 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.

3	Raw material supplier	PVC compound shall be procured from reputed 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.

4	Min. thickness at anypoint of measurement	**3 CORE CABLE**						
		95 sq.mm.		120 sq.mm.	150 sq.mm.	185 sq.mm.	300 sq.mm.	400 sq.mm.
		0.6 mm		0.6 mm	0.6 mm	0.7mm	0.7 mm	0.7 mm
		1 CORE CABLE						
		300 sq. mm.	400 sq.mm.	630 sq.mm.		1000 sq.mm.		
		0.4 mm(min)	0.4 mm	0.5 mm		0.6 mm		

5.7 Armour:

S. No.	Parameter	Requirement					
		3 CORE CABLE				**1 CORE CABLE**	
1	Material	Low carbon annealed hot dippedgalvanized round steel wires				H4 Grade Aluminum wires	
2	Compliance to Standard	It shall comply with the requirements of IS 3975 along withlatest amendments. Hot dipped galvanizing layer shall be uniform on low carbon annealed steel wires. Zinc coating shall be 290g/m2 as per IS 4826:1979.				It shall comply with the requirements of IS8130 along with latest amendments.	
3	Nominal Dimensions	**3 Core cable**					
		95 sq.mm	120 sq.mm	150 sq.mm	185 sq. mm.	300 sq.mm	400 sq.mm.
		2.5 (GI Wire)	2.5 (GI Wire)	2.5 (GI Wire)	3.15(GI WIRE)	3.15 (GI Wire)	4.00 (GI Wire)
		1 CORE CABLE					
		300 sq. mm.	400 sq.mm	630 sq.mm			1000 sq.mm
		2 mm (Aluminum wire)	2 mm (Aluminum wire)	2 mm (Aluminum wire)			3.15 mm (Aluminum wire)
4	Approx. Armor Short circuitrating in kAfor 1 sec	**3 Core cable**					
		95 sq.mm	120 sq.mm	150 sq.mm		300 sq.mm	400 sq.mm.
		9	12	15		15	15
		1 CORE CABLE					
		300 sq. mm	400 sq.mm	630 sq.mm			1000 sq.mm
		15	15	15			15
		Fault current for the armour with minimum 90 % coverage.					

5	Jointing in the armour wires	Not acceptable in any armour wire
6	Laying of armour	The armor wires shall be applied as closely as practicable. Shall not be less than 90% of total circumference.
7	Binding	The rubberized cotton binding tape shall be applied to bind the armor wires suchthat it shall not affect the electrical properties of the armor wires and the overall cable.
8	Weight of armor	To be furnished by Bidder
9	Raw material supplier	Steel armour shall be procured from reputed raw material suppliers viz., TATA Steel, Jindal Steel, SAIL/ Equivalent (in-line with TS) / Aluminium armour shall be procuredfrom reputed raw material suppliers viz TATA/ BALCO/HINDALCO/NALCO/Vedanta Only/ Equivalent (in-line with TS)

5.8 Outer Sheath (for Normal cable)

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.mm	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					

5.9 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

5.10 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.

5.11 Other Requirements:

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

6 MARKING:

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

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

I. Following details shall be provided on flanges of drum:

a) Manufacturer's name
b) Type of Cable
c) Size of Cable
d) Voltage Grade
e) Length of the cable on the drum
f) Direction of the rotation of the drum
g) Gross mass
h) Country of manufacture
i) Year and month of manufacture

j) Purchase Order no.

k) Drum No.

II. Following details shall be embossed on the outer PVC Jacket (For normal Cable) & HDPE layer (for co-extruded cable):

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

i) TPWODL/ TPCODL/ TPNODL/ TPSODL

ii) Manufacturer's name

iii) Month & Year of Manufacturing

iv) Voltage grade

v) Size of the cable

vi) Purchase Order no.

vii) Cable code

Note: - Sequential meter marking shall be printed.

7 TESTS:

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

7.1 ACCEPTANCE TESTS

Test on Conductor

7.1.1 Conductor resistance test

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

7.1.3 Visual inspection for conductor cleanliness

7.1.4 Conductor water penetration test

Test on Conductor Screen

7.1.5 Thickness of semi-conducting tape over conductor

7.1.6 Test for conductivity of semi-conducting tape over conductor

7.1.7 Resistivity of extruded semi-conducting conductor screen

7.1.8 Thickness of extruded semi-conducting conductor screen

Test on Insulation

7.1.9 Tensile strength & Elongation at break (before ageing)

7.1.10 Insulation thickness

7.1.11 Eccentricity and Ovality of insulation

7.1.12 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 XLPEinsulation, 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

7.1.21 PVC thickness

7.1.22 Color of inner sheath

Test on Armour (For 3 Core)

7.1.23 Tensile test

7.1.24 Mass of zinc coating

7.1.25 Uniformity of zinc coating

7.1.26 Adhesion test

7.1.27 Diameter and no. of wires

7.1.28 Coverage %

Test on Armour (For 1 Core)

7.1.29 Tensile test

7.1.30 Wrapping test

7.1.31 Resistance test

7.1.32 Diameter and no. of wires

7.1.33 Coverage %

Test on Outer sheath (for Normal cable)

7.1.34 Thickness

7.1.35 Tensile strength and Elongation at break (before ageing)

7.1.36 Color of outer sheath

7.1.37 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

7.1.44 Thickness

7.1.45 Tensile strength and Elongation at Break (before ageing)

7.1.46 Color

OUTER LAYER

7.1.47 Thickness

7.1.48 Tensile strength and Elongation at Break (before ageing)

7.1.49 Carbon Content

7.1.50 Color

7.1.51 Surface uniformity of outer sheath (on full drum)/ shall be free from any damage- void,nick, cavity

Test on Complete Cable

7.1.52 Partial discharge test

7.1.53 High voltage test

7.2 ROUTINE TESTS

i) Conductor resistance test

ii) Partial discharge

iii) High voltage test with power frequency

iv) Resistance test for Aluminium armour

7.3 TYPE TESTS

Tests on Conductor

7.3.1 Conductor resistance test

7.3.2 Conductor water penetration test

Tests on Insulation

7.3.3 Tensile strength & Elongation at break (before ageing)

7.3.4 Ageing in air oven

7.3.5 Tensile strength & Elongation at break

7.3.6 Tests for thickness of insulation

7.3.7 Eccentricity and Ovality of insulation

7.3.8 Hot set test

7.3.9 Shrinkage test

7.3.10 Gravimetric test (Water absorption)

7.3.11 Volume resistivity/ Insulation Resistance

Tests on Inner Sheath

7.3.12 PVC thickness

Tests on Extruded semi-conducting screen

7.3.13 Volume resistivity test of conductor screen

7.3.14 Volume resistivity test of core screen

Tests on Outer Sheath (PVC)

7.3.15 Flammability test for outer sheath

7.3.16 Thickness

7.3.17 Tensile strength and Elongation at break (before ageing)

7.3.18 Tensile strength and Elongation at break (after ageing)

7.3.19 Variation due to ageing

7.3.20 Loss of mass test

7.3.21 Shrinkage test

7.3.22 Hot deformation test

7.3.23 Heat shock test

7.3.24 Thermal stability test

7.3.25 Flammability test

7.3.26 Oxygen index

7.3.27 Temperature index

7.3.28 Acid gas generation

7.3.29 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

7.3.46 Partial discharge test

7.3.47 Thermal ageing test

7.3.48 Bending test

7.3.49 Dielectric power factor test

7.3.50 High voltage test

7.3.51 Heat cycle test

7.3.52 Impulse withstand test

Additional Test (To be checked by Inspector)

7.3.53 Raw material consumption

7.3.54 Color coding identification over copper screen (for 3C cable)

7.3.55 Sequential marking check

7.3.56 Cable drum length verification

7.3.57 Packaging of cable on cable drum

7.3.58 Diameter over outermost sheath of co-extruded cable

7.3.59 Weight of outer sheath of co-extruded cable/ km

7.3.60 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, TPWODL/ 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 TPWODL/ TPCODL/ TPNODL/ TPSODL.

9 PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material.

a) Test reports

b) MDCC issued by TPWODL/ TPCODL/ TPNODL/ TPSODL

c) TPWODL/ TPCODL/ TPNODL/ TPSODL Invoice in duplicate

d) Packing list

e) Drawings & catalogue.

f) Guarantee / Warrantee card

g) Delivery Challan

h) Other Documents (as applicable).

10 INSPECTION AFTER RECEIPT AT STORE:

The material received at TPWODL/ TPCODL/ TPNODL/ TPSODL, Odisha store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copyof 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 TPWODL/ TPCODL/ TPNODL/ TPSODL as per IS 10418 and its latest amendments.

d) **Sealing of cable ends:** The ends of the cable shall be sealed by means of heat shrinkable polyolefin end caps. Additional 2 nos. end caps shall be provided with each drum.

e) **Requirements for Cable drums:** Cable drums shall be so constructed as to have required mechanical strength so that the drum flanges and other components do not break during transport, in actual use or in storage. The flanges and the outside surface of the barrel shall be free from protruding materials/projections/ unevenness/ sharp edges that can damage the cable or hands of the operator during rotation of drums.

A metal preservation shall be applied to the entire drum.

f) Bottom end of cable should be clamped on drum by jute or nylon rope.

g) All ferrous metal parts used shall be treated with a suitable rust-free finish or coating to avoid rusting during transit or storage. The drums shall withstand normal handling and transport.

h) **Rail/ Road transportation:** The bidder shall ensure that the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

i) **Packaging shall be as per climate change perspective. Cable wound on cable drum shall be covered by recyclable PVC sheet for dust proof.**

13 TENDER SAMPLE:

Not Applicable

14 QUALITY CONTROL:

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

15 TESTING FACILITIES:

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

16 MANUFACTURING FACILITIES:

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

17 SPARES, ACCESSORIES AND TOOLS

Not applicable.

18 DRAWINGS AND DOCUMENTS:

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

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

Deviations

b) Work Experience details

c) Type test certificates.

d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

19 SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

Bidder to submit clause wise compliance.

20 SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2012

Specification Name : Standard Technical Specification of 11kV Button Type Fast Blowing (K-type) Fuse Link

Sandeep Saurav	SATYA PRASAD NAYAK	SHANTAPRIYA JENA	JYOTIPRAKASH MOHANTY	Shailendra Kumar Jaiswal	SHIRISH SHARAD DIKAY
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPSODL	TPCODL	TPNODL	TPWODL	TPSODL	TPSODL
29-12-2022	29-12-2022	30-12-2022	02-01-2023	02-01-2023	02-01-2023

CONTENTS

TPCODL TPNODL TPWODL TPSODL	**Document No: ENG-HV- 2012** **Document Title: Standard Technical Specification of 11kV Button Type Fast Blowing (K-type) Fuse Link**

1. SCOPE:

This specification covers technical requirements of design, manufacture, construction, performance, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site of 11kV, Button type fast blowing (K-Type) fuse link of 2A, 5A, 8A, 10A, 20A, 30A, 40A & 63A for use in drop down Fuse unit for trouble free and efficient performance.

2. APPLICABLE STANDARDS:

DO Fuse unit shall comply with the requirements stated in the latest editions of the following standards.

IS 9385 (Part-II)	Specification for high voltage fuse Part II- Expulsion and similar fuses
IEC 60282-2	High voltage fuses part 2: Expulsion fuses
ANSI C37.42	Specification for high-voltage expulsion type distribution class fuses, cutouts, fuse disconnecting switches and fuse-links

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following 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/TPSODL/TPWODL service area has heavy saline conditions along the coast andHigh 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	Descriptions	Requirement
1	Type of fuse link	Button type fast blowing (K-Type)
2	Class of fuse link	Expulsion, class-2
3	Rated Voltage	12 KV
4	Service Voltage	11 KV
5	Rated Frequency	50 Hz
6	Rated continuous current	2,5,8,10,20,30,40, and 63 Ampere
7	Tensile withstand strength	6.1 KG
8	Overall length of fuse link	510±1 mm

9	Rated continuous Current (Amp)		2	5	8	10	20	30	40	63
	300 sec fuses melting current (Amp)	Minimum	4	9	15	19.5	39	63	80	128
		Maximum	6	15	18	23.4	47	76	96	153
	10 sec fuses melting current (Amp)	Minimum	8	15	18	22.4	48	77.5	96	159
		Maximum	10	35	27	34	71	115	146	237
	0.1 sec fuse melting current (Amp)	Minimum	40	75	97	128	273	447	565	918
		Maximum	80	105	116	154	328	546	680	1100

10	Diameter of button head	12.5 ± 0.5 mm
11	Outer Diameter of FRP tube	12.5 ± 0.5 mm
12	Diameter of the washer	19 ± 0.5 mm
13	Inner diameter of FRP tube	8 ± 0.5 mm
14	Length of FRP tube	140 ± 5 mm
15	Thickness of FRP tube (min)	2 mm
16	Max. thickness of bending section	4mm up to 40 Amp and 6.4 mm for 63 Amp
17	Material of fuse link tube	Fiber Reinforced Plastic (FRP) with flame retardant properties
18	Material of fuse element	Tinned copper
19	Material of the flexible wire	Tinned copper
20	Material of the washer	Tinned copper
21	Material of top button	Tinned Brass / Nickel Coated Brass
22	Connection of fuse link and flexible wire	Crimp and soldered
23	Area of Flexible connecting wire	

A	For 2A, 5A,8A,10A	2 ± 0.1 sq.mm
B	For 20A,30A	4 ± 0.2 sq.mm
C	For 40A,	6 ± 0.3 sq.mm
D	For 63 A	10 ± 0.5 sq.mm
24	Time/Current Characteristics	To be provided by the bidder

5.0 GENERAL CONSTRUCTION

1. The FRP tube shall be fire retardant V0 grade.
2. The finishing of FRP tube shall be smooth and free from sharp edges.
3. Connection of fuse link and flexible wire shall be Crimped & Soldered.

5.1. TIME/CURRENT CHARACTERISITCS

The time characteristics of fuse link shall be based on applying current to a new and unloaded fuse link in a fuse base specified by the bidder. The curves shall show the following.

a) The pre-arcing time or the operating time
b) The relation between the time and the r.m.s. symmetrical prospective current for the time range, at least 0.1s to 300s as appropriate to the fuse-link rated current.
c) The type and rating and speed designation of the fuse-link to which the curve applies.

The Pre-arcing (melting) time-current characteristics for fuse link shall meet the minimum and maximum current values required to meet the fuse link at the three points as follows:

a) 300 sec
b) 10 sec
c) 0.1 sec

5.2 ACCURACY

The minimum melting-current characteristics for fuse-link shall not be less than the Minimum values specified in GTP. The minimum melting-current characteristics plus manufacturing tolerance for fuse link shall not be greater than the maximum values specified in GTP as per ANSI C37.42-1996.

5.3 DIAMETER OF BUTTON HEAD AND WASHER

The diameter of button head and washer to be used with the fuse links shall be same as specified in GTP.

5.4 SIZE AND SHAPE

The size and shape of fuse links for all ratings shall be such that they can freely enter a fuse link tube having the inside diameter as specified in GTP.

5.5 MINIMUM OVERALL LENGTH

The minimum overall length of fuse links of all rating for use in fuses shall be same as specified in GTP.

5.6 BENDING REQUIRMENTS

Fuses links shall bend readily when installed and during operation so as not to interfere with the proper functioning of fuse cutouts.

6.0 NAME PLATE AND MARKING

Sticker shall be at the bottom portion of the FRP tube of Fuse link with the following details

i. Manufacturer ‘s name.
ii. PO number
iii. Rated continuous current.
iv. Rated Voltage

7.0 TESTS

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 TPCODL/TPNODL/ /TPSODL/TPWODL his authorized representative. All the components shall be type tested as per the relevant standards

7.0 TYPE TESTS

The following tests shall constitute the type tests and shall be carried out as per relevant standards with latest Amendment:

Serial No.	Test Description	Standard
1	Pre-Arching Time Current tests	IS 9385-2
2	Temperature rise	S 9385-2
3	Flammability test on FRP Tube	ANNEX N of IS 6746 or IEC 60695 or UL

7.2 ROUTINE TESTS

Dimensional verification.

7.3 ACCEPETANCE TEST

a) Dimension check
b) Flammability test on FRP Tube
c) Area of the flexible connecting wire
d) Connection of fuse link and flexible wire
e) Parameter verification for fuse link

8.0 TYPE TEST CERTIFICATES

All the tests shall be conducted at any NABL accredited Lab / CPRI / ERDA / CIPET as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or
any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPCODL/TPNODL /TPSODL/TPWODL

9.0 PRE-DESPATCH INSPECTION

The Material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODLTPSODL/TPWODL. Inspection may be made at any stage of manufacture at the discretion of the TPCODL/TPNODL/TPSODL/TPWODL 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/TPNODL/ TPSODL/TPWODL/s representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPSODL/TPWODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPNODL/TPSODL/TPWODL. Following documents shall be sent along with material

a) Routine Test reports
b) MDCC issued by TPCODL/TPNODL/TPSODL/TPWODL
c) TPCODL/TPNODL/TPSODL/TPWODL Invoice in duplicate
d) Packing list
e) Drawings
f) Delivery Challan
g) Other Documents (as applicable).

10.0 INSPECTION AFTER RECIPT AT STORES

The material received at TPCODL/TPNODL/TPSODL/TPWODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection. If any deviation or anomaly observed at this stage same need to be rectified by the bidder at bidders' own cost at the earliest.

11.0 GUARENTEE

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 TPCODL/TPNODL/TPSODL/TPWODL up to a period of 12months from the date of commissioning or 18 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 time frame, and to the satisfaction of the TPCODL/TPNODL/TPSODL/TPWODL

12.0 PACKING

Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit. Supplier shall be responsible for packing, transporting and delivery to the consignee. Copies of packing list and inspection report duly approved shall be sent along with each consignment. The material to be supplied shall be packed and dispatched only after inspection or MDCC approval from TPCODL/TPNODL/TPSODL/TPWODL. **No single use plastic to be used in packing material. Packing should be done with environment friendly recyclable materials.**

13.0 SAMPLE

Bidders to provide one sample of each rating free of cost during tender time for verification and shall take back the sample within 15 days after order allotment.

14.0 TRAINING

Not applicable**.**

15.0 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. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished.
The TPCODL/TPNODL/TPSODL/TPWODL 's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

16.0 MINIMUM TESTING FACILITIES

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

17.0 MANUFACTURING ACTIVITIES

The bidder shall get the approved drawing and GTP before start of manufacturing activity. The successful bidder will have to submit details of the offered design & components for approval as per specification. CAT-A/CAT-B is mandatory to start manufacturing.

18.0 SPARES, ACCESSORIES & SPECIAL TOOLS

Not applicable.

19.0 DRAWINGS & DOCUMENTS

Following documents to be submitted along with the bid for evaluation:

a) Completely filled–in clause wise compliance of this specification.
b) Type test reports
c) Dimensional drawing

Following documents shall be submitted after award of RC/PO before manufacturing:

a) Completely filled–in clause wise compliance of the specification.
b) Dimensional drawing.
c) Compliances of undertaking submitted during Technical Evaluation.
d) Type test Certificates for each specified test if not submit during technical evaluation.

All the Documents shall be in English Language.

20.0 GUARANTEED TECHNICAL PARTICULARS

Bidders to comply for all above requirement of specification clause by clause & submit signed

and stamp copy of clause wise compliance of this specification along with all detailed drawing having dimensions and material details.

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 TPCODL/TPNODL/TPSODL/TPWODL 's specifications

S. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

CONTENTS

1. SCOPE:

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

2. APPLICABLE STANDARDS:

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

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

3. CLIMATIC CONDITIONS:

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

TPCODL/TPWODL/TPNODL/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 PARTICULARS (Class-SL,Class-II)	DESIRED VALUE
1	Installation	Outdoor
2	Reference standards (Latest Amend.)	IS 15086,Part-4, IEC 60099
3	Arrester Type and Housing	Metal Oxide Gapless Cage type with Polymeric housing
4	Normal System Voltage	11 kV
5	Highest System Voltage	12 kv
6	Rated Frequency	50 Hz
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

SL. NO.	TECHNICAL PARTICULARS (Class-SL,Class-II)	DESIRED VALUE
10	Short Circuit rating	25 kA
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 10kA)	49 kV
13	**Long Duration Current**	
a	Peak Current	75 A
b	Virtual duration of Peak T	1000 T (Micro Sec)
14	High Current impulse Operating Duty	65 kA (Peak)
15	Creepage Distance of Arrester Housing	31mm/KV (min) or 380 mm (min)
16	Partial Discharge at 1.05 times M.C.O. V	<10 pc
17	Energy Absorption capacity (KJ/KV)	>=4KJ/KV
18	Repetitive charge transfer withstand (coloumbs),Qrs	>=1.0
19	**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 5kA	35kVp
b	at 10kA	38kVp
c	at 20kA	--
21	**Maximum switching current impulse residual voltage in kVP at 500 A**	21 kVp
22	Max. Cantilever Strength	12 Kg-M(minimum)
23	Total height of the arrester	To be specified by bidder
24	Total weight of the arrester	To be specified by bidder
25	No. of Metal oxide blocks in arrester	To be specified by bidder
26	Rating of individual ZnO blocks used for assembly	To be specified by bidder
27	Power Losses of the Arrester in watt	To be specified by bidder
28	Type of Mounting	Bracket type
29	Material of Insulating base	UV resistant Fire retardant DMC
30	**Disconnector (optional)**	
a	Disconnector connecting lead	Insulated flexible tinned plated copper braid with lugs
b	Size of Insulated Tinned copper	25 sq.mm

SL. NO.	TECHNICAL PARTICULARS (Class-SL,Class-II)	DESIRED VALUE
	braid	
c	Length of Insulated Tinned copper braid	300 mm
31	Insulating Terminal Cap	Polyolefin
32	Material of Nuts and bolts	Stainless Steel

5. GENERAL CONSTRUCTION:

Lighting arrestors shall be station class, zinc oxide and gapless type suitable for operation under the system conditions specified. This shall be self-supporting, structure mounting type. Each unit of arrestor assembly shall be hermitically sealed, leak tested and protected against ingress of moisture and shall be individual demountable. The seal shall be properly designed and tested for operation under extreme weather conditions.

5.1 Assembly:

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

a) The 12kV 10kA station class Lightning Arrester 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 anticontamination feature to prevent arrestor failure, consequent to uneven voltage gradient across the stack in the event of contamination of the arrestor insulating material. These features shall be described in detail when submitting the Bid.

Arrestors shall be capable of discharging over voltages occurring during switching of unloaded transformers, capacitors banks and long lines. No radio interferences shall be caused by the arrestors operating at the normal rated voltage.

e) Bidder shall mention energy handling capacity.

5.2 EARTHING TERMINALS:

Earth Terminals shall be provided with Lightning arrestor.

5.3 MECHANICAL STRENGTH:

a) The Lightning Arrester and it base shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability.

b) The Lightning Arrester shall not come out of their positions by gravity, wind pressure, vibrations or reasonable shocks.

5.4 DISCONNECTORS (OPTIONAL):

a) Each Individual unit of Lighting Arrester with disconnector shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire life time of the Lightning Arrester with disconnector under the specified service conditions. Disconnectors shall give the visible indication of the failed arrestor. 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 bidder's scope of supply. The mounting details for mounting the Lightning Arrester with disconnector on purchaser's support shall be given along with bid.

5.5 MOUNTING BRACKET:

a) The 12kV 10kA Distribution class Lightning Arrester shall be fixed over a mounting bracket made of UV resistance, Fire retardant DMC material.

b) The 12kV 10kA Station class Lightning Arrester shall be fixed over a mounting arrangement made of Hot dip galvanized MS material.

6. MARKING:

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

The following information shall be mentioned on the Name Plate

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

7. TESTS:

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

7.1 ACCEPTANCE TESTS

a) Measurement of Power frequency reference voltage
b) Lightning impulse residual voltage test on complete arrestor or arrestor unit.
c) Internal Partial Discharge test
d) Visual Examination

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

7.2 ROUTINE TESTS

a) Measurement of reference voltage test
b) Residual Voltage Test on complete arrester
c) Internal partial discharge test. This test shall be performed on each arrester unit. The test sample may be shielded against external partial discharges. Internal partial discharge shall not exceed 10 pC

7.3 TYPE TESTS

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

7.4 SPECIAL THERMAL STABILITY TEST:

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

8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI/ERDA** as per relevant standard. Type tests should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/TPWODL/TPNODL/TPSODL.

9. PRE-DISPATCH INSPECTION:

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

with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPWODL/TPNODL/TPSODL.

Following documents shall be sent along with material.

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

10. INSPECTION AFTER RECEIPT AT STORE:

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

11. GUARANTEE:

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

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

12. PACKING AND TRANSPORT:

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

shape of rain shed does not get deformed during transportation and storage.

13. TENDER SAMPLE:

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

14. QUALITY CONTROL:

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

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

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

The successful bidder will have to submit technical compliance document and drawing as per 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/TPWODL/TPNODL/TPSODL. .

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be prepared based on TPCODL/TPWODL/TPNODL/TPSODL 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 lightening arrester.
d) Sectional drawing showing internal blocks etc.

e) Bill of material.
f) Experience Certificate and list.
g) Type test certificates.
h) List of makes of major components.
i) Foundation plan

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

List of Drawings/Parameters to be submitted:

a) Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
b) General Arrangement Drawing of the Lightening 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/TPWODL/TPNODL/TPSODL for approval.

Instruction Manuals:

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

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

SL. NO.	TECHNICAL PARTICULARS (Class-SL,Class-II)	DESIRED VALUE
1	Installation	
2	Reference standards (Latest Amend.)	
3	Arrester Type and Housing	
4	Normal System Voltage	
5	Highest System Voltage	
6	Rated Frequency	
7	Maximum Continuous Operating Voltage (M.C.O.V)	
8	Arrester Rating	
9	**Discharge Current**	
a	Nominal Discharge Current	
b	Switching impulse discharge current	
10	Short Circuit rating	
11	**Voltage Withstand on Arrester Housing**	
a	Standard rated short duration Power Frequency withstand Voltage (Dry/Wet) as per IS:2165	
b	Standard rated Lightning Impulse withstand Voltage (Peak in kV)	
	Lightning Impulse Protection Level (at 10kA)	
13	**Long Duration Current**	
a	Peak Current	
b	Virtual duration of Peak T	
14	High Current impulse Operating Duty	
15	Creepage Distance of Arrester Housing	
16	Partial Discharge at 1.05 times M.C.O. V	
17	Energy Absorption capacity (KJ/KV)	
18	Repetitive charge transfer withstand (coloumbs),Qrs	
19	**Temporary over voltage (TOV)**	
a	1 sec	
b	10 sec	
20	**Maximum Lightning Impulse Residual voltage with 8/20 microsecond wave**	
a	at 5kA	
b	at 10kA	
c	at 20kA	
21	**Maximum switching current impulse residual voltage in kVP at 500 A**	
22	Max. Cantilever Strength	
23	Total height of the arrester	

SL. NO.	TECHNICAL PARTICULARS (Class-SL,Class-II)	DESIRED VALUE
24	Total weight of the arrester	
25	No. of Metal oxide blocks in arrester	
26	Rating of individual ZnO blocks used for assembly	
27	Power Losses of the Arrester in watt	
28	Type of Mounting	
29	Material of Insulating base	
30	**Disconnector (optional)**	
a	Disconnector connecting lead	
b	Size of Insulated Tinned copper braid	
c	Length of Insulated Tinned copper braid	

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2016

Specification Name : Technical Specification For Heat Shrinkable Straight through Joint & Termination for 11KV Power Cable

BARSHA BANDITA	MILAN MAITY	K GOVINDARAJ	Syed Mohammed Yousuf Raja	KHAJAN BHARDWAJ	POURUSH GARG
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPCODL	TPNODL	TPWODL	TPSODL	TPCODL	TPCODL
10-01-2023	10-01-2023	11-01-2023	12-01-2023	12-01-2023	12-01-2023

CONTENTS

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 3.3 kV and up to including 33 kV)
2	IS 7098(part2):2011	Cross-linked polyethylene insulated thermoplastic sheathed cables (for working voltages from 3.3 kV up to and including 33 kV)
3	IS 692 : 1994	Paper insulated lead sheathed cables for rated voltages up to and including 33 kV
4	IEC 60502 : 2009	Power cables with extruded insulation and their accessories for rated voltages from 1 kV up to 30 kV
5	ASTM D-2303	Standard Test Methods for Liquid Contaminant, Inclined-plane tracking and Erosion of insulating materials
6	ASTM D-2671	Standard Test Methods for Heat Shrinkable Tubing
7	ENA TS 09-13:1981	High Voltage Heat Shrinkable Components for use with HV solid type cables up to and including 33 kV
8	IEC 61238(part1) : 2003	Test methods and requirements - Compression and mechanical connectors for power cables for rated voltages up to 30 kV
9	IS 8308 : 2003	Compression type tubular in-line connectors for Aluminium conductors of insulated cables
10	IS 8309 : 2003	Compression type tubular terminal ends for Aluminium conductors of insulated cables
11	IS 2633:1986	Method for testing of uniformity of zinc coating
12	IS 4826 : 1979	Hot dipped galvanized coatings on round steel wires
13	IS 12444:1988	Continuously Cast and Rolled Electrolytic Copper Wire Rods for electrical conductors

SL. No.	IEC/IS	Description
14	IS 191	Copper
15	IS 10810	Methods of test for cables
16	IEC 60216 part 2	Determination of thermal endurance properties of electrical insulating materials
17	IEC 60216 part 8	Instructions for calculating thermal endurance characteristics using simplified procedures

3. CLIMATIC CONDITIONS:

SL.NO.	CONDTIONS	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 tosun	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.

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

and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4. GENERAL TECHNICAL REQUIREMENTS:

4.1 TYPES OF CABLES

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

a) A2XCWY- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, wire GI armour, PVC sheath)

b) A2XCWaY -(Aluminium conductor, XLPE insulation, copper tape screen, Aluminium wire armour, PVC sheath)

i) 3CX70 sq.mm. A2XCWY/A2XFY
ii) 3CX95 sq.mm. A2XCWY/A2XFY
iii) 3CX120 sq.mm. A2XCWY/A2XFY
iv) 3CX150 sq.mm. A2XCWY/A2XFY
v) 3CX185 sq.mm. A2XCWY/A2XFY
vi) 3CX240 sq.mm. A2XCWY/A2XFY
vii) 3CX300 sq.mm. A2XCWY/A2XFY
viii) 3CX400 sq.mm. A2XCWY/A2XFY
ix) 1CX400 sq.mm A2XCWaY
x) 1CX300 sq.mm A2XCWaY
xi) 1CX630 sq.mm. A2XCWaY
xii) 1CX1000 sq.mm. A2XCWaY
xiii) HT AB- 55/95/120/150 sq.mm. – Straight Through Jointing/ Outdoor Jointing

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

a) A2XCY- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, PVC sheath)

b) A2XC2Y- (Aluminium stranded compacted conductor, XLPE insulation, copper tape screen, HDPE sheath)

c) A2XWaY- (Aluminium stranded compacted conductor, XLPE insulation, Aluminium wire screen, PVC sheath)

i) 3CX95 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

ii) 3CX150 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

iii) 1CX55 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

iv) 1CX95 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

v) 1CX150 sq.mm. A2XCY/ A2XC2Y/ A2XWaY

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

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

i) 3CX150 sq.mm. Belted APLST

ii) 3CX240 sq.mm. Belted APLST

iii) 3CX300 sq.mm. Belted APLST

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

Type & size of cable	Type of Joint	Type of connector
3CX70, 3CX95, 3CX120, 3CX150, 3CX185, 3CX240, sq.mm. XLPE insulated cable	Indoor termination	Compression lug
	Outdoor termination	Compression lug
	Straight through joint	Compression lug
3CX95, 3CX120, 3CX185 sq.mm. XLPE insulated cable	Indoor termination RMU	Mechanical connector
3CX300, 3CX400 sq.mm. XLPE insulated cable	Indoor termination	Mechanical connector
	Outdoor termination	Compression lug
	Straight through joint	Mechanical connector
1CX300, 1CX400, 1CX630, 1CX1000 sq.mm. XLPE insulated cable	Indoor termination	Mechanical connector
	Outdoor termination	Mechanical connector
	Straight through joint	Mechanical connector
1CX55, 1CX95, 1CX150 sq.mm. HT AB insulated cable	Outdoor termination joint	Compression lug
	Straight through joint	Compression lug
3CX185 – 400 sq.mm. XLPE	Straight through joints between XLPE insulated cables	Mechanical connector

4.3 General requirement for Heat Shrinkable Jointing and Termination kit:

a) The jointing kit containing heat shrinkable tubing, mastics and other accessories for making a complete joint and termination shall be designed to meet TPCODL/TPWODL/TPNODL/TPSODL specification, ENA TS 09-13, IEC 60502 and IS 13573, part-2 and other relevant standards.

b) 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.

c) Assembled jointing kit components shall perform without distress in system with parameters (mentioned below):

S. No.	Parameter	Units	Requirement
1	Max. Withstand System Voltage	kV	12
2	Partial Discharge at 1.73 Uo	pC	<10
3	Impulse Peak Withstand	kV	75 kV
4	Continuous operation withstand Temperature	ºC	90
	Short Circuit withstand temperature	ºC	250
5	Withstand short circuit current	kA/1Sec	As per Size of Conductors
6	Storage Temperature Range	ºC	-10ºC to + 45ºC
7	Shelf life of kit components excluding mastic and solution	Years	Min. 5
8	Shelf life of mastic and solution	Years	Min. 2

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

SL. No.	Parameter	Requirement
1	Visual Examination	Free from protrusions, pinholes, cracks, nicks and other visible defects.
2	Wall thickness Ratio	0.6 or 60% (Minimum at any two points of measurements)
3	Internal diameter of tube after full recovery	Shall not be higher than as specified in approved BOM / GTP
4	Longitudinal change	10% Max.

SL. No.	Parameter	Requirement
5	Electric Strength	10 KV /mm (Minimum)
6	Tensile Strength	10 N/mm2 (Minimum) and (8 N/mm2 for anti-tracking)
7	Ultimate Elongation	200% (Minimum)
8	Heat Shock	No splitting, cracking, dripping or flowing after 30 minutes at 200ºC Min. (For stress control tube: 30 Minutes at 250ºC Min.)
9	Low Temperature Flexibility	No cracking after 4 hrs. at minus -20ºC Max.
10	Volume Resistivity	1x 1010 Ohm- meter (Minimum) (For stress control, tube VR: 1x 10 7 Ohm-meter min.)
11	Tracking resistance	No tracking, erosion to top surface or flame failure after 1hr @ 2.5KV 1hr @2.7KV 1Hr@ 3.0 KV 20 min@ 3.25KV
12	Flame Retardant (Applicable only for Anti tracking Tubes/ sleeves)	After 1-minute burn: Burnt or charred length 250 mm max.

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

Sl. No.	Parameter	Specified limit
1	Visual Examination	Free from protrusions, pinholes, cracks, nicks and other visible defects.
2	Wall thickness Ratio	0.6 or 60% (Minimum at any two points of measurements)
3	Internal diameter of tube after full recovery	Shall not be higher than as specified in approved BOM / GTP.
4	Longitudinal change	25% Max.
5	Dielectric Strength	10 KV /mm (Minimum)
6	Tensile Strength	8 N/mm^2 (Minimum)
7	Ultimate Elongation	200% (Minimum)
8	Heat Shock	No splitting, cracking, dripping or flowing after 30 minutes at 250ºC Min.

Sl. No.	Parameter	Specified limit
9	Low Temperature Flexibility	No cracking after 4 hrs. @ minus -20ºC Max.
10	Volume Resistivity	1x 10^{10} Ohm- meter (Minimum)
11	Flame Retardant (For anti-tracking moulded components)	After 1-minute burn: Burnt or charred length 250mm max.

4.6 Service Support:

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

5. GENERAL CONSTRUCTION:

5.1 Components of Indoor/ Outdoor Termination Kit:

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

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

i) HT ABC - 450mm

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

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

iv) 3 core cable I/D RMU - 950 mm

S. No.	Components	Requirement
1	Compression Lugs/ Tinned coated Mechanical Lugs	**Compression Lugs:** a) Material: Aluminium b) All Aluminum lugs with anti-corrosive paste shall be long barrel type as per IS 8309: 2003. c) Dimensions shall be as annexure-I of this specification. d) 1000mm² Aluminum lugs shall be without palm hole. e) Conductivity of ferrule shall be as per IS 8309:2003. **Mechanical Lugs:** a) Tinned coated Aluminium 185-400 mm^2/ 630mm^2/1000mm^2 b) Type Test as per IEC 61238(part1):2003 c) Dimensions shall be as annexure-I of this specification.

<table>
<tr><th>S. No.</th><th>Components</th><th>Requirement</th></tr>
<tr><td></td><td></td><td>d) Approved make NILLED, PFISTERER, NEXANS, TYCO (GERMANY).
e) Dimensions shall be as annexure-I of this specification.</td></tr>
<tr><td>2</td><td>Lug Seal, Anti-tracking tube, weather sheds, Stress control tube</td><td>a) Heat Shrinkable
b) Fire resistant and weather resistant as per ENA TS 09-13 – for lug seals, weather sheds and Anti-tracking tubes
<table>
<tr><th>Sl. no</th><th>Size</th><th>Tube type</th><th>Qty</th><th>Size (min in mm)</th><th>OD (Before/After shrinking) mm</th></tr>
<tr><td>1</td><td>3C 300/400 sqmm I/D & O/D</td><td>Stress control tube</td><td>3</td><td>130</td><td>50/25</td></tr>
<tr><td>2</td><td>3C 300/400 sqmm O/D</td><td>Anti tracking tube</td><td>3</td><td>60</td><td>55/20</td></tr>
<tr><td>3</td><td>1C 630 sqmm O/D & ID</td><td>Stress control tube</td><td>1</td><td>130</td><td>65/30</td></tr>
<tr><td>4</td><td>1C 630 sqmm O/D & ID</td><td>Anti tracking tube</td><td>1</td><td>400</td><td>70/30</td></tr>
<tr><td>5</td><td>1C 630 sqmm O/D & ID</td><td>Insulating tube</td><td>3</td><td>300</td><td>35/12</td></tr>
</table>
For lower sizes length & OD of tubes should be adjusted suitably. BOM approval is mandatory before supply.</td></tr>
<tr><td>3</td><td>Mastic tape</td><td>a) Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant.
b) Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENA TS 09-13.
c) Stress grading mastic should be provided for both connector portion and semicon portion.
d) Water resistant sealing mastic shall also be provided.for end sealing in straight through kit and lug sealing in termination kit.</td></tr>
<tr><td>4</td><td>Heat Shrink Breakout & Lug seal</td><td>a) Fire resistant and weather resistant as per ENA TS 09-13.
b) Adhesive coated Breakouts shall be provided on outer sheath of the cable to prevent water ingress.
c) Anti tracking lug seal with adhesive coated, flame retardant.</td></tr>
</table>

S. No.	Components	Requirement
5	Tinned coated copper braid	a) Shall be completely insulated by adhesive coated fire retardant and weather resistant HS tube/sleeve up to copper lug. b) Fire resistant and weather resistant as per ENA TS 09-13. c) Size and length is as follows: d) 25 mm² x 500 mm x 1 Run for 3C 70, 95, 120 &150 mm² cables. e) 50 mm² X 600 mm X 1 Run for above 150 mm² & up to 400 mm² cables. f) 70 mm² X 500 mm X 1 Run for 630 mm² & 1000mm² cables. Additionally 3 nos. X 150mm² Al lugs with sealing sleeves/ mastic for armor back fold earth bonding. For Copper screened HT ABC, continuity of armor shall be through 25 sq.mm. X 500mm insulated tinned copper braid. Additionally 1 no. 95 mm² Al long barrel lugs with sealing sleeves/ mastic shall be provided for armor back fold earth bonding in Aluminum armored 150 mm² HT ABC.
6	Tinned coated copper braid as a Leakage Current Collector	a) Leakage current collector tinned copper braid b) 1R X 7 mm² X 150 mm per core shall be provided for terminations.
7	Tinned copper wire mesh	a) Minimum 2.5mm² tinned copper mesh shall be provided on armour circumference beneath the copper braid. b) For 3 core cable 1R X 0.5mtr c) For 1 core cable 1R X 0.7mtr
8	Sub-kit components	a) GI Solid Collet dia of dia as per cable OD (1no only in 3C cables), b) Worm drive clip/ Jubilee clip of stainless steel (2 nos), c) Compatible support rings (Aluminium for single core and GI for three core cables) d) Soldering on copper screen is not acceptable e) Constant pressure roll spring shall be provided for screen connections as per compatible size. For 3 core- 3nos, for 1C - 1nos. f) Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring should be used for same g) Tinned copper binding wire 20 SWG, qty 50gms h) Nylon string OD 1mm, 2mtr i) Silicone grease, 30 gms j) Cleaning liquid k) Vinyl tape l) Al oxide cloth m) Other necessary items

S. No.	Components	Requirement
9	Submission of BOM and instruction sheet	a) 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 TPCODL/TPWODL/ TPNODL/TPSODL authorized official at the time of pre-bid.

5.2 Components of Straight Through jointing kit:

<table>
<tr><th>S. No.</th><th>Components</th><th>Requirement</th></tr>
<tr><td>1</td><td>Heat Shrinkable insulating tube/ Sleeve</td><td>a) Surface of material: shall be smooth and free from protrusion, voids and nicks.
b) Recovered thickness: Recovered thickness of insulation tubes over ferrule or connector circumference shall not be less than 4.32 mm at any point of measurement.
c) Wall thickness ratio (before recovery) of all sleeves/ tubes shall not be less than 60% at any two points of measurement.
<table>
<tr><th>Sl no</th><th>Size</th><th>Tube type</th><th>Qty</th><th>Size (min in mm)</th><th>OD (Before/After shrinking) mm</th></tr>
<tr><td>1</td><td>3C 300/400 sqmm</td><td>Stress control tube</td><td>3</td><td>470</td><td>45/20</td></tr>
<tr><td>2</td><td>3C 300/400 sqmm</td><td>Red Insulating tube</td><td>3</td><td>460</td><td>55/20</td></tr>
<tr><td>3</td><td>3C 300/400 sqmm</td><td>Dual wall tube</td><td>3</td><td>450</td><td>65/21</td></tr>
<tr><td>4</td><td>1C 630 sqmm</td><td>Stress control tube</td><td>1</td><td>500</td><td>65/30</td></tr>
<tr><td>5</td><td>1C 630 sqmm</td><td>Red Insulating tube</td><td>1</td><td>490</td><td>70/30</td></tr>
<tr><td>6</td><td>1C 630 sqmm</td><td>Dual wall tube</td><td>1</td><td>480</td><td>85/30</td></tr>
</table>
d) For lower sizes length & OD of tubes should be adjusted suitably. BOM approval is mandatary before supply.</td></tr>
</table>

S. No.	Components	Requirement
2	Compression lugs/ Mechanical Connectors	a) Material : 99% Electrolytic grade Aluminium with Anti-corrosive paste b) Shape: As per IS 8308 c) Dimensions as per Annexure-I of this Specification d) Conductivity of ferrules/mechanical connectors shall be as per IS 8309: 2003. e) Conductivity of Aluminium shall be min. 60% of IACS. **Mechanical Lugs:** a) Tinned coated Aluminium 185-400 mm^2/ 630mm^2/1000mm^2 b) Type Tested as per IEC 61238(part1):2003 c) Dimensions shall be as annexure-I of this specification. d) Approved make NILLED, PFISTERER, NEXANS, TYCO (GERMANY). Dimensions shall be as annexure-I of this specification.
3	Mastic Tape	a) Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant. b) Volume resistivity of mastic shall not be less than volume resisti of insulating tube as specified in ENA TS 09-13. c) Stress grading mastic should be provided for both connec portion and semicon portion. d) Water resistant sealing mastic shall also be provided.for end sealing in straight through kit and lug sealing in termination kit.
4	Tinned coated copper braid for GI armour continuity / Ferrules for Aluminium armour continuity	a) Shall be completely insulated with adhesive coated fire retardant and weather resistant HS tube/sleeve up to copper lug at one end. b) Fire resistant and weather resistant as per ENA TS 09-13 c) Size and length as per below: d) Wrap tinned copper wire mesh with 50% overlap around the joint area and continue 25 mm over the copper screen on both sides. Bind the copper wire mesh on copper screen. e) Uniformly tinned coated copper braid shall be provided for armor continuity f) Size of tinned copper braid shall be: 50 mm^2 x 1 Run for 150-400 sq.mm. three core cables. 25 mm^2 x 1 Run for below 150 sq.mm. three core cables. Ferrules for Aluminum armor continuity: a) In single core cables, 1CX400,1CX630 and 1CX1000 sq.mm., Aluminum armor continuity shall be done using 2 nos. long barrel type of size 150 sq.mm. and 185 sq.mm. ferrules respectively. Additionally 70 mm^2 x 1 Run tinned copper braid to be provided.

S. No.	Components	Requirement
		b) For Copper screened HT ABC, continuity of armor shall be through 2.5 sq.mm. copper wire mesh.
5	Tinned copper wire mesh	a) Uniformly tinned coated copper mesh shall be provided for screen continuity shall be provided on both sides of armor circumference beneath the copper braid. b) For 3C cable: 2.5mm² (2'' X 6mtr) c) For 1C cable: 2.5mm² (2" X 7mtr), (2" X10mtr) & (2"X12mtr)
6	GI wire mesh/ Copper wire mesh	a) Mechanical protection shall be provided in GI armored cables by means of heavily zinc coated GI mesh as per IS 4826. b) Minimum 3" X 15mtr GI wire mesh for 3C cable c) In 1C Aluminium armored cables, for mechanical protection, copper wire mesh shall be provided as mentioned in SL. No 5.
7	Breakouts	a) Adhesive coated Breakouts shall be provided on outer sheath at both sides on the cable to prevent water ingress.
8	Nesting & end sealing tube	a) Hot melted adhesive coated bested end sealing tube for protection of moisture ingress in cores. b) Length 200mm minimum c) 6 nos for 3C, 2 nos for 1C
9	Wrap around insulating tube/Sleeve as outer most tube	a) Material: cross-linked polyolefin (Heat Shrinkable) as a waterproof seal. b) Shape: Wrap around form with hot-melt adhesive liner on the inner surface of the sleeve (Upon heating, the sleeve shrinks and the adhesive melts, creating a water-tight bond between the sleeve and the cable). c) Stainless steel channel shall be provided along the wrap around to close the sleeve during installation. d) Excellent mechanical and corrosion protection, and atmospheric sealing. e) High split resistance. f) *Note: Overlapping of wrap around sleeve is not acceptable. Length of one sleeve: Minimum 1000mm, Qty. 2nos Insulating sleeve of 500 mm should be provided to cover mid joints Portion
10	Sub-kit Components	a) GI Solid Collet dia of dia as per cable OD (2nos only in 3C cables), b) Worm drive clip/ Jubilee clip of stainless steel (3 core- 6nos, 1C 2nos), c) Compatible support rings (Aluminium for single core and GI for three core cables) d) Soldering on copper screen is not acceptable e) Constant pressure roll spring (size 4) shall be provided for screen connections. For 3 core- 6nos, for 1C -2nos

S. No.	Components	Requirement
		f) Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring should be used for same g) Tinned copper binding wire 20 SWG, qty 50gms h) Nylon string OD 1mm, 2mtr i) Silicone grease, 30 gms j) Cleaning liquid k) Vinyl tape l) Al oxide cloth m) Other necessary items
11	Submission of BOM and instruction sheet	a) 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. b) *Note: BOM shall be approved by TPCODL/TPWODL/TPNODL/TPSODL authorized official at the time of pre-bid.

6. MARKING:

Following details shall be printed in the box:

a) Manufacture's name and address.
b) Month & Year of Manufacturing
c) Voltage Grade
d) PO No.
e) "TPCODL/ TPWODL/ TPNODL/ TPSODL" Name

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

a. Manufacture's name and address.
b. Month & Year of Manufacturing
c. Batch No. / Lot No.
d. Shrink Ratio
e. Size
f. Type
g. "TPCODL/ TPWODL/ TPNODL/ TPSODL" Name

7. TESTS:

All Routine, Acceptance & Type tests shall be carried out in accordance with the Relevant IS/IEC/ ENA TS 09-13. All the components shall also be type tested as per the relevant

standards mentioned below. Following tests shall be necessarily conducted on the Joint and Termination Kits In addition to others specified in IS/IEC/ENA-TS 09-13 standards:

7.1 ACCEPTANCE TESTS:

Test	Clause No.	Reference Standard
Visual inspection	3.15	ENA -TS 09-13
Physical verification of kit contents and dimensions	As per TPCODL/TPWODL/TPNODL/TPSODL approved BOM	
Electric Strength test	3.4	ENA -TS 09-13
Ultimate Elongation tests	3.12	ENA -TS 09-13
Tensile Strength	3.12	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13
Wall thickness ratio	3.3	ENA -TS 09-13
Expanded and recovered diameters	3.3	ENA -TS 09-13
Longitudinal change after recovery	3.3	ENA -TS 09-13
Heat shock test	3.7.1/3.7.2	ENA -TS 09-13
Low temperature flexibility	4.5	ENA -TS 09-13
Insulation build up thickness after shrink on Ferrule	8.1	IS 10810 -6
Flame retardant test on anti-tracking tubes and anti-tracking moulded components and earth braid protective tube after shrink on mandrill for terminations	3.5.1/ 3.5.2	ENA -TS 09-13
Area measurement of tinned copper braids (Area of one wire x no. of wires x no. of carriers)	As per TPCODL/TPWODL/TPNODL/TPSODL approved BOM	
Conductivity test on ferrules/ connectors/ lugs	8.3	IS 8309/ As per IEC 61238 part 1
Uniformity of zinc coating on GI mesh (Manufacturer's TC to be provided)	4.1	IS 2633

7.2 ROUTINE TESTS

Test	Clause No.	Reference Standard
Visual inspection of tubing and moulded components for free from pin holes, cracks, nicks, protrusion and	3.15	ENA -TS 09-13

Test	Clause No.	Reference Standard
other defects		
Dimension check	As per TPCODL/TPWODL/TPNODL/TPSODL approved BOM	
Electric Strength	3.4	ENA -TS 09-13
Ultimate Elongation	3.12	ENA -TS 09-13
Tensile Strength	3.12	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13
Wall thickness ratio	3.3	ENA -TS 09-13
Expanded and recovered diameters of tubes	3.3	ENA -TS 09-13

7.3 TYPE TESTS:

(i) Terminations & Straight Through joints

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

(II) Kit Components

a) For Tubing and Moulded Components

Test	Clause No.	Reference Standard
Corrosion Resistance	3.1	ENA -TS 09-13
Density	3.2	ENA -TS 09-13
Dimensions	3.3	ENA -TS 09-13
Electric Strength	3.4	ENA -TS 09-13
Flame Retardance	3.5	ENA -TS 09-13
Heat Shock	3.7	ENA -TS 09-13
Low temperature flexibility	3.8	ENA -TS 09-13
Relative Permittivity	3.9	ENA -TS 09-13
Tensile strength and Ultimate elongation	3.12	ENA -TS 09-13
Thermal Ageing	3.13	ENA -TS 09-13
Tracking Resistance	3.14	ENA -TS 09-13
Visual Examination	3.15	ENA -TS 09-13
Volume Resistivity	3.16	ENA -TS 09-13
Water Absorption	3.17	ENA -TS 09-13

b) For Compression Lugs, Compression Ferrules and Mechanical connectors

Test	Reference Standard
Mechanical Pull Test	IEC 61238, part - 1
Heat cycle Test (1000 Nos.)	IEC 61238, part - 1
Short circuit Test	IEC 61238, part - 1

8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI/ERDA** as per relevant IS. However, TPCODL/ TPWODL/ TPNODL/ TPSODL/ TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report/ Lab having accreditation from ILAC Signatory under exceptional circumstances after due diligence/ scrutiny by DISCOM. 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/ TPWODL/ TPNODL/ TPSODL.

9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/ TPWODL/ TPNODL/ TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or

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

Following documents shall be sent along with material.

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

10. INSPECTION AFTER RECEIPT AT STORE:

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

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

Bidder shall be liable to undertake to replace/rectify such defects at own costs, within mutually agreed time frame, and to the entire satisfaction of TPCODL/TPWODL/TPNODL/TPSODL, failing which TPCODL/TPWODL/TPNODL/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 the Company.

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 be submit the sample of material during tender evaluation process with the offer (in case of first supply to TPCODL/TPWODL/TPNODL/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) BOM

c) Work Experience details

d) Type test certificates.

e) Drawing 1 Set of Hard Copy & Soft Copy PDF File containing complete information about manufacturing.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

S. No.	Parameter	Units	To be Furnished by Bidder
1	Max. Withstand System Voltage	KV	
2	Partial Discharge at 1.73 Uo	pC (Pico-coulombs)	
3	Impulse Peak Withstand	KV	
4	Continuous operation withstand Temperature	°C	
	Short Circuit withstand temperature	°C	
5	Withstand short circuit current	KA/1Sec	
6	Storage Temperature Range	°C	
7	Shelf life of kit components excluding mastic and solution	Years	
8	Shelf life of mastic and solution	Years	

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

S.No.	Parameter	To be Furnished by Bidder
1	Visual Examination	
2	Wall thickness Ratio	

S.No.	Parameter	To be Furnished by Bidder
3	Internal diameter of tube after full recovery	
4	Longitudinal change	
5	Electric Strength	
6	Tensile Strength	
7	Ultimate Elongation	
8	Heat Shock	
9	Low Temperature Flexibility	
10	Volume Resistivity	
11	Tracking resistance	
12	Flame Retardant (Applicable only for Anti tracking Tubes/ sleeves)	

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

Sl.No.	Parameter	To be Furnished by Bidder
1	Visual Examination	
2	Wall thickness Ratio	
3	Internal diameter of tube after full recovery	
4	Longitudinal change	
5	Dielectric Strength	
6	Tensile Strength	
7	Ultimate Elongation	
8	Heat Shock	
9	Low Temperature Flexibility	
10	Volume Resistivity	

Sl.No.	Parameter	To be Furnished by Bidder
11	Flame Retardant (For anti-tracking moulded components)	

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

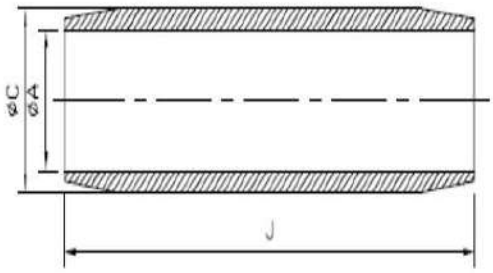
Signature

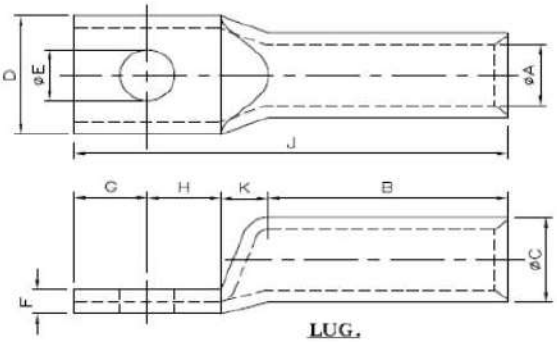
Designation

Annexure- Dimensions Ferrules & Lugs HT

Dimensional details of Aluminum ferrules for HT AL circular stranded compacted XLPE cables			
Cable Size in MM²	φA (mm) +0.3mm	φC (mm) +0.3 mm	J (mm) ±3mm
95	12	16.9	108
150	15.1	21.2	116
300	21.8	30.2	150
400	25	34.8	150
630	31.7	44.4	200
1000	41	56	250

Dimensional details of Aluminum Lugs for HT circular stranded compacted XLPE cables							
Cable Size in MM²	ϕE (mm) ±0.1mm in centre of palm	ϕA (mm) +0.5mm	ϕC (mm) +0.5 mm	D (mm) ±1.5mm	F (mm) ±0.5mm	B±3.0mm	J (mm) ±5mm
95	13	12	16.9	23.5	4.9	73	109
150	13	15.1	21.2	29.5	6	83	128
300	17	21.8	30.2	42	8.4	89	157
400	17	25	34.8	48	9.8	113	187
630	17	31.7	44.4	61	12.7	140	225
1000	-	41	56	77.5	15	160	280





LUG.

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

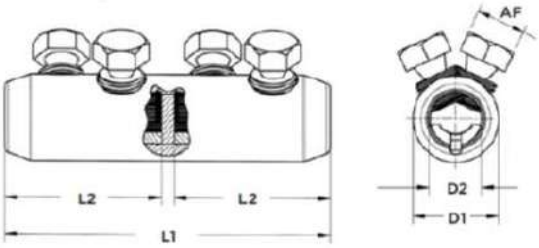
Annexure- Dimensions Mechanical connectors & Mechanical Lugs

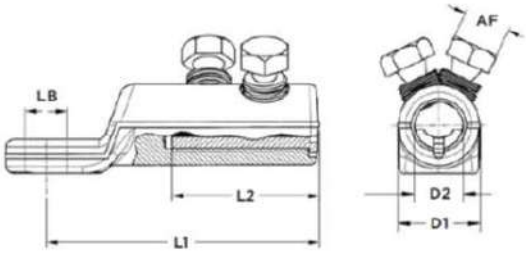
Aluminium Mechanical connectors

Cable Size in MM²	ϕD1 (mm)	ϕD2 (mm)	L (mm)
185-400	50	25.5-26	440- 450
185-400	42	25.5-26	170-200
500- 630	50	33- 33.5	180-230
1000	60	40	180-230

Tinned Aluminium Mechanical Lugs

Cable Size in MM²	ϕLB (mm)	ϕD1 (mm)	ϕD2 (mm)	L (mm)
185-400	17	42	25.5-26	137-150
500- 630	17	50	33- 33.5	150-180
1000	2x17	60	40- 40.5	180- 240





STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2023

Specification Name : Technical Specification For HT stay (Guy) insulator

SAYANTANI DAS	MILAN MAITY	SANTOSH KUMAR PATRA	Susavan Biswas	KHAJAN BHARDWAJ	POURUSH GARG
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPCODL	TPNODL	TPWODL	TPSODL	TPCODL	TPCODL
24-01-2023	25-01-2023	25-01-2023	27-01-2023	30-01-2023	31-01-2023

CONTENTS

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

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

4. GENERAL TECHNICAL REQUIREMENTS:

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Manufacturer's Name	To be specified by Bidder
2	Type of insulator	Designation 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	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	**DIMENSIONS**	
(a)	Length	140 mm
(b)	Width	85 mm
(c)	Cable Hole Dia	25 mm (+/- 1.5 mm)
7	Creepage Distance	57 mm
8	Type of Glaze	Brown / Dark Brown
9	Weight per piece	1.1 Kg approx.

5. GENERAL CONSTRUCTION:

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

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

c) The glaze shall be brown in color for insulators. The glaze shall cover the entire porcelain surface parts except those areas that serve as supports during firing.

d) The standard guy strain insulators shall be of designation, 'C' as per IS: 5300 or its latest revision. The recommended type of guy strain insulators for use on guy wires of HT overhead line is Type-C.

6. MARKING:

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

a) "TPCODL/ TPNODL/ TPWODL/ TPSODL"

b) Failing Load in KN

c) Manufacturer Name/ Trade Mark

d) Year of manufacturing, Country of Manufacturing

7. TESTS:

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

7.1 ACCEPTANCE TESTS

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

7.2 ROUTINE TESTS

i) Visual examination

7.3 TYPE TESTS

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

8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All tests shall be conducted at **CPRI / ERDA / Other Government Labs** as per relevant IS. Type tests should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/ TPNODL/ TPWODL/ TPSODL.

9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/ TPNODL/ TPWODL/ TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPCODL/ TPNODL/ TPWODL/ TPSODL's representatives at all times when the work is in progress. Inspection by the TPCODL/ TPNODL/ TPWODL/ TPSODL or its authorized

representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/ TPNODL/ TPWODL/ TPSODL.

Following documents shall be sent along with material.

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

10. INSPECTION AFTER RECEIPT AT STORE:

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

11. GUARANTEE:

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

12. PACKING:

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The materials are to be packed in crates or boxes for rough handling. Packing shall be marked with the strength and voltage ratings. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

13. TENDER SAMPLE:

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

14. QUALITY CONTROL:

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

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

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

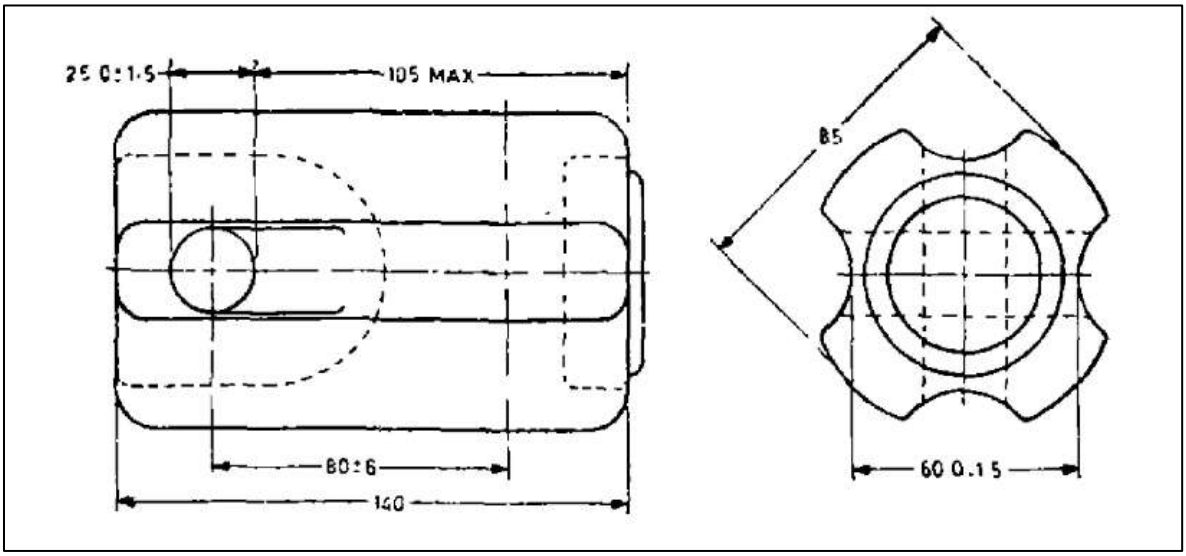
17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

The 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.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

SL. NO.	TECHNICAL PARTICULARS	To be furnished by Bidder
1	Manufacturer's Name	
2	Type of insulator	
3	Standard Specification to which the material shall confirm	
4	ELECTRICAL CHARACTERISTICS	
(a)	Dry one minute power frequency Flashover voltage	
(b)	Wet one minute power frequency Flashover voltage	
(c)	Dry one minute power frequency Withstand voltage	
(d)	Wet one minute power frequency Withstand voltage	
5	Minimum Failing Load	
6	Power Frequency Punctured withstand voltage	
7	**DIMENSIONS**	
(a)	Length	
(b)	Width	
(c)	Cable Hole Dia	
8	Creepage Distance	
9	Type of Glaze	
10	Weight per piece	

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-HV-2024

Specification Name : Technical Specification For HT Stay set including Clamp

SAYANTANI DAS	MILAN MAITY	SANTOSH KUMAR PATRA	Susavan Biswas	KHAJAN BHARDWAJ	POURUSH GARG
Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
TPCODL	TPNODL	TPWODL	TPSODL	TPCODL	TPCODL
16-02-2023	16-02-2023	21-02-2023	21-02-2023	22-02-2023	23-02-2023

CONTENTS

1. SCOPE:

This specification covers the technical requirements of design, manufacture, test at manufacturer's works, packing & forwarding, supply and unloading at stores/ site and performance of HT Stay Set.

2. APPLICABLE STANDARDS:

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

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

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

4. GENERAL TECHNICAL REQUIREMENTS:

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Manufacturer Name & Address	To be specified by Bidder
2	Referred IS	IS: 2062, IS: 2633, IS: 2629
3	Dimensions	
4	**Anchor Rod (20mm Dia): 1 No.**	
a)	Dia of Rod	20mm (+ 5%, - 3%)
b)	Overall length of Anchor rod	1800mm (+ 0.5%)
c)	Inside Dia of Rounded Eye	40mm (+ 3%)
d)	Length of threaded portion	40mm (+ 11%, - 5%)
e)	Size of MS Nut & Bolt, Square MS Washers confirming to IS 1387 (1967) and IS 1363 (1967)	20mm Sq. Washer 50X 50 X 1.6mm (2No.s)
5	**Anchor Plate: 1 No.**	
a)	Size of the MS Anchor plate	300x300x8 mm
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 Channel**	
(i)	Dia of the MS Rod used for bow	20mm dia
(ii)	Overall length and height of the bow	995mm 450mm
(iii)	Magnitude of the angle in radians by which bow is bended at the top	10 R
(iv)	Length and size of the GI Channel welded at the order end of the bow	200mm & 100x50x5 mm Channel
(v)	Number of holes made in the GI Channel	3
(vi)	Dia of the holes	22mm (3Nos.)
7	**Thimble: 1 No.**	
a)	Thickness of the MS Sheet used for thimble	1.5mm
b)	Size of thimble	75x22x40mm

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
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	14.523 kg (min) / 15.569 kg (Max)
10	Surface Finish of stay set	Hot Dip Galvanized
11	All Tolerance of the dimensions/weight	± 5%
12	**Hot-Dip Galvanized, Flat (50X8) GI Flat for Stay Clamp**	
1	Relevant Standard	IS: 2062, IS: 2633, IS: 2629
2	Grade of Steel	E 250 A
3	Minimum Tensile Strength	410 N/mm2
4	Yield Stress	250 N/mm2
5	Percentage Elongation (Min.) at Gauge Length	23%
6	Bend Test (Internal Dia)	Min-2t
7	Mass of Zinc Coating	705 gm/m2
8	Zinc Coating Thickness	100 micron (6 Dip)
9	Chemical composition	Grade: E 250 (As per IS: 2062)
10	Markings/Embossing	TPCODL/ TPNODL/ TPSODL/ TPWODL, Manufacture's trademark.

5. GENERAL CONSTRUCTION:

5.1 ANCHOR ROD WITH MS CHANNEL

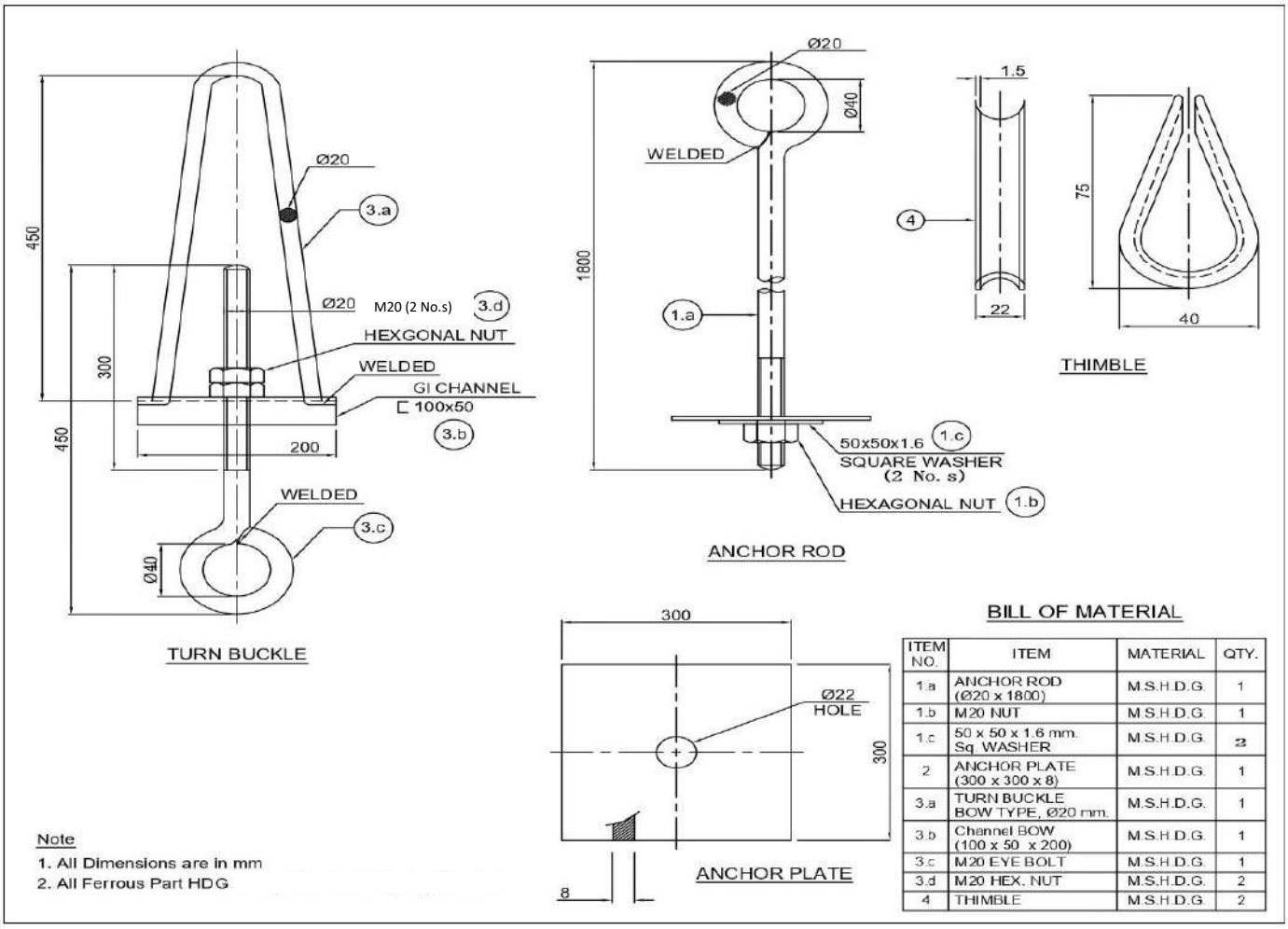
Overall length of rod should be 1800 mm made out of 20 mm diameter MS rod. One end of rod to be made into a round eye having an inner diameter of 40 mm. Other end fitted with MS channel 100 x 50 x 5 mm; 200 mm long. Hot Dip galvanized as per IS 4759-1996.

5.2 EYE BOLT

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

DRAWINGS

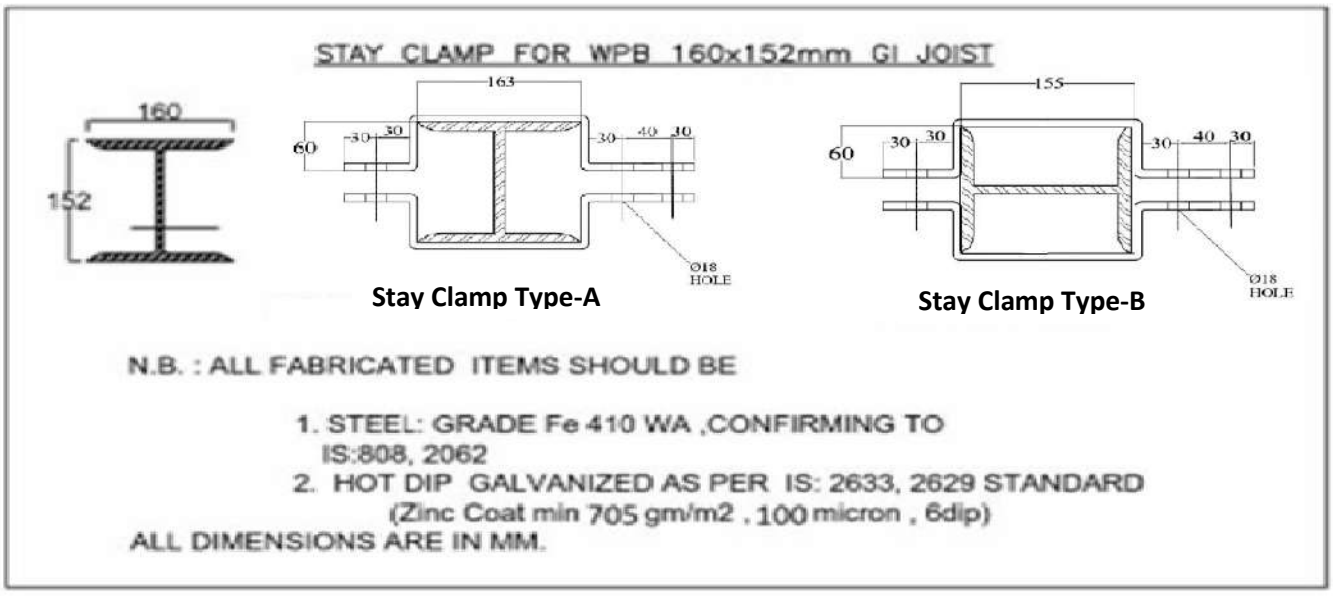
HT Stay Set :



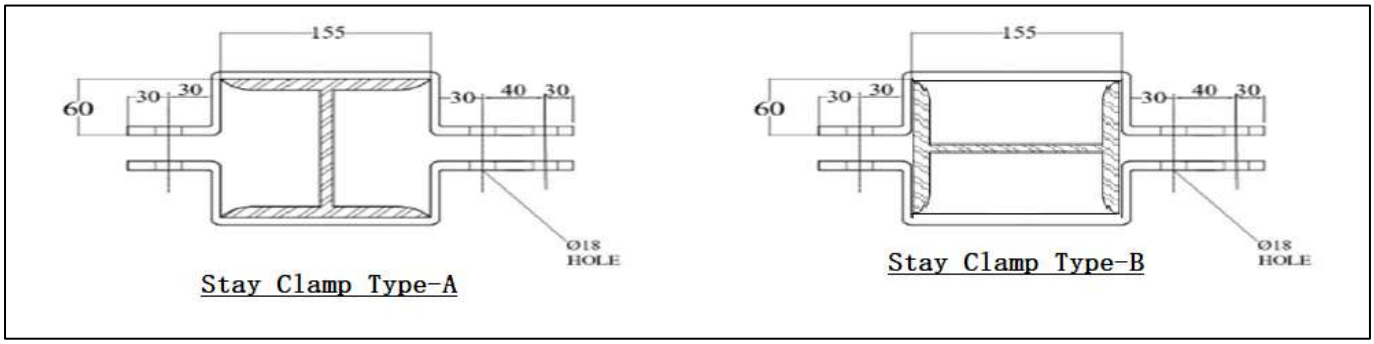
BILL OF MATERIAL

ITEM NO.	ITEM	MATERIAL	QTY.
1.a	ANCHOR ROD (Ø20 x 1800)	M.S.H.D.G.	1
1.b	M20 NUT	M.S.H.D.G.	1
1.c	50 x 50 x 1.6 mm. Sq. WASHER	M.S.H.D.G.	2
2	ANCHOR PLATE (300 x 300 x 8)	M.S.H.D.G.	1
3.a	TURN BUCKLE BOW TYPE, Ø20 mm.	M.S.H.D.G.	1
3.b	Channel BOW (100 x 50 x 200)	M.S.H.D.G.	1
3.c	M20 EYE BOLT	M.S.H.D.G.	1
3.d	M20 HEX. NUT	M.S.H.D.G.	2
4	THIMBLE	M.S.H.D.G.	2

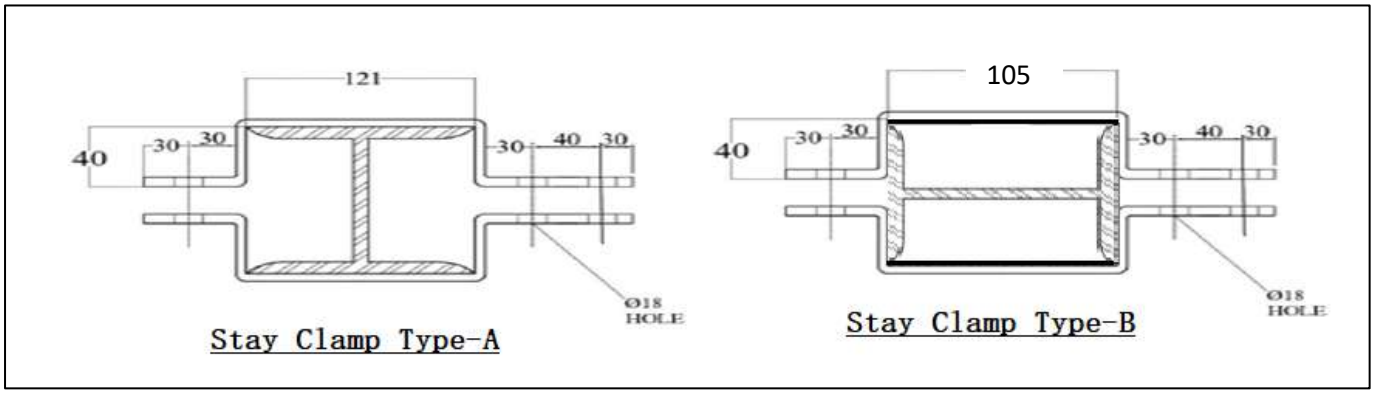
HT Stay Clamp for WPB Pole (50x8 mm):



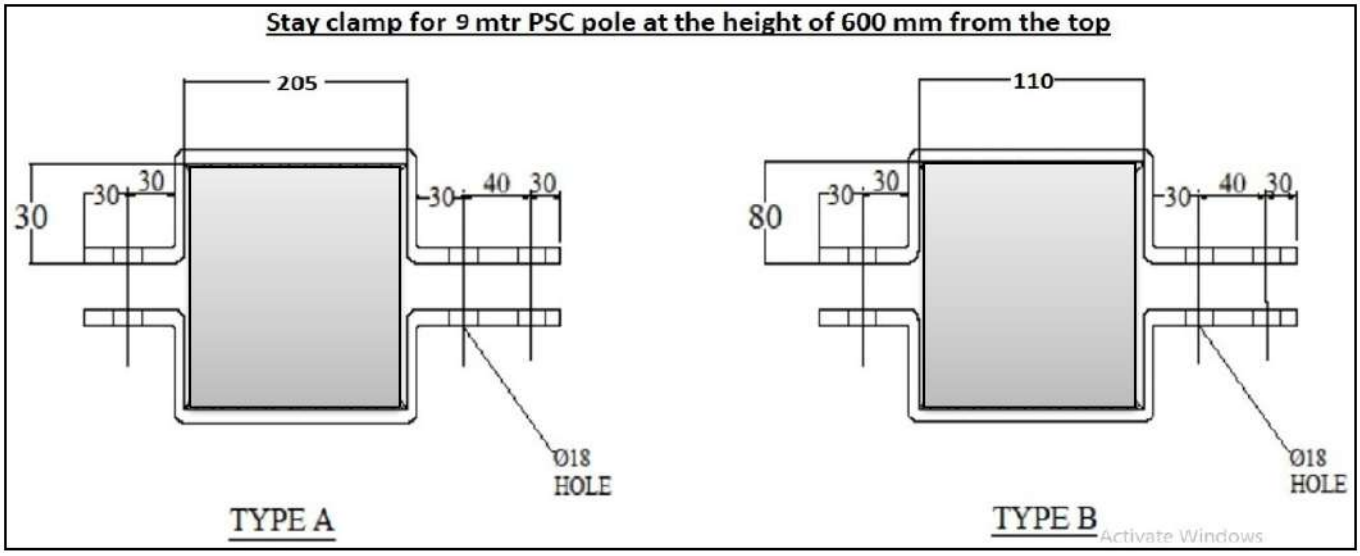
HT Stay Clamp for 150x150 RSJ Pole (50x8 mm):

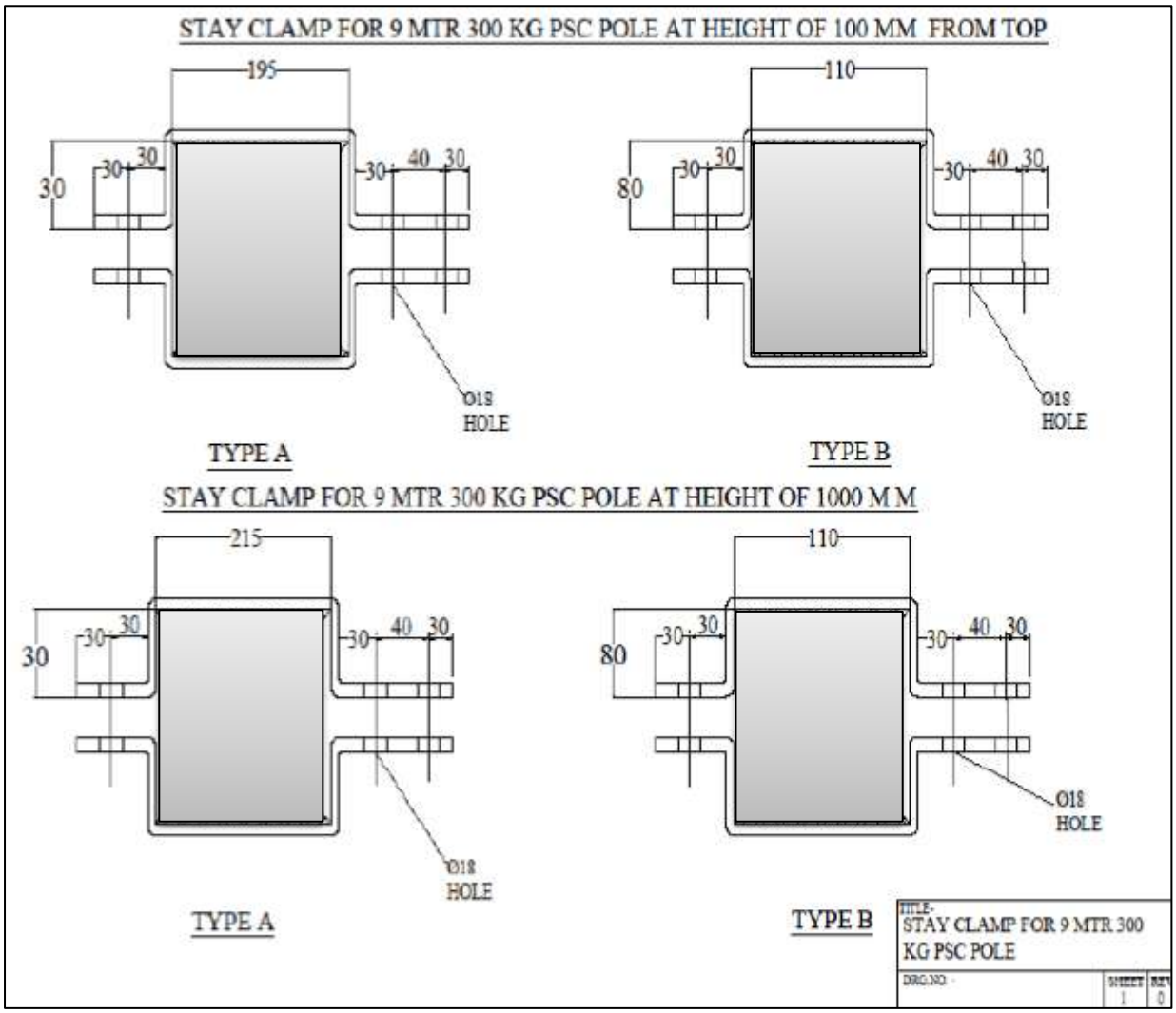


HT Stay Clamp for 116x100 RSJ Pole (50x8 mm):



HT Stay Clamp for 9 mtr PSC Pole (50x8 mm):





Specific requirements as per Tender, are to be fulfilled at the time of detailed engineering.

6. MARKING:

Following distinct non-erasable embossing to be made on each HT Stay Set and clamp Supplied to TPCODL/ TPNODL/ TPSODL/ TPWODL under this Tender.

a) Manufacturer Name/ Trade Mark

b) Engraved Marking (Punching before galvanization)

c) "TPCODL/ TPNODL/ TPSODL/ TPWODL"

d) Year of manufacturing, Country 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.

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/ TPNODL/ TPSODL/ TPWODL.

9. PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material.

a) Test reports
b) MDCC issued by TPCODL/ TPNODL/ TPSODL/ TPWODL
c) TPCODL/ TPNODL/ TPSODL/ TPWODL Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card

g) Delivery Challan

h) Other Documents (as applicable).

10. INSPECTION AFTER RECEIPT AT STORE:

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

11. GUARANTEE:

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

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

12. PACKING:

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

13. TENDER SAMPLE:

Not Applicable

14. QUALITY CONTROL:

The bidder shall submit QAP indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free

access to the manufacturer's/sub-supplier's works to carry out inspections.

15. TESTING FACILITIES:

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

16. MANUFACTURING FACILITIES:

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

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS:

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

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

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY THE BIDDER
1	Manufacturer Name & Address	
2	Referred IS	
3	Dimensions	
4	**Anchor Rod (20mm Dia): 1 No.**	
a)	Dia of Rod	
b)	Overall length of Anchor rod	
c)	Inside Dia of Rounded Eye	
d)	Length of threaded portion	
e)	Size of MS Nut & Bolt, Square MS Washers confirming to IS 1387 (1967) and IS 1363 (1967)	
5	**Anchor Plate: 1 No.**	
a)	Size of the MS Anchor plate	

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY THE BIDDER
b)	Dia of the hole made at the centre of the plate	
6. (A)	**Turn Buckle**	
(i)	Dia of the eye bolt	
(ii)	Length of the eye bolt	
(iii)	Length of the threaded portion of the bolt	
(vi)	Inner dia of the circular eye made at other end of the bolt.	
(B)	**Bow with welded Channel**	
(i)	Dia of the MS Rod used for bow	
(ii)	Overall length and height of the bow	
(iii)	Magnitude of the angle in radians by which bow is bended at the top	
(iv)	Length and size of the GI channel welded at the order end of the bow	
(v)	Number of holes made in the GI Channel	
(vi)	Dia of the holes	
7	**Thimble: 1 No.**	
a)	Thickness of the MS Sheet used for thimble	
b)	Size of thimble	
8	Minimum strength of the welding provides on various components of Guy/Stay Sets (IS:823/1964)	
9	Average weight of finished stay set	
10	Surface Finish of stay set	
11	All Tolerance of the dimensions/weight	
12	**Hot-Dip Galvanized, Flat (50X8) GI Flat for Stay Clamp**	
1	Relevant Standard	
2	Grade of Steel	
3	Minimum Tensile Strength	
4	Yield Stress	
5	Percentage Elongation (Min.) at Gauge Length	
6	Bend Test (Internal Dia)	
7	Mass of Zinc Coating	
8	Zinc Coating Thickness	

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY THE BIDDER
9	Chemical composition	
10	Markings/Embossing	

20. SCHEDULE "B" 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:

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

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

Seal of the Company:

Signature

Designation

CONTENTS

1. SCOPE

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

2. APPLICABLE STANDARDS

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

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

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

SL.NO.	CONDTIONS	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.

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

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

seismic forces corresponding to an acceleration of 0.1 g.

4. GENERAL TECHNICAL REQUIREMENTS:

i) The Composite insulators will be used on lines on which the conductor will be ACSR/AAAC of size up to 100 Sq.mm. The insulators should withstand the conductor tension, the reversible wind load as well as the high frequency vibrations due to wind.

ii) Insulator shall be suitable for 3 Phase, 50 Hz effectively earthed 11KV Overhead Distribution System in a moderately/heavily polluted atmosphere.

iii) **Bidder must be indigenous manufacturer and supplier of Composite insulator of rating 11kV** or above or must have developed proven in house technology and manufacturing process for composite insulators of above rating or possess technical collaboration/association with the manufacturer of composite insulators of rating 11kV or above. The Bidder shall furnish necessary evidence in support of the above along with the bid which can be in the form of certification from Utilities concerned, or any other documents to the satisfaction of the Owner.

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

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

$\pm (0.04d + 1.5)$ mm when $d \leq 300$ mm
$\pm (0.025d+6)$ mm when $d > 300$ mm

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

vi) The composite insulators including the end fitting connection shall be standard design suitable for use with the hardware fittings of any make conforming to relevant IEC/IS standards.

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

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE
1	Type of insulator	11 kV Polymeric composite Pin Insulator
2	Reference Standard	IEC 61109
3	Material of FRP Rod	Borron free ECR
4	Material of sheds	High voltage grade Silicone rubber Wacker-Germany, Dow Corning-USA
5	Material of End Fittings	SGCI /MCI/FORGED STEEL
6	Material of sealing compound	RTV Silicon
7	Colour of sheds	Grey
8	Rated system voltage	11 KV
9	Highest system voltage	12 KV
10	Dry Power Frequency Withstand voltage	70 KV
11	Wet Power Frequency Withstand voltage	35 KV
12	Dry Lightning Impulse withstand voltage	Positive: 75 KV Negative: 75 KV
13	Dry Lightning Impulse Flashover voltage	Positive: 95 KV Negative: 95 KV
14	RIV at 1 MHz when energized at 10 KV / 30 KV (rms) under dry condition	< 50 microvolt
15	Creepage distance (min)	320 mm
16	Min Failing load/ SCL (Specified cantilever Load)	5 KN
17	Dia of FRP Rod	24 mm
18	Length of FRP Rod (min)	200 mm
19	Dia of weather sheds	≥90 mm
20	Thickness of housing	3 mm
21	Dry arc distance(min)	165 mm
22	Method of fixing sheds to housing	Injection moulding
23	Visible Discharge Voltage	9 kV
24	Type of sheds	Aerodynamic
25	Dia of bottom end fitting	20 mm
26	Thread length of bottom end fitting	150 mm (Min)

5. GENERAL CONSTRUCTIONS:

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

(a) Core- the internal insulating part

(b) Housing- the external insulating part

(c) Metal end fittings.

5.1 CORE

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

5.2 POLYMER HOUSING:

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

5.3 WEATHERSHEDS

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

5.4 HARDWARE FITTINGS:

End fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminium alloy. Metal end fitting

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

6. MARKING:

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

a) Name & Trade mark of the manufacturer
b) Voltage Grade
c) Year of manufacture
d) Minimum failing load in KN
e) “TPCODL/TPNODL/TPWODL/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
v) Galvanizing Test
vi) Verification of the specified mechanical load
vii) Bending Load Test
viii) Dry Power Frequency Withstand Voltage Test
ix) Wet Power Frequency Withstand Voltage Test
x) Analysis of material properties of housing material
xi) Analysis of material properties of Core material

7.2 ROUTINE TESTS

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

7.3 TYPE TESTS

A) For Insulators

i) Dry Power Frequency Withstand Voltage Test
ii) Dry Power Frequency Voltage Flashover Test
iii) Dry lightning impulse withstand voltage test.
iv) Wet Power Frequency Withstand Voltage Test
v) Wet Power Frequency Voltage Flashover Test
vi) Mechanical failing load test.
vii) Salt fog test: On insulators for 1000 hr as per IEC
viii) Galvanization test
ix) Radio interference test.

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.

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. TPCODL/ TPWODL/ TPNODL/ TPSODL. TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report under exceptional circumstances after due diligence/ scrutiny by DISCOM. 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/ TPNODL/ TPWODL/ TPSODL.

9. PRE DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as

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

Following documents shall be sent along with material.

a) Test reports
b) MDCC issued by TPCODL/TPNODL/TPWODL/TPSODL
c) 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/TPNODL/TPWODL/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 timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

The bidder shall further be responsible for 'free replacement' for another period of THREE

years from the end of guarantee period for any 'latent defects' if noticed by the company.

12. PACKING:

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

13. TENDER SAMPLE:

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

14. QUALITY CONTROL:

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

15. TESTING FACILITIES:

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

16. MANUFACTURING ACTIVITIES:

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

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS

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

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

b) Work Experience details

c) Type test certificates.

d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY BIDDER
1	Type of insulator	
2	Reference Standard	
3	Material of FRP Rod	
4	Material of sheds	
5	Material of End Fittings	
6	Material of sealing compound	
7	Colour of sheds	
8	Rated system voltage	
9	Highest system voltage	
10	Dry Power Frequency Withstand voltage	
11	Wet Power Frequency Withstand voltage	
12	Dry Lightning Impulse withstand voltage	
13	Dry Lightning Impulse Flashover voltage	
14	RIV at 1 MHz when energized at 10 KV / 30 KV (rms) under dry condition	
15	Creepage distance (min)	
16	Min Failing load/ SCL (Specified cantilever Load)	
17	Dia of FRP Rod	
18	Length of FRP Rod (min)	
19	Dia of weather sheds	
20	Thickness of housing	
21	Dry arc distance(min)	
22	Method of fixing sheds to housing	
23	Visible Discharge Voltage	
24	Type of sheds	

SL. NO.	TECHNICAL PARTICULARS	TO BE FURNISHED BY BIDDER
25	Dia of bottom end fitting	
26	Thread length of bottom end fitting	

20. SCHEDULE "B" 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:

SL. No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature

Designation

CONTENTS

1. SCOPE

This specification covers the technical requirements of design, manufacture, performance, testing at manufacturer's works, packing & forwarding, supply and unloading at store/ site, performance of 11 kV Ball and Socket Disc Polymer Insulator complete with all the accessories for trouble free and 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/IEC	Description
IEC:61109	Definition, test methods and acceptance criteria for composite insulators for A.C. overhead lines above 1000V.
IS:2071/ IEC:60060-1	Methods of High Voltage Testing.
IS:2486/ IEC:60120/ IEC:60372	Specification for Insulator fittings for Overhead Power Lines with a nominal voltage greater than 1000V. Ball and socket couplings of string insulator units –Dimensions Locking devices for ball and socket couplings of string insulator units - Dimensions and tests
IEC:60575	Thermal-mechanical performance test and mechanical performance test on string insulator units.
IS: 13134/ IEC: 60815	Guide for the selection of insulators in respect of polluted condition.
IEC: 60433	Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic insulators for AC systems - Characteristics of insulator units of the long rod type.
STRI guide 1.92/1	Hydrophobicity Classification Guide.
IS:8263/ IEC:60437	Methods of RI Test of HV Insulators.
IS:4759	Hot dip zinc coatings on structural steel & other allied products.
IS:2629	Recommended practice for Hot Dip galvanization for iron and steel
IS:6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles.
IS:3203	Methods of testing of local thickness of electroplated coatings.

Ref. IS/IEC	Description
IS:2633	Testing of Uniformity of coating of zinc coated articles.
ASTM D 578-05	Standard specification for glass fiber standards.
IS:4699	Refined secondary zinc

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

SL.NO.	CONDTIONS	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.

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

4. GENERAL TECHNICAL REQUIREMENTS:

i) The Composite insulators will be used on 11kV lines on which the conductor will be ACSR/AAAC of sizes 100 Sq.mm. The insulators should withstand the conductor tension, the reversible wind load as well as the high frequency vibrations due to wind. Insulator shall be suitable for moderately to heavily polluted, Humid & High saline atmosphere.

ii) 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.

iii) Insulators shall be suitable for Strain type of load and shall be of B&S type. The diameter of Composite Insulator shall be as per technical specification.

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

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

± (0.04d + 1.5) mm when d ≤ 300 mm
± (0.025d+6) mm when d > 300 mm

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

vi) The composite insulators including the end fitting connection shall be standard design suitable for use with the hardware fittings of any make conforming to relevant IEC/IS standards.

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

viii) The composite insulators offered shall be suitable for use of hotline maintenance technique so that usual hot line operation can be carried out with ease, speed and safety.

SL. No.	TECHNICAL PARTICULARS	DESIRED VALUE
		Min. requirement for 11 kV 70 KN
1	Type of Insulator	Polymeric B&S
2	Standard according to which the insulators manufactured and tested.	IEC 61109
3	Name of material used in manufacture of the insulator with class/grade)	High voltage grade Silicone rubber Wacker-Germany, Dow Corning-USA
(a)	Material of core (FRP rod) (I) E-glass of ECR-glass.	ECR or BORRON FREE
(b)	Material of housing weather sheds (silicon content)	Silicon content of minimum 40% by weight
(c)	Material of end fittings	SGI/MCI/Forged Steel
(d)	Sealing compound for end fittings	RTV SILICON
4	Colour	GREY
5	Electrical characteristics	
(a)	Nominal system voltage	11 kV
(b)	Highest system voltage	12 kV
(c)	Dry Power frequency withstand voltage	70 kV
(d)	Wet Power frequency withstand voltage	35 kV
(e)	Dry flashover voltage	75 kV
(f)	Wet flash over voltage	40 kV
(g)	Dry lighting impulse withstand voltage	
	(a) Positive	75 kVp
	(b) Negative	75 kVp
(h)	Dry lighting impulse flashover voltage	
	a) Positive	80kVp
	b) Negative	80kVp
(i)	FRP rod leakage current at 175 V/mm	< 0.05 mA
(j)	RIV at 1 MHz when energized at 10 kV/30kV (rms) under dry condition.	< 50 microvolt
(k)	Creepage distance (Min.)	320 MM
6	Minimum failing load.	70 KN
7	**Dimensions of insulator**	
(i)	Weight (Approx.)	1.2 kg
(ii)	Dia of FRP rod	16 mm
(iii)	Length of FRP rod	240 mm
(iv)	Dia of weather sheds	≥90 mm
(v)	Thickness of housing	3 mm
(vi)	Dry arc distance Dimensioned drawings of insulator (including weight with tolerances in weight)	175 mm

SL. No.	TECHNICAL PARTICULARS	DESIRED VALUE
		Min. requirement for 11 kV 70 KN
8	Method of fixing of sheds to housing (specify). Single mould or Modular construction (injection moulding/compression	Injection Moulding
9	Type of sheds	Aerodynamic

5. GENERAL CONSTRUCTIONS:

Composite Insulators shall be designed to meet the light quality, safety and reliability and are capable of withstanding a wide range of environmental conditions. Polymeric Insulators shall consist of THREE parts, at least two of which are insulating parts:

(a) Core- the internal insulating part

(b) Housing- the external insulating part

(c) Metal end fittings.

5.1 CORE

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

5.2 POLYMER HOUSING:

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

Sheath material in the bulk as well as in the sealing / bonding area shall be free from voids.

5.3 WEATHERSHEDS

The composite polymer weathersheds 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 weathersheds 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 weathersheds material shall have tensile strength of 3 Mpa with 400% elongation minimum and tear strength of 16 N/mm.

5.4 HARDWARE FITTINGS:

a) 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 Ball and socket type hardware of respective specified mechanical load and shall be hot dip galvanized in accordance with IS 2629.

b) They shall be connected to the rod by means of a controlled compression technique. 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 fibers or crack the core.

c) 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.

d) The dimensions of end fittings of insulators shall be in accordance with the standard dimensions stated in IEC: 60120/IS: 2486 - Part-II.

e) Outer portion of ball or socket should be Zinc sleeved with minimum 99.95% purity of Electrolytic high grade zinc.

f) **Ball pin and socket couplings**: Ball pin and socket shall be of forged steel and dimensions are as specified in IS 2486 (Part-2). Insulator metal caps shall be made of malleable cast iron conforming to IS 14329.

g) **Locking device of the coupling:** The security clips to be used as a locking device for ball and socket coupling shall be ‘R’ shaped hump type or ‘W’ type as per IS 2486. The locking device shall be resilient, corrosion resistant, and of suitable mechanical strength. Material to be used for ‘W’ locking clip is phosphor bronze and for ‘R’ type locking clip is stainless

steel. The hardness and temper of material are important for their satisfactory operation. The locking devices shall retain their ability after being operated from the locking to the coupling position at least twenty times at normal temperature. They should be effective at the lowest temperature likely to be encountered in service. Socket for use with W-clips have the lower edge of the rectangular slot at the level of bottom of the socket. The slot is so shaped that it will accept the W-clip and retain it in two distinct positions when operated for coupling and locking. The shape of the W-clip is such that complete withdrawal when moving from the locking to the coupling position prevented.

h) All ferrous parts shall be hot dip galvanized to give a minimum average coating of zinc equivalent to 705 gm/Sq.m, or 100mm min. thickness and shall be in accordance with the requirement of IS: 4759, The zinc used for galvanizing shall be of purity 99.5% as per IS: 4699. The zinc coating shall be uniform, adherent, smooth, reasonably bright continuous and free from imperfections such as flux, ash rust stains, bulky white deposits and blisters. Before ball fittings and galvanized, all die flashing on the shank and on the bearing surface of the ball shall be carefully removed without reducing the design dimensional requirements.

6. MARKING:

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

a) Name & Trade mark of the manufacturer
b) Voltage Grade
c) Year of manufacturing
d) Minimum failing load in KN
e) “TPCODL/TPNODL/TPWODL/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) Mechanical performance Test
v) Galvanizing Test

vi) Mechanical Failing Load Test
vii) Dry Power Frequency Withstand Voltage Test
viii) Wet Power Frequency Withstand Voltage Test
ix) Verification of the locking system or the tightness of the interface between end fitting and insulator housing

7.2 ROUTINE TESTS

i) Visual examination (Free from voids, cavity, foreign particle and scratch/nick spot)
ii) Mechanical Load test
iii) Electrical routine test

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) Mechanical failing load test.
vii) Salt fog test: On insulators for 1000 hr as per IEC
viii) Galvanization test
ix) Damaged Limit Proof Test
x) Radio interference test.

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

D) For End Fittings

i) Thickness of Zinc coating

ii) Uniformity of Zinc Coating

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 Govt. Lab** 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. TPCODL/ TPWODL/ TPNODL/ TPSODL. TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report under exceptional circumstances after due diligence/ scrutiny by DISCOM. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/TPNODL/TPWODL/TPSODL.

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The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPCODL/TPNODL/TPWODL/TPSODL's representatives at all

times when the work is in progress. Inspection by the TPCODL/TPNODL/TPWODL/TPSODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/ TPNODL/ TPWODL/ TPSODL.

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11. GUARANTEE:

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

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

12. PACKING:

Supplier shall ensure that all the equipment covered under this specification shall be prepared

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

13. TENDER SAMPLE:

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

14. QUALITY CONTROL:

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.

15. TESTING FACILITIES:

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

16. MANUFACTURING ACTIVITIES:

The bidder shall get the approved drawing and GTP before start of manufacturing activity. The successful bidder will have to submit details of the offered design & components for approval as per specification. CAT-A/CAT-B is mandatory to start manufacturing.

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 clause wise compliance of the specification

b) Schedule “B” Deviations
c) Work Experience details
d) Type test certificates.
e) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

19. SCHEDULE- “A” GUARANTEED TECHNICAL PARTICULARS

Bidder to submit completely clause wise compliance of this specification

20. SCHEDULE “B” 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:

SL. No	Clause No.	Details of deviation with justifications

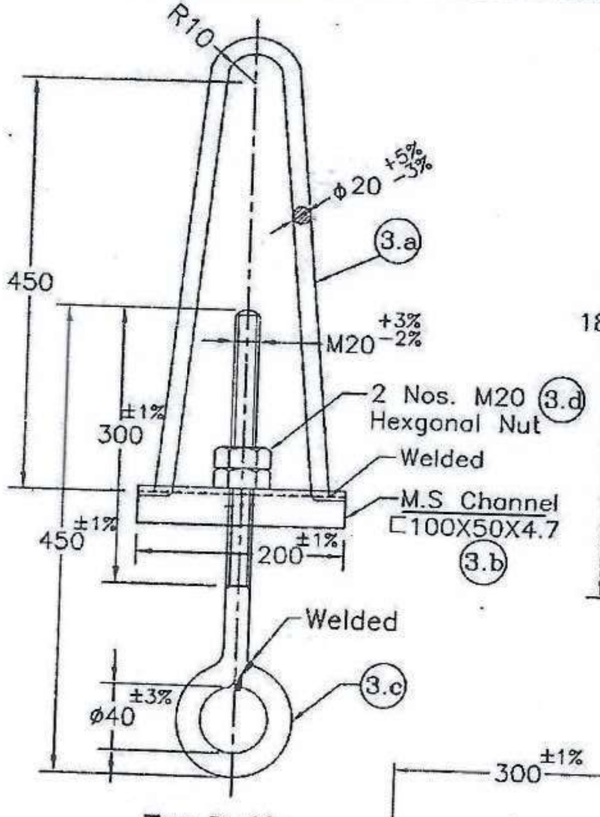
We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

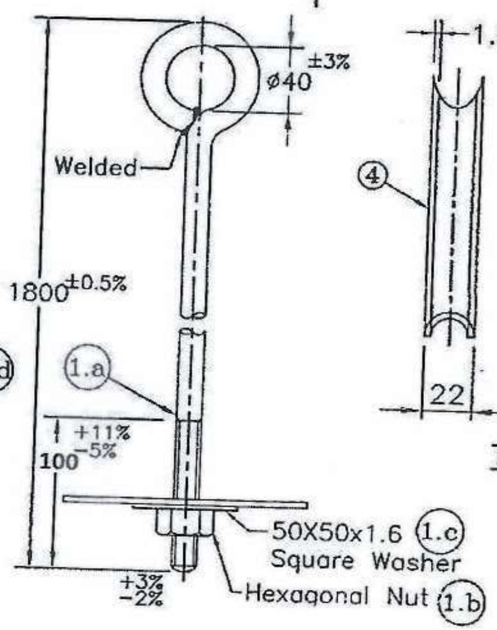
Signature

Designation

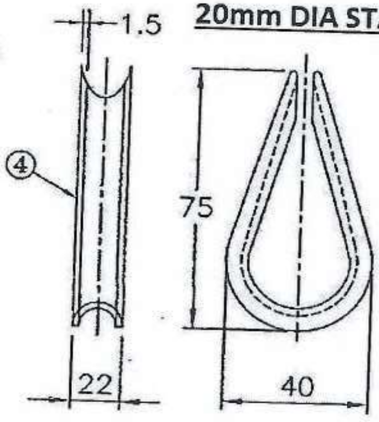
20mm DIA STAY SET FOR HT LINE



Turn Buckle



Anchor Rod

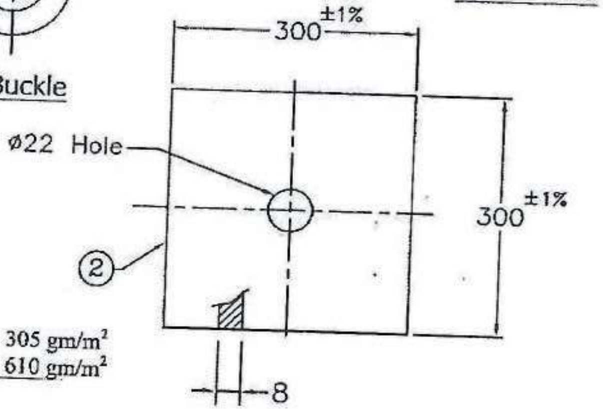


Thimble

Bill of Materials			
SN.	Item	Material	Qty.
1.a	Anchor Rod (ϕ20x1800)	M.S.,HDG	1
1.b	M20 Nut	M.S.,HDG	1
1.c	50x50x1.6 mm Sq. Washer	M.S.,HDG	1
2	Anchor plate (300x300x8)	M.S.,HDG	1
3.a	Turn Buckle Bow type, ϕ20 mm	M.S.,HDG	1
3.b	MS Channel (100x50x4.7x200)	M.S.,HDG	1
3.c	M20 Eye Bolt	M.S.,HDG	1
3.d	M20 Hex. Nut	M.S.,HDG	2
4	Thimble	M.S.,HDG	2

Technical Details

1. Material : Mild Steel (E250, Fe 410 WA) as per IS:2062
2. Finish : Hot Dip Galvanising conforming to IS:2633
3. Minimum Breaking Strength of Stay Assembly : 4900kg.



Anchor Plate

Wt. of Zn. Coating
a) For Threaded Rod 305 gm/m^2
b) For Other 610 gm/m^2

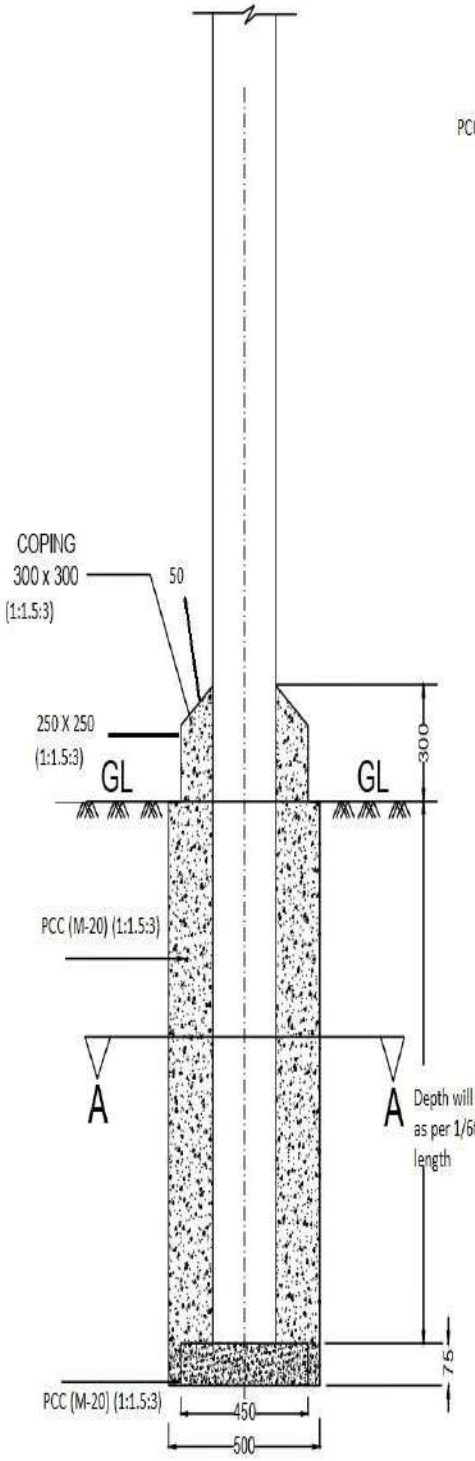
Minimum Breaking Strength of Stay Assembly 4900 Kg.

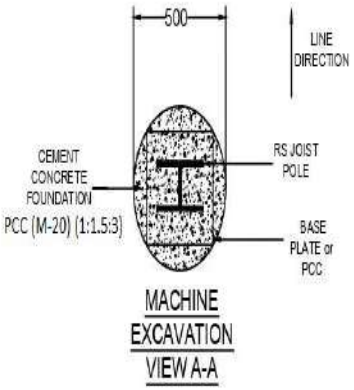
Raw Material grade (Mild Steel) E250 (Gr. Fe 410 WA) of IS:2062/Equivalent

APPROVED

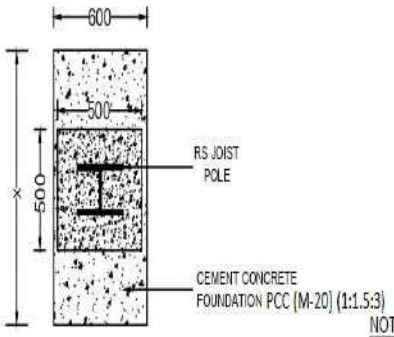
Sr. General Manager (Elec.) Technical, CESU)

ALL DIMENSIONS ARE IN MM	SCALE: NTS	SHEET 1 OF 1	A4





MACHINE EXCAVATION VIEW A-A



MANUAL EXCAVATION VIEW A-A

VOLUME OF CONCRETING FOR CUBICAL FOUNDATION

SL NO.	DESCRIPTION	SECTION	LENGTH IN MM	QTY IN NOS	VOLUME IN M³
1	CONCRETING POLE	500 x 500	1500	01	0.375
2	COPING CIRCULAR	300 x 300	300	01	0.021
3	PCC	450 x 450	75	01	0.002
				TOTAL VOLUME	0.398

VOLUME OF CUBICAL EXCAVATION

SL NO.	DESCRIPTION	SECTION	LENGTH IN MM	QTY IN NOS	VOLUME IN M³
1	FOR NORMAL SOIL	1M x 0.6M	1500	01	0.960
2	FOR SOFT ROCK	1M x 0.6M	1500	01	0.960
3	FOR HARD ROCK	0.9M x 0.6M	1500	01	0.960

VOLUME OF CONCRETING FOR CYLINDRICAL FOUNDATION

SL NO.	DESCRIPTION	SECTION	LENGTH IN MM	QTY IN NOS	VOLUME IN M³
1	CONCRETING POLE	500	1500	01	0.294
2	COPING	300	300	01	0.021
3	PCC	500	75	01	0.015
				TOTAL VOLUME	0.330

VOLUME OF CYLINDRICAL EXCAVATION

SL NO.	DESCRIPTION	SECTION	LENGTH IN MM	QTY IN NOS	VOLUME IN M³
1	FOR ALL KIND OF SOIL	600	1575	01	0.309

X(MM)	FORMATION
1600	FOR NORMAL SOIL
1600	FOR SOFT ROCK
550	FOR HARD ROCK

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. MACHINE & MANUAL EXCAVATION PRACTICE SHALL BE USED AS PER THE REQUIREMENT OF SITE AND EASE OF EXECUTION.
2. AS PER BOQ NO. F(V).30.02(b)

Annexure VII

General Condition of Contract

CONTENTS	
CLAUSE NO.	**DESCRIPTION**
1.0	**ORGANIZATIONAL VALUES**
2.0	**ETHICS**
3.0	**CONTRACT PARAMETERS**
3.1	Issue/ Award of Contract
3.2	Contract Commencement Date
3.3	Contract Completion Date
3.4	Contract Period/Time
3.5	Contract Execution Completion Date
3.6	Contract Execution Period/Time
3.7	Contract Price /Value
3.8	Contract Document
3.9	Contract Language
3.10	Reverse Auction
4.0	**SCOPE OF WORK**
4.1	Technical Evaluation
4.2	Indemnity
4.3	Display of notice boards at work site
4.4	Disposal of waste at site
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4.7	Issuance of material
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5.1	For Supply part of Contract
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5.3	Changes in statutory Tax Structure

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

1.0 ORGANIZATIONAL VALUES

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

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

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

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

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

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

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

2.0 ETHICS

In our effort towards Excellence and in Management of Business Ethics at TPCODL, an Ethics Management Team is constituted.

The main objective of the Ethics Management Team is to:

1. Record, address and allay the issues and concerns on ethics raised by different stakeholders like employees, consumers, vendors, Associates etc. by initiating immediate corrective actions.
2. Ensure proper communication of the ethics policies and guidelines through prominent displays at all offices of TPCODL and through printed declarations in all concerned documents where external stakeholders are involved.
3. Ensure proper framework of policies as preventive measures against any ethics violation recorded by them.
4. Prepare and submit MIS of all issues and concerns, corrective and preventive actions on monthly basis to the top management for their information.

All members of Team TPCODL, Associates and Stakeholders are requested to submit any grievance on ethics violation to Mr. Rajeev Kharyal, Chief Ethics Counselor.

3.0 CONTRACT PARAMETERS

3.1 Issue/Award of Contract

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

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

3.2 Contract Commencement Date

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

3.3 Contract Completion Date

The date of expiry of Guarantee Period (detailed in section 12 of this document) shall be deemed as the Contract Completion Date.

3.4 Contract Period/Time

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

3.5 Contract Execution Completion Date

The stipulated date for completing the execution of all items in the schedule of quantities (Supply, Service and or both as applicable) shall be deemed as the Contract Execution Completion Date.

3.6 Contract Execution Period/Time

The Period from Contract Commencement Date to Contract Execution Completion Date shall be the Contract Execution Period/Time. Timely Completion of Works/Timely Delivery of Materials is the essence of the contract. The period from effective date of contract to the date stipulated for completion of delivery of all items/completion of all the works/services, as per schedule of quantities of the contract is defined as contract execution completion time. The Delivery of Materials /The Completion of Works, as applicable, should be achieved in all respects as per schedules of quantities and all the terms and conditions of the contract, in the contract execution time.

Any revision/amendment in the originally stipulated contract execution time has to be approved by authorized representative of TPCODL.

3.7 Contract Price /Value

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

3.8 Contract Document

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

- NIT/Tender Enquiry, QR, Instruction to Bidders, Special Condition of Contract (SCC) of tender, GCC, Technical & Commercial Specifications including relevant annexure and attachments).
- Bids & Proposals Received from Associate including relevant annexure/attachments.

- Letter of Intent (LOI/RC/PO) with agreed deviations from the tender/bid documents.
- All the Inspection and Test reports, Detailed Engineering Drawings.
- Material Dispatch Clearance Certificate (MDCC).
- Minutes of Meeting (MoM)

3.9 Contract Language

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

The Contract documents and all correspondence between the TPCODL, Third Parties associated with the contract, and the Associate shall be in English language.

However, all signboards required indicating "Danger" and/or security at site and otherwise statutory required shall be in English, Hindi, and local languages.

3.10 Reverse Auction

TPCODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached in Annexure J. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form as mentioned in the Annexure J as a token of acceptance for the same.

4.0 SCOPE OF WORK

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

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

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

TPCODL have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the

Contract by submitting a request in writing to the Associate. The Associate shall, within fifteen days of receipt of such request from the TPCODL, provide Purchaser with a reasonably detailed estimate of the cost of the change outlined in the request.

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

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

4.1 Technical Evaluation

TPCODL reserves the right to assign scores to different parameters including but not limited to the following while evaluating the bids. TPCODL reserves the right to change the parameters and score without prior information to the associates:

S. No.	Evaluation Parameter	Max. Score
A	**Bidders already Registered with TPCODL**	**100**
A.1.	**Quality of the Products & Services** a. <u>For Supply Part:</u> No Material Rejections in last 2 years Deduction of 3 marks for each PO/ RO (for same product category) with major rejections in last 2 years. (Major rejection shall be considered when material is taken back by the vendor for rectification and the quantity of rejected material is more than 10%). b. <u>For Service Part:</u> No violation of statutory compliances in last 1 year. Deduction of 2 marks for each instance of violation in last 1 year. c. <u>Safety</u> Deduction of 2 marks for each instance of safety violation in last 1 year. Deduction of 4 marks for each reported Non-Fatal Accident in last 1 year. In case of any reported fatal accident: *ZERO MARKS*	12 12 16
A.2.	**Timely Execution of Contracts** Total Achieved Score = {30 – 3 x (Avg. %age LD deductions in last 2 years)}	30
A.3.	**Legal Issues with TPCODL** Zero instances of Arbitration procedures / Court Cases / PBG forfeitures in last 2 years: 30 marks else 'Zero' marks	30
B	**Bidders new to TPCODL**	**100**
B.1.	**Visits** <u>For Supply Part</u>: Factory Visit and Evaluation. <u>For Service Part:</u> Client Site Visit where the bidder is providing similar services. The visits as above shall be arranged by the bidder. However all costs towards conveyance, lodging, boarding etc. shall be borne by TPCODL. The score assigned by TPCODL based on the above visits shall be final and binding on the bidder. **<u>Safety:</u>**	30 20

S. No.	Evaluation Parameter	Max. Score
	Score achieved against the BA safety Management System questionnaire.	
B.2.	**Client Referrals** At least 3 nos. Customer References for similar products/ services in last 3 years. All customer references shall be either of the following: ▪ Govt. Organizations/ PSUs/ Power Distribution Utilities. ▪ Private Organizations with an annual turnover of >= 500 cr. PO copies or Completion Certificates are admissible. Each reference: 10 marks	30
B.3.	**Blacklisting Information** Not blacklisted by any reputed organization / utility in last 2 years: 20 marks else 'Zero' marks.	20

- Bidder shall be considered as technically qualified if they are able to achieve a technical score of >70 marks on the above parameters. 'A' or 'B'.
- The bidder must have the PF and ESI registration. In case it is not there (provided the bidder is not exempted from the PF and ESI), bidder shall not be evaluated on the above parameters and will be considered as disqualified.

4.2 Indemnity

Associates shall undertake to fully indemnify TPCODL (also referred to as the Company in the GCC) against all kinds of liabilities or damages, of whatsoever nature, including compensation arising from any accident to the person or property of those in Associate's employment or to any other person or properties including those of TPCODL, arising due to reasons attributable to any, act, omission or negligence of the Associate the Associates, for the entire period of contract including period of guarantee.

Within 7 days of award of work, the Associates shall submit Indemnity Bond in the format as per Annexure-E to Order Issuing Authority.

Contract having value more than Rs 2 Cr per Annum, Associates shall submit Indemnity Bond on Rs 100/- Non Judicial Stamp Paper in the format as per Annexure- E to Order Issuing Authority.

4.3 Display of Notice Boards at Work Sites

The Associate shall put up display notice board at each project site where the works are in progress indicating the information given below:

- Name of the Project.
- Estimated Cost of Project.
- Date of Commencement.
- Expected date of completion.
- Name of Associate and his telephone number.
- Name of Engineer-in-Charge and his telephone number.

4.4 Disposal of Waste at Site

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

The associates shall follow the below criteria for disposal of waste at site during the execution of project.

- Associate shall ensure that the detailed project plan include the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/destination in timely and safe manner as per environmental legislations during the execution of project. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise during the execution of project. The copy of same shall be given to EIC before the commencement of project.
- The purchase policy of BA shall encourage the procurement of material with recycled and minimum packaging of goods during delivery. Associate shall provide the appropriate means for site to site transportation of materials to avoid damage and litter generation.
- Associate shall educate and inform to its project team about the requirement and responsibilities for waste minimization and disposal in general and provide training of practices that support this. Waste management should be treated like a safety program.
- In the event that area of contaminated or biological hazard is identified, Associate shall ensure that plant, equipment, personnel and any activity associated with the work is carried out in consultation with EIC of TPCODL.
- Associate shall ensure that the residents living near the site are kept informed about proposed working schedule and shall informed timings and duration of any abnormal noise full activity that is likely to happen.
- Associate shall ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

4.5 Deployment of Work Force

Associate shall deploy adequate labour, as considered necessary by TPCODL for execution of the contract including Sundays and Holidays whenever required to do so with no extra cost to TPCODL. However, prior permission shall be taken from the site Engineer to carry out the work beyond normal working hours or on Sundays and Holidays. Female employees shall not be deployed beyond normal working hours/days and no child labour shall ever be deployed. Associate shall depute full time qualified and experienced engineers to supervise the work at site. All such staff shall be maintained from commencement to completion of all works to the entire satisfaction of the Engineer-in-Charge. Associate's employees deployed for the works under this contract will not be considered in Company's employment at any time. Associate shall continue to be responsible for all such employees, their safety, all types of statutory compliances related thereto and in any other manner whatsoever. The company will stand indemnified by the Associate in respect of all the above. At the same time Company upon noticing any breach or default on any statutory compliances, may at their sole discretion, decide to act in a manner as deemed fit at the risks and costs of the Associate.

TPCODL shall have the right to instruct the Associate to change the Sub- Associates or skilled /unskilled workers in case the conduct, the workmanship or speed of the work is not satisfactory.

Associates shall submit duly signed undertaking regarding engagement of competent staff / employee commensurate to the nature of job to Engineer–in–charge in the format attached as Annexure – H.

4.6 Damages to Properties

The Associates shall take necessary steps to ensure that the equipment and installations of the Company, Third parties, including other utility services like water supply pipelines; open drains telephone cables etc. are not damaged during execution of the works. The Associates shall be responsible for all such damages and shall have to repair/ replace and/or compensate for the entire claims in respect of such damages at its own cost.

4.7 Issuance of Material

The material issued to the Associate shall be in the custody of the Associates who shall be fully responsible for the same. After completion of the works, the Associates will reconcile the material. Any cost of material which is short or damaged/lost will be deducted from Associate bill/ deposits.

4.8 Company's Right To Use Works

If Taking Over Certificate is delayed for any reason, for which TPCODL's decision shall be final and binding upon the Associate, the Company shall be entitled to use the works or portion thereof without affecting Associate's responsibility and liability to complete the balance works as per company's directives from time to time, though Associate shall be afforded reasonable opportunity by the company to enable Associates to complete all balance works required for issuance of 'Taking Over Certificate' by the company.

4.9 Rights of TPCODL to vary the scope work

TPCODL shall have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract by communicating the intent to do so in writing to the Associate. On receipt of such communication the Associate shall, within the time frame specified in the contract shall provide TPCODL with a reasonably detailed estimate of the cost of the change in scope outlined in the TPCODL communication. The change in the Contract price and time shall be revised upwards or downwards, as the case may be, and shall be mutually agreed to. The Associate shall not be entitled to any extension of time unless such changes adversely affect the time schedule.

The Associate shall not proceed with the changes in the scope of work till such time revision of Contract price and time schedule are approved and communicated to the associate by TPCODL.

Any change in the Scope of Work and/or Terms & Conditions of the order shall be intimated by TPCODL through an amendment to the contract. The amendment shall be treated valid only if signed by the authorized signatory of the original contract.

5.0 PRICES/ RATES/ TAXES

5.1 For Supply part of Contract

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

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

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

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

5.2 For Service part of Contract

The Prices and Rates are inclusive of cost of materials supplied as per contract terms and for which MDCC is issued by TPCODL and to the extent required for completion of works, cost of service executed as per schedule of quantities, cost of testing as per contract terms, cost of documentations including all relevant test certificates and other supportive documents to be furnished as per contract terms. The rates shall remain firm till actual completion of contract.

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

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

5.3 Changes in Statutory Tax Structure

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

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

6.0 TERMS OF PAYMENT

A. 5% of the Release Order/ Purchase Order price shall be paid as initial interest free advance on fulfillment of the following by the Associate:

   a) Acceptance of PO/ LOI.
   b) Submission of advance payment BG of 15% of the Release Order/ Purchase Order price which shall remain valid till the advance is fully adjusted.

c) Submission of Contract Performance Bank Guarantee of 5/10% of the RC/ PO price valid till 30 days after taking over of the works.

B. 10% of the Release Order/ Purchase Order price shall be paid as interest free advance against approval of drawings under Category-1 of major drawings, Quality Plans, Pert Chart, Field Quality Plan, posting of Project Manager and commencement of the first mile stone of the work mutually agreed including C-3 Form, and submission of a true copy of 'Erection All Risk Insurance Policy' taken for the awarded jobs. The drawing list shall be mutually agreed at the time of award of work.

C. 50% on account payment of the total of item wise cost of material Release Order/ Purchase Order shall be paid against receipt of material at site in good condition and certification by TPCODL along with bills complete in all respects viz. MDCCs etc.

D. 20% on account payment of the actual executed value shall be paid against mechanical completion of erection on prorate basis against monthly bills and 70% on account of the actual executed value shall be paid against the service line item including composite line item. In case this milestone is not completed beyond 120 days for reasons attributable to TPCODL, the payment corresponding to supply part shall be released subject to submission of BG of equivalent amount by the BA valid for a period of further 12 months. If required, it shall be extended by the BA on request of TPCODL.

E. 15% payment of the actual executed Release Order/ Purchase Order shall be paid after completion of acceptance test and Taking Over of the complete systems specified in the enquiry, including clearance of Electrical Inspection, compliance of final punch point and after reconciliation & adjustment of payments, if any, towards Quantities of materials issued from purchaser's stock and consumed by the contractor for expeditious completion of the job. In case this milestone is not completed beyond 120 days beyond schedule for reasons attributable to TPCODL, the payment corresponding to supply part shall be released subject to submission of BG of equivalent amount by the BA valid for a period of further 12 months. If required, it shall be extended by the BA on request of TPCODL.

The Contractor shall submit all Operation & Maintenance manuals and "As Built Drawings" etc. and shall also submit Equipment Warranty Bank Guarantee (EWBG) equivalent to 5/10% of actual executed contract price before the release of this last payment and return of CPBG. The validity of EWBG shall be for a period of 15 months from the date of taking over of the works or specified guarantee period in drawing/tender/technical specification documents etc. whichever is later. The associate shall also submit 'No Demand Certificate' at the time of receipt of full and final payment.

6.1 Pre-Requisites for Payment

- Associate should have completed execution of that part of contract, for which payment is sought, to the satisfaction of TPCODL's Engineer-in-Charge responsible for the contract and obtained certification for execution of the work.
- Associate has undertaken joint measurement of the work executed along with TPCODL's Engineer-in-charge

- Associate's bills/invoices submitted have been certified by Engineer-In-Charge.

6.2 Bills & Invoices

Unless specified otherwise in the special conditions of contract, Associate shall raise not more than one invoice/contract per month for the services rendered in the prescribed Tax Format and the invoice shall be submitted within 15 days of the following month at Bill Inward Receipt Desk (BIRD) located at IDCO Towers, Janpath, Bubaneswar**.**

All Bills shall be supported by joint measurement of work done, quality test report and a copy of wage sheet, if applicable (showing proof of having disbursed wages as per applicable law) and a copy of statement substantiating that statutory payments having been affected.

Bills/ invoices shall mention Associate's 'Sales, Service, WCT Tax Registration Number, PAN number as applicable.

Final bill submission after completion of project or execution of job must be within 30 days from the actual date of completion/execution of work awarded.

6.3 Payment & Statutory Deductions

Payment shall be released within 30 days from the submission of the bills. The associate shall submit "No Demand Certificate" in the format as per Annexure-D at the time of receipt of full and final payment. In case any non-compliance to contract conditions comes to TPCODL's notice, TPCODL will be entitled to deduct 30% of estimated wages plus 20% of wages as TPCODL's overheads. Associates would be obliged to provide the copy of monthly wage sheet in any case, failing which no payment shall be made. TPCODL at their sole discretion may deposit the PF etc. with statutory authorities. TPCODL will deduct the amounts of TDS as per statutory requirement under the income tax act and the DVAT Act and certificates (wherever applicable) will be issued to associate accordingly.

In case of non-submission of PAN No TDS @ 20% shall be deducted from all payable amounts for which no TDS certificate shall be issued. TDS once deducted as above shall not be revised in any condition.

6.3.1 Statutory Deductions

TPCODL will deduct the amounts of TDS, TCS as per statutory requirement under the income tax act, the Goods and Services tax act, BOCW Act, or any other applicable tax act and certificates (wherever applicable) will be issued to associate accordingly. For consumption of TPCODL's Water and Electricity by Associate for execution of Contract, Associate shall pay 0.5% & 1.0% respectively of contract value and it shall be deducted from the running bills. The Engineer-in-Charge as stated in the Order shall be responsible for certification of the work executed and the bills. Bills (including original) shall be submitted in triplicate at Bill Inward Receipt Desk (BIRD) located at IDCO Towers, Janpath, Bhubaneswar.

6.4 Guidelines for Raising Running/Final Bills

Contract Value Up to 5 Lakhs	One Final Bill
Contract Value More than 5 lakhs	Monthly Running Bill & One Final Bill

All Bills shall be processed only when all bank Guarantees are in place and before payments of Final Bill Associate have to furnish NDC.

6.5 Quantity Variation

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

6.6 Full and Final Payment

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

7.0 MODE OF PAYMENT

Payment shall be made through RTGS mode for which Business Associated shall submit the details of Bank Account and other details as per annexure K. Further, for any payments made, TPCODL is not responsible for any consequences/disputes Associate have among the owners channel partners, sub-Associates and all such dispute/concerns shall be settled solely by the Associate.

The quantities of items indicated are estimated and preliminary. However, payments shall be made on the basis of actual quantity of work carried out and measured jointly by the Company and the Associate. Associates shall be responsible to organize joint measurements of works with TPCODL Engineer-in-Charge before raising any bill of work done. In the event Associate fails to do so, TPCODL at their sole discretion, may take measurements of work done and proceed as deemed fit and in such an event Associate's right to lodge any subsequent claim shall stand forfeited.

8.0 SECURITY CUM PERFORMANCE DEPOSIT

Associates shall submit within 15 days from the effective date of issue of PO/RC, Security cum Performance Guarantee (SPBG) in the format as per Annexure B of this document from banks acceptable to TPCODL for:

(a) 5% of the PO value if purchase order value is more than Rs 5 Crores.
(b) 10% of the PO value if purchase order value is less than Rs 5 Crores.
This shall remain valid till the end of the Guarantee Period of contract, plus one month.

(c) 5% of the RC value in case of Rate Contract. This shall remain valid till the Guarantee period plus one month.

- For PO/RC values less than Rs. 5 lacs, Associate may request for deduction of amount equivalent to SPBG value from their first invoice. Such amount shall be withheld by TPCODL while processing the invoice and shall be released after completion of Guarantee Period plus one month.
- For PO/RC values less than Rs. 3 lacs, the clause (8.0) for Security cum Performance Bank Guarantee (SPBG) shall not be applicable.
- In case of RC (Rate Contract) after the expiry of RC validity, Associate shall have to submit SPBG. However, the Associate has the option to re-submit the SPBG as per actual RO (Release Order) value issued against the RC, valid for Guarantee Period plus one month. The Guarantee Period shall be considered as per the last RO issued against the said RC. The original SPBG as submitted against the RC shall be released on submission of the new SPBG to TPCODL. Alternatively, Associate may extend the

validity of original SPBG only till the requisite period, i.e. Guarantee Period plus one month.

9.0 STATUTORY COMPLIANCE

9.1 Compliance to Various Acts

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

9.2 Social Accountability

TPCODL expects its Associates to follow guidelines of best practices on the following aspects

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

9.3 Affirmative Action

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

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

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

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

S. No.	Initiative	for SC/ ST BA's	Guideline Document
1	Tender Fees	100% waiver for SC/ST community	All Open Tenders
2	Earnest Money Deposit	50 % relaxation of estimated EMD value	All limited and Open Tenders
3	Performance Bank Guarantee	25% relaxation in PBG for order value above 50 lacs else 50% relaxation	All limited and Open tenders
4	Turnover	25% relaxation in company turnover under qualifying requirement criteria	All Open Tenders

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

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

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

9.4 Compliance to Labour Laws

Bidder needs to ensure compliance to applicable labour laws including timely disbursement of wages. In case wages are not disbursed as per the stipulated timelines, then TPCODL shall pay the wages to BA employees on behalf of BA. Apart from deducting the amount of wages paid, TPCODL shall deduct an additional service charge equivalent to 25% of the wages paid from the payment due to BA.

9.5 Compliance to Construction and Demolition Waste Management Rules & Environment (Protection) Amendment Rules

BA is liable to follow the Construction and Demolition Waste Management Rules- 2016, Environment (Protection) Amendment Rules- 2018 and Guidelines on dust mitigation measures in handling construction material and C&D wastes issued by CPCB.

Following are some main points of above Rules/Guidelines for Construction work, cable laying jobs etc.

1. Barricading to be provided at site to cover complete area.
2. Construction material and waste should be inside the closed area made by using barricading.
3. Water sprinkling/fine spray from nozzles to be done to suppress the dust.
4. The board of Dust mitigation measures shall be displayed at site for public viewing with required details.
5. Loose sand or soil and construction material that causes dust shall be covered.
6. Transport material that are easily wind borne need to be covered by a sheet made of either jute, tarpaulin, plastic or any other effective material.
7. All areas for storing C&D waste/construction material to be demarcated and preferably barricaded particularly those materials that have potential to be dust borne.
8. Grinding and cutting of building materials in open area shall be prohibited.
9. Construction material and waste should be stored only within earmarked area and road side storage of construction material and waste shall be prohibited.
10. No uncovered vehicles carrying construction material and waste shall be permitted.
11. Construction and demolition waste processing and disposal site shall be identified and required dust mitigation measures to be notified at the site.

10.0 QUALITY

10.1 Knowledge of Requirements

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

10.2 Material/Equipment/Works Quality

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

10.3 Adherence to Rules & Regulations

The Associate shall procure and/or fabricate/erect all materials and equipment in accordance with all requirements of Central and State enactment, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Associate from complying with any requirement of TPCODL as enumerated in the Contract which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Technical Specification from the laws, ordinance, rules and regulations governing the work, the Associate shall immediately notify the same to the TPCODL. It is the sole responsibility of the Associate, however, to determine that such variance exists. Wherever required by rules and regulations, the Associate shall also obtain the statutory authorities' approval for the plant, machinery and equipment to be supplied by the Associate.

10.4 Specifications and Standards

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

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

circumstances the codes, specimen and standards prescribed by any government agency should not be violated.

11.0 SAFETY

All Associates shall strictly abide by the guidelines provided in TPCODL's Contractor Safety Management System (CSMS) as applicable at all stages during the contract period. Associate shall execute the contracts ensuring the following in and as order of priority:

- Safety of Human Beings.
- Safety of equipment/Assets.
- Timely Completion of Contract.

Safety related requirements as mentioned in our Contractor Safety Management System is attached as annexure L and is an integral part of this GCC.

12.0 INSPECTION/PARTICIPATION

12.1 Right to Carry Out Inspection

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

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

All inspections and participations shall be carried out within maximum of two weeks of TPCODL giving written intimation to the Associate or receiving appropriate advance written inspection call from the Associate, unless otherwise specified elsewhere in the contract document.

12.2 Facilitating Inspection

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

The Associate shall provide free of charge office accommodation, office facilities, secretarial services, communication facilities, general and drawing office stationary, etc. as may be reasonably required by the TPCODL's engineers. Similarly, facilities shall also be provided by Associate's outsource agencies/partners/authorized dealers (collectively termed as sub-associates) if such basic and detail engineering activities are carried out in the design offices of sub-Associates.

The Associate shall be responsible for the safety of employees of TPCODL/Third Party Agency when they are at the Associate's /Associate's outsource agency's plant or facility for carrying out/witnessing inspection/testing. All statutory safety precautions as applicable shall be followed by the Associate during Inspection Testing. If TPCODL inspectors are not satisfied with the safety arrangements at the plant, TPCODL have the right to call off inspection till such time corrective action is taken by the Associate.

Before raising the call for pre-dispatch final inspection and testing, the Associate shall conduct all the tests—type tests, routine tests etc-as specified in the contract document and submit copies of the test certificates to TPCODL along with the inspection call, for scrutiny of TPCODL.

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

12.3 Third Party Nomination

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

12.4 Waiver of Inspections

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

12.5 Incorrect Inspection Call

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

13.0 MDCC & DELIVERY OF MATERIALS

13.1 Material Dispatch Clearance Certificate

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

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

All such packing shall allow to the extent possible for easy removal and checking at Site. The associate shall take special precautions to prevent rusting of steel and iron parts during

transit by sea. Gas seals or other materials shall be utilised by the associate for protection against moisture during transit of all Plant and Equipment.

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

All packing cases, containers, packing and other similar materials shall be new and supplied free by the associate and it shall not be required to be returned to the associate.

Notwithstanding anything stated in this clause, the associate shall be entirely responsible for loss, damage or depreciation or deterioration to the materials and supplies due to faulty and/or insecure packing or otherwise during transportation to the Site until otherwise provided herein.

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

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

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

Timelines for inspection and MDCC is as below:

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

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

13.2 Right to Rejection on Receipt

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

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

13.3 Consignee

Unless otherwise specified in the Contract Document, Materials/Goods/Equipment shall be consigned to “Stores-In-Charge”, TPCODL Bhubaneswar.

13.4 Submission of mandatory documents on Delivery

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

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

13.5 Dispatch and Delivery Instructions

S. No.	Instructions
1	Purchase order/ Release order no. shall be mentioned on invoice and on material
2	TPCODL material code and material description shall be mentioned in invoice and on material.
3	“Property of TPCODL” shall be embossed on material.
4	The material shall be properly sealed and packed in standard packing as per purchase order terms & conditions.
5	The weight and quantity of material shall be mentioned wherever applicable
6	The material supplied shall be co-related with the packing list.
7	The name plate detail on equipment shall include Material code, Material description, specification detail of material [as applicable], Serial No. Year of manufacturing, PO/RO no. and date, “PROPERTY OF TPCODL, Bhubaneswar”, Guarantee period and Associate’s name.
8	In case of manual unloading, supplier / transporter shall deploy sufficient Labour for unloading the material at TPCODL central store. For heavy item(s), crane will be provided by TPCODL [unloading cost will be recovered from the associate].
9	The driver should have valid License and one helper in truck. All the documents of truck like registration papers, PUC etc. should be available in Truck.
10	BA representative should accompany the material and get it unloaded / stacked in his presence wherever possible.

14.0 GUARANTEE

14.1 Guarantee of Performance

Associates shall stand guarantee that the equipment and material supplied/service or work rendered under the contract is free from design, manufacturing, material, construction, erection & installation and workmanship & quality defects and is capable of its due, rated and intended quality performance, as an integrated product delivered under the contract. for a specific period termed as Guarantee Period(as elaborated elsewhere in this clause) The

Associate should also guarantee that the equipment/material is new and unused except for the usage required for the tests and checks required as part of quality assurance.

14.2 Guarantee Period

The Guarantee Period will be equipment/service/work specific and shall be as specified in the Standard Specifications of TPCODL for the equipment/material/service/work and where standard specifications are not part of contract documents or guarantee period is not specified in the standard specifications,, the guarantee period shall be as per the Special Terms and Conditions of the Contract. In case of no mention of the guarantee period in standard specifications or SCC, Guarantee Period will be 15 Months from the Date of Commissioning or 24 months from the date of delivery of final lot of supplies made, whichever is earlier.

14.3 Failure in Guarantee Period (GP)

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

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

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

14.4 Cost of repairs on failure in GP

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

14.5 Guarantee period for Goods Outsourced

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

14.6 Latent Defect

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

14.7 Support beyond the Guarantee Period

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

15.0 LIQUIDATED DAMAGES

Liquidated damages @1% of the total executed contract value per week or part thereof, for the period of delay in integrated completion, subject to maximum 10% of the value of the contract shall become leviable without prejudice to other rights of the TPCODL. This amount shall be recoverable from any amount due or becoming due to the Business Associates under this or any other contract. In specific cases, TPCODL reserves the right to apply LD only on the unexecuted portion of the supply and works for standalone use, provided full quantity is executed within a maximum 30% additional time. Deduction of LD shall be on landed cost i.e contract value inclusive of taxes and in pursuant statutory compliance GST would be applicable at the stipulated rate and the same shall be borne by Business Associate. In case of LD deduction, a GST invoice shall be issued by TPCODL as a proof of deduction/ recovery.

15.1 LD Waiver Request

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

15.2 Material Recovery

In case of any recoveries for materials or services (for material free issued by TPCODL and not reconciled by BA or for services claimed and paid in excess at the time of running bills), the total cost which shall be recovered from the BA, shall be the gross amount of material or services (i.e. including taxes) plus applicable taxes as prevailing at the time of such recoveries.

16.0 ASSIGNMENT OR SUBCONTRACTING

Associates shall not assign/subcontract/outsource the schedule of activities of contract TPCODL enters with the associate, in part or full, without TPCODL's prior written approval.

However outsourcing of materials/equipment/services by Associate to make the integrated product for which TPCODL's has placed the contract with the associate from suppliers, makes and agencies which have been mutually agreed upon during contract pre-award stage is permitted subject to following conditions.

In such cases where outsourcing is done by the Associate

- Shall ensure that outsourced suppliers comply with the technical and financial qualification requirements specified by TPCODL in the contract document
- Shall furnish all particulars about the proposed outsourcing agencies and the details of the goods/services/work outsourced to the Associate while seeking approval of TPCODL for inclusion for outsourcing. The Associate shall give approval or shall refuse approval in writing within thirty (30) days of receipt of such request. However the Associate shall not be entitled for any additional contract execution time whatsoever in lieu of the process for approval for outsourcing agencies, and shall be held responsible for any delay in the project execution time.
- Shall remain jointly and severally liable for any action, deficiency, and/or negligence on the part of his outsourcing agencies. The approval extended by the Associate to outsourcing agencies recommended by the Associate shall not discharge the later from his Contract obligations.

Shall submit to the Associate unpriced copies of purchase orders with technical specifications included in the orders, placed on outsourcing agencies as soon as the respective orders have been placed by the Associate.

17.0 UNLAWFUL ACTIVITIES

The Associate shall have to ensure that none of its employees are engaged in any unlawful activities (whether covered under the scope of the present GCC or not) subversive of the TPCODL's interest failing which appropriate action (legal or otherwise) may be taken against the Associate by the TPCODL, in accordance with the terms of the present GCC.

18.0 CONFIDENTIALITY

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

18.1 Documents

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

18.2 Geographical Data

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

18.3 Associate's Processes

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

18.4 Exclusions

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

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

18.5 Violation

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

19.0 INTELLECTUAL PROPERTY RIGHTS

If, in the course of performance of its functions and duties as envisaged by the scope of the present GCC, the Associate acquires or develops, any unique knowledge or information which would be covered, or, is likely to be covered within the definition of a trademark, copyright, patent, business secret, geographical indication or any other form of intellectual property right, it shall be obliged, under the terms of this present GCC, to share such knowledge or information with the TPCODL. All rights, with respect to, or arising from such intellectual property, as afore mentioned, shall solely vest in TPCODL.

Moreover, the Associate undertakes not to breach any intellectual property right vesting in a third party/parties, whether by breach of statutory provision, passing off, or otherwise. In the event of any such breach, the Associate shall be wholly liable to compensate, indemnify or make good any loss suffered by such third party/parties, or any compensation/damages

arising from any legal proceeding/s, or otherwise. No liability of TPCODL shall arise in this respect, and any costs, damages, expenses, compensation payable by TPCODL in this regard to a third party/parties, arising from a legal proceeding/s or otherwise, shall be recoverable from the Associate.

20.0 INDEMNITY

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

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

The TPCODL shall not be held responsible for any accident or damages incurred or claims arising, due to the Associate's error there from prior to completion of work. The Associate shall be liable for such accidents and after completion of work for such accidents as the case may be due to negligence on his part to carry out Work in accordance with Indian laws and regulations and the specifications set forth herein.

21.0 LIABILITY & LIMITATIONS

21.1 Liability

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

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

21.2 Limitation of Liability

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

22.0 FORCE MAJEURE

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

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

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

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

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

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

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

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

23.0 SUSPENSION Of CONTRACT

23.1 Suspension for Convenience

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

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

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

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

23.2 Suspension for Breach of Contract conditions.

TPCODL shall suspend execution of whole/or part thereof the contract till such time Associate complies with the conditions stipulated under section clause 27 for breach/default of contract conditions.

23.3 Compensation in lieu of Suspension

If the suspension of the contract in whole or in part is for convenience of TPCODL and not due to any breach of contract conditions by the associate, TPCODL at its discretion shall consider compensating all reasonable additional costs incurred by Associate in lieu of suspension of whole or part of contract, on representation of the Associate providing justified estimates of such additional costs and such estimates are found acceptable and approved by competent authority of TPCODL.

If the suspension of contract in whole or part thereof is due to breach of contract conditions (refer clause 24.3) by the Associate, Associate shall not be entitled for any compensation for any cost incurred in lieu of suspension of whole or part of contract and also shall be liable for compensating all the losses arising to TPCODL in lieu of suspension of contract. Resumption notice shall be subject to the Associate taking corrective action for the breach of contract conditions within the time frame and as per the terms specified in the suspension notice.

24 TERMINATION OF CONTRACTS

24.1 Termination for Default/Breach of Contract

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

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

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

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

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

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

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

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

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

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

If the default or breach as specified under clause 24 (except sub clause g thereof) be committed by the associate for the first time, TPCODL shall issue, along the with notice of default or breach, a warning notice instructing the associate to take remedial/corrective action within the time frame stipulated in the warning notice and not to repeat the same in future. The timeframe for corrective action by the associate shall be specific to the nature of breach of contract and the same shall not be objected to by the Associate. If the Associate fails to comply with the instructions in the warning notice or in taking corrective action to the satisfaction of TPCODL then TPCODL may terminate the entire or part of contract at its discretion by issuing termination notice without incurring any liability on this ground.

In case the contract is terminated for any breach of the nature specified in clause 24 g stated above, TPCODL shall have the right to terminate all the contracts TPCODL is having with the Associate by issuing termination notice which shall be without prejudice to the other rights of TPCODL available to it under law.

Without prejudice to its right to terminate for breach of contract, TPCODL may, without assigning any reason, terminate the Contract in whole or in part at any time at its discretion while the contract is in force by serving a written notice of two weeks to the Associate.

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

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

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

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

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

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

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

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

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

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

In the event of such termination, TPCODL may finish the Work by whatever method it may deem expedient, including the hiring of services and /or purchase of material equipment from such third parties as TPCODL may deem fit or may itself provide any labor or materials and perform any part of the Work. The associate undertakes to bear the incremental costs if any paid by TPCODL in such a case attributable to failure on the part of the associate. The Associate in such a case shall not be entitled to receive any further payments and any sums found payable to it may be adjusted by TPCODL against the amount recoverable from him on this ground. The same shall be without prejudice to other rights available to TPCODL under law against the associate.

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

24.2 Termination for convenience of Associate

Associate at its convenience may request for termination of contract, clearly assigning the reason for such request. TPCODL has full right to accept, reject or partially accept such request. This convenience will be available to associate only after one year from the contract effective date. For this purpose, associate will provide a notice period of 90 days to TPCODL, Associate will have to pay TPCODL a 'termination convenience fee' equivalent to 5% of unexecuted contract value.

24.3 Termination for Convenience of TPCODL

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

25.0 DISPUTE RESOLUTION & ARBITRATION

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

25.1 Governing law and jurisdiction

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

26.0 ATTRIBUTES OF GCC

26.1 Cancellation

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

26.2 Severability

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

26.3 Order of Priority

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

27.0 INSURANCE

The Associate shall arrange accident insurance policy for his foreign experts/specialists/personnel deputed to Site and Associate's/his sub-Associates' manufacturing works as well as for his Indian engineers and supervisory staff. The Associate shall also take out for his Indian workmen, where applicable, a separate policy as required under Workmen's Compensation Act.

Associates shall be responsible to suitably insure their entire work-force (to the extent of at least meeting requirements under Workmen Compensation Act) Tools, Plant, Third party liability at the project site, All Risk comprehensive insurance for the entire works (insurance for free issue items will be in TPCODL scope) for total contract (PO/RO) value or any other such risks during execution of works, till the works are handed over to the company, in consultation with TPCODL and shall submit copies of such insurances to the Engineer-in-Charge for review / acceptance before commencing the work. Engineer-in-charge must ensure compliance to insurance requirement by Associate before commencement of works. TPCODL shall stand fully indemnified in this respect.

28.0 ERRORS AND OMISSIONS

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

29.0 TRANSFER OF TITLES

The title of ownership and property to all equipment, installations, erections, constructions materials, drawings & documents shall pass to the TPCODL after Commissioning and complete handing over-taking over.

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

The Associate shall take all corrective measures arising out of discrepancies, errors and omissions in drawings and other information within the time schedule and without extra cost to the TPCODL.

The Associate shall also be responsible for any delay and/or extra cost if any, in carrying out engineering, and site works by other agencies arising out of discrepancies, errors and omissions stated in as well as of any late revision/s of drawings and information submitted by the Associate.

30.0 SUGGESTIONS & FEEDBACK

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

You may send your feedback by filling up our Business Associate Feedback Form enclosed herewith as Annexure-I. You can also log on to our website www.tpcentralodisha.com to provide your feedback according to the guidelines mentioned below:

31.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be lodged by log on to our website www.tpcentralodisha.com

32.0 LIST OF ANNEXURES

S. No.	Subject	Annexure
1.	Performa for Bid Security Bank Guarantee	A
2.	Performa for Advance Payment Bank Guarantee	B
3.	Performa for Performance Bank Guarantee (CP cum EP)	C
4.	Performa for No Demand Certificate by Associate	D
5.	Performa for Indemnification on Statutory Compliance	E
6.	Performa For Application For Issuance of Consolidated TDS Certificate	F
7.	HR Service Level Agreement	G
8.	Under taking for competence of workmen	H
9.	Business Associate Feedback Form	I
10.	Acceptance Form For Participation In Reverse Auction Event	J
11.	NEFT or RTGS payment request form	K
12	Contractor Safety Management System	L
13	Vendor Appraisal Form	M
14	Manufacturers Authorization Form	N

ANNEXURE-A

PROFORMA FOR BID SECURITY BANK GUARANTEE

TP Central Odisha Distribution Ltd,

Bhubaneswar

WHEREAS, (Name of the Bidder) _____ (hereinafter called "the BIDDER") has submitted his bid dated_____ for the (Name of Contract) _____ (hereinafter called "the BID").

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

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

The CONDITIONS of this obligation are**:**

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

or

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

We the ……. Bank or our local Branch at Bhubaneswar ……..(detail address & code No…….. of local branch to be specified) undertake to pay the TPCODL upto the above amount upon receipt of its first written demand, provided that in its demand the TPCODL will note that amount claimed by it is due to it owing to the occurrence of one or both conditions, specifying the occurred condition or conditions.

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

DATE…… **SIGNATURE OF THE BANK……..**

WITNESS…… **SEAL……..**

(Signature, Name & Address)

(At least 2 witnesses)

ANNEXURE-B

PROFORMA FOR ADVANCE PAYMENT BANK GUARANTEE

(On Rs.100/- Stamp Paper)

Note:

(a) Format shall be followed in toto

(b) Claim period of six months must be kept up

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

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TP Central Odisha Distribution Limited

Bhubaneswar

Advance Payment B.G.No……

Contract No……dated……

1. You have entered into a Contract No_____ with M/s._____ (hereinafter referred to as "the Vendor") for the supply and delivery of _____

   (hereinafter referred to as" the said Equipment") for the price and on the terms and conditions contained in the said contract.

2. In accordance with the terms of the said contract, you have agreed to make an advance payment of Rs._____ (Rupees_____ only) being _____% (_____percent) of the total value of the contract on "the Vendor" furnishing you with an irrevocable, unconditional and acceptable bank guarantee to be valid till the date of receipt of "the said equipment" covered by your above mentioned contract. For this purpose you have agreed to accept our guarantee.

3. In consideration thereof, we, _____ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of Rs._____ (Rupees _____ only) being _____% (_____percent) of the total value of the contract on receipt of your intimating that "the Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.

4. You shall have the right to file / make your claim on us under the guarantee for a further period of three months from the date of expiry.

5. This guarantee shall not be revoked without express consent and shall not be affected by your granting time or any other indulgence to "the Vendor", which shall include but

not be limited to, postponement from time to time of the exercise the same in you or any right which you may have against "the Vendor" and to exercise the same in any covenant contained or implied in the said contract or any other course or remedy or security available to you, and our Bank shall not be released from its obligations under this guarantee by your exercising any of your rights with reference to matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under the law would, but for this provision have the effect of relieving our bank from its obligation under this guarantee.

6. We also agree that you shall be entitled at your option to enforce this guarantee against our bank as a principal debtor, in the first instance, notwithstanding any other security or guarantee that you may have in relation to "the Vendor's" liabilities in respect of the premises

7. This guarantee shall not be affected by any change in the constitution of our Bank or "the Vendor" or for any other reason whatsoever.

8. Any claim / extension under the guarantee can be lodge-able at outstation banks or at Bhubaneswar branch and claim will also be payable at Bhubaneswar Branch (**to be confirmed by Bhubaneswar Branch by a letter to that effect)**

9. Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____
(Rupees_____ only) and the guarantee will remain in force upto and including _____(Date) and shall be extended from time to time for such period or period as may be desired by "the Vendor".

10. Unless a demand or claim under this guarantee is received by us in writing within one month from_____ (expiry date) i.e. on or before _____ (claim period end date), we shall be discharged from all liabilities under this guarantee thereafter.

Dated at _____this _____ day of _____ 200_____

Witness

Bank's rubber stamp

1. _____ Banks full address

Designation of Signatory

2. _____ Bank official number

ANNEXURE- C

PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)

(On Rs.100/- Stamp Paper)

Note:

(a) Format shall be followed in toto

(b) Claim period of one month must be kept up

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

---

TP Central Odisha Distribution Limited

Bhubaneswar

CP cum EP BG No…….

Order/Contract No……dated……

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

available to you, and our Bank shall not be released from its obligations under this guarantee by your exercising any of your rights with reference to matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under the law would, but for this provision have the effect of relieving our bank from its obligation under this guarantee.

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

Dated at_____ this_____ day of _____ 200__

Witness

Bank's rubber stamp

1. _____ Banks full address

Designation of Signatory

2. _____ Bank official number

ANNEXURE-D

PROFORMA FOR "NO DEMAND CERTIFICATE" BY ASSOCIATE

(On Company's Letter head or with Company Seal)

(To be submitted by the Associate to TPCODL Accounts Department at the time of receipt of full and final payment)

(Certificate No. CCP/002)

Name of the Project

Order/ Contract No.

Dated

Name of the Associate

Scheme No. / Job No.

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

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

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

Dated **Signature**

Place **Name**

Designation

(Company Seal)

ANNEXURE – E

PROFORMA FOR "INDEMNIFICATION ON STATUTORY COMPLIANCES"

(To be submitted by the successful Bidder within seven days of award of work)

(Certificate No. CCP/001)

Name of the Project

Letter of Award / Contract No.

Dated

Name of the Associate

Scheme No. / Job No.

By this confirmation we, _____ (Associate) are formally bound to M/s. TPCODL towards any sum which may be imposed, levied or hereinafter recovered by the Provident Fund Organization under the provisions of the Employees of the Provident Fund and Miscellaneous Provisions Act 1952 in respect of employees employed by us.

We well and truly bind ourselves and our heirs executors administrators and representatives jointly severely and respectively for the above payment only to be paid to M/s. TPCODL.

AND WHEREAS we, _____ (Associate) is making compliance of the Employees Provident Fund and Miscellaneous Provisions Act 1952, have entered into the above written bond for the indemnity to M/s. TPCODL against all losses from the acts or default of the said Associate in respect of compliance of the Provident Fund Act.

Similarly we hereby confirm that we have complied with all statutory and local laws and nothing is outstanding with regard to Local Sales Tax, Labour Laws, Local Municipal dues, Electricity dues etc. We have entered into the above written bond for the indemnity to M/s. TPCODL against all losses from the acts or default of the said Associate in respect of compliance of the Local Sales Tax Laws, Local Laws, Labour Laws, Local Municipal Dues, Electricity dues etc.

NOW THE CONDITION, of the above written bond is as such that if the Associate during the period of this contract commits any default or fails to make payment of Contributions in respect of his employees to the Employees Provident Fund Organization, he shall indemnify the Principal Employer M/s. TPCODL from all and every loss and damage caused to them from any act, omissions or negligence of the said Associate in respect of compliances under the Employees Provident Fund and Miscellaneous Provisions Act, 1952.

IN WITNESS to the above written bond we have here to set our hands, with our free consent.

Dated **Signature**

Place **Name**

Designation (Company Seal)

ANNEXURE-F

PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS CERTIFICATE

To be printed on the letterhead

To,

TP Central Odisha Distribution Limited,

Bhubaneswar

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

Dear Sir,

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

For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

ATTACH THE COPY OF PAN CARD

ANNEXURE - G

SERVICE LEVEL AGREEMENT

(To be adhered to by Business Associates (BAs) in TPCODL on Human Resource Issues)

1.0 The following shall be adhered to by the Business Associates during his / its association with TPCODL:

Shall Abide by Tata Core Values:

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

b) **Understanding –** We must be caring, show respect, compassion and humanity to our colleagues and customers and always work for the benefit of the communities we serve.

c) **Excellence –** We must constantly strive to achieve the highest possible standards in our day to day work and in the quality of services we provide.

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

e) **Responsibility –** We must continue to be responsible and sensitive to the communities and environments in which we work and always ensuring that what comes from the people; goes back to the people many times over.

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

2.0 The Business Associate / his manager / supervisor who is responsible for managing the project site / performance contract etc. in TPCODL would also ensure adherence of these values by his employees / persons deployed by him in connection with his works undertaken in TPCODL.

3.0 The Business Associates are required to:

a) Support and respect the protection of human rights and make sure that they are not complicit in human right abuses.
b) Respect freedom of association and effective recognition of the right to collective bargaining.
c) Not to resort to any form of forced and compulsory labour.
d) Shall ensure abolition of child labour in his area of work.
e) There is no discrimination in respect of employment and occupation in respect of his employees.
f) Support precautionary approach to environmental challenges.
g) Promote greater environmental responsibility by himself and his employees in his areas of work.
h) Deploy and defuse environmental friendly technologies while carrying out the works.
i) Work against corruptions in all its form including extortion and bribery by himself and his employees.

4.0 The Business Associates are required to adhere to all applicable Labour Laws with special reference to the following:

a) No person below the age of 18 years and no child labour will be engaged directly or indirectly for executing the work connected with the business of TPCODL.

b) Minimum wages along with other statutory dues like PF, ESI, etc. as applicable to the workers shall be made within the prescribed period of 7th / 10th day of the following month.

c) Deduction / deposit / record keeping and all other requirements under Employees PF Act 1952, Employees State Insurance Act 1948 and other applicable acts (if any) shall be adhered to.

d) Only statutorily authorized deductions (if any) shall be made in accordance with the relevant statutes.

e) All the provisions of Contract Labour (R&A) Act 1970 shall be complied with in respect of the workers engaged for TPCODL work. The work will be commenced only after completing necessary formalities for obtaining Labour License (if applicable).

f) Necessary registers / records, filing of returns etc. shall be maintained for verification by Statutory / TPCODL authorities.

g) Payment of wages shall be made only in presence of and with certification of authorized representative of TPCODL or shall be made in the form of cheque / bank transfer to the employee.

h) During the period of contract, the Business Associate will arrange for deployment of his supervisor / manager for total supervision and control of the work and their manpower. All the activities related to their manpower e.g. attendance, leave, wage disbursement etc. will be done under the supervision & control of Business Associates, While adhering to the prescribed standard / norms of production / productivity & quality. During execution of the work, Business Associate shall engage only such qualified / skilled manpower as may be envisaged / required for ensuring level of production / service into the contract / work order.

i) Clearances as follows shall be obtained from IR & Welfare Group:

   i. Clearance for commencement (before start of the work).
   ii. No Objection Certificate (after completion / before final settlement).
   iii. Copies of PF / ESI Challans shall be deposited with IR & Welfare Group every month

j) The Business Associate shall indemnify TPCODL from any liabilities under applicable Labour Statutes.

k) The Business Associate shall ensure safety and health of his employees and shall also maintain hygienic working environment / condition in his area of work.

l) The Business Associate and his employee shall abide by Laws of Land and shall not violate any applicable provisions.

m) The Business Associate appreciates with and acquiesces to the right of TPCODL as principal employer to fulfil any of his legal obligations, if he fails to do so under applicable labour laws and deduct the same from his running bills / final payments / enchasing security deposit / Bank Guarantee as the case may be. If there is any further shortfall TPCODL has the right to recover the same from the Business Associate.

n) The Business Associate ensures that person employed by him adhere to the moral and legal conduct and shall not violate any standard conduct envisaged in the premise of

TPCODL by all such as, Transparency, Safety, Discipline, Integrity etc. The Business Associate or his employees should refrain from corrupt practices, giving or taking bribe in connection with any TPCODL business.

5.0 The '<u>Statutory Compliance Enforcement System</u>' in TPCODL is detailed below for adherence by all concerned. Business Associate Cell (BA Cell) will be the process owner for implementation of the system with the help of concerned Engineer I/c or Officer I/c.

a) Statutory Compliance being a professed value in TPCODL Code of Conduct, the concerned Engineer / Officer in charges are requested to adhere to the provisions and advise respective Business Associates in their domain to comply in letter and spirit.

b) Immediately after issuance of letter of intent, the authorized representative of the Business Associate will report to BA Cell for completion of statutory requirements.

c) Normally, the work will be started only after 'Clearance for Commencement of Work (CCW) is issued by BA Cell to the Business associate. However in exceptional exigencies in engineer I/c / Officer I/c may direct the Business Associate to start the work and inform BA Cell about the same. Statutory requirements in this case may be completed in parallel.

d) First monthly bill will be released only after producing CCW to the finance department. Similarly closure of work and final settlement will be affected after issuance of no objection certificate from BA Cell group.

6.0 <u>Requirements for 'Clearance for Commencement of Work' (CCW):</u>

a) Submission of filled up Form 'A' for database (Annexure-1).
b) Copy of PF Code allocation letter.
c) Copy of ESI Code allocation letter.
d) Submission of duly filled up Form IV CL(R&A) act (In case more than or equals to 20 workers during the period of contract).
e) Submission of duly filled up Form VI A (Notice of Commencement).
f) Copy of insurance cover note under WC Act 1923 (if applicable).
g) Copy of Contract Agreement.
h) Copy of indemnity bond (if applicable).
i) Affidavit with regard to payment of wages through cheque / bank transfer only.

7.0 <u>Requirements during execution of work:</u>

a) Copy of receipt of application for license / license (if applicable).
b) Copy of PF Challan (latest by 26th day of every Month).
c) Copy of ESI Challan (latest by 26th day of every Month).
d) Copy of Wage disbursement sheet / Bank statement.
e) Filing / Maintenance of all statutory registers / reports / returns for inspection by Statutory/ TPCODL authorities.
f) Certification of wage disbursement by authorized representative of TPCODL.
g) Copy of 'Labour Welfare Fund' deposit certificate / Challan.
h) Insuring safe working practices at the work place.

8.0 <u>Requirements for 'No Objection Certificate' (NOC) for closure of work:</u>

a) Submission of duly filled up Form VI A (Notice of Completion).
b) Copy of Half yearly / Annual return for ESI / PF / CL(R&A).

c) Consolidated copy of wage sheet of last month indicating full & final settlement of all dues like retrenchment benefit, bonus, leave encashment etc. Copy of individual declaration by employees in Form X regarding termination of employment.

d) Confirmation certificate regarding filling up of form for transfer / withdrawal of PF by the concerned workers.

In case any of the above are deviated / not complied with the Letter of Award/Order shall be liable to be withdrawn / cancelled.

Enclosure:

1) Form A
2) Form X
3) Form XI
4) Form VI A
5) Form XXIV

FORM (A)

[To be submitted by the Business Associate to the Principal Employer within a week from LoA issuance]

A. Details of the Agency

1. Name of Agency :
2. Nature of work :
3. Local Address with Ph.No. :

   (With Father's name) :
4. Permanent Address (Full) :
5. PF code no. & Place :
6. ESI Code no. & Place :
7. Name and address of :

   Sub-contractor (if any)

B. Details of Work

8. Name of work (as specified in LOI/LOA) :
9. LOI/LOA Nos. & Dates :
10. Period of contract (Specify Dates) :

    [Including Extension period, if any] :
11. Work Area [Department / Location] :
12. Name / Cell no. of Officer I/c :
13. Maximum No. of workers and staff to be engaged on any day during the year.
    - Supervisory Staff :
    - Workers :
14. Do you have any other contract in TPCODL : Yes/No

    If yes, furnish details:

15. Details of Workmen's compensation Policy, if applicable

Name of Insurance Company ……..
……Policy No …… Number of persons covered …… Period of coverage: From …….. To ……..

If no, I hereby undertake the liability arising out of Workmen's Compensation Act and Rules made there under.

C. Details of workers to be engaged

No. of Workers

S. No.	Unskilled*	Semi-skilled*	Skilled*	Clerical / Supervisory

*** Number to be indicated**

I/We shall fulfill all obligations arising from and under all relevant law in force from time to time. I/We undertake to keep the TPCODL indemnified against any loss or liability arising out of failure of my / our abiding the relevant laws.

The name of my / our representatives is …… to enter the TPCODL Premises on my behalf.

Date:

(Signature of the Business Associate

or his Authorized Representative)

This Business Associate is / will be engaged in TPCODL.

(Signature and seal of

Officer I/c of the Work)

Form X

Undertaking

I _____ hereby undertake that all the dues in respect of my employment with M/s _____ for the period of _____ to _____have been settled and final payments including retrenchment benefit have been made to me in full.

( )

_____

Date:

Form XI

Undertaking

With reference to the contract job awarded by M/s TP Central Odisha Distribution Limited to M/s_____ vide work order No._____ dated_____

I _____on behalf of

M/s _____hereby undertake:

1. that the dues in respect of the workmen/ employee(s) engaged by us for the said contract, payable as per the provisions of relevant statute pertaining to
   i. wages/ salary
   ii. PF & ESI, Bhubaneswar Labour Fund
   iii. All other statutory obligation

   has been paid /settled in full and no amount/ compliance is due/ pending.

2. That in case any dispute / claim is raised by the concerned workers i.r.o. any dues / payments, M/s _____ will settle the same on it's own and such liability will be borne by M/s _____

3. That M/s _____ hereby indemnify M/s TPCODL from any future liability i.r.o. any statutory obligation in respect of said contract.

Date:

_____

( )

Authorized Signatory

For M/s _____

FORM- VI A

Notice for Commencement /Completion of contract work

I/We, Sh. / M/s _____ (Name and Address of the Contractor) hereby intimate that the contract work _____ (name of work) in establishment of the _____ (name and address of the Principal Employer) for which License No._____dated_____has been issued to me/us by the Licensing Officer _____(name of the Headquarters), has been commenced / completed with effect from _____date / on date.

Signature of Contractor

With Office Seal

The Inspector

_____

_____

FORM XXIV

[See Rule 82(1)]

Return to be sent by the Contractor to the licensing Officer (in duplicate)

Half -Yearly Ending_____

1. Name and address of the Contractor
2. Name and address of the Establishment
3. Name and address of the Principal Employer
4. Duration of Contract: From _____to _____
5. No. of days during the half year on which
   (a) the establishment of the principal employer had worked
   (b) the contractor's establishment had worked
6. Maximum No. of contract labour employed on any day during the half –year:

Men	Women	Children	Total

7. (i) Daily hours of work and spread over
   (ii) (a) whether weekly holiday observed and on what day
   (b) if so, whether it was paid for
   (iii) No. of man – hours of overtime worked
8. No. of man days worked by

Men	Women	Children	Total

9. Amount of wages paid

Men	Women	Children	Total

10. Amount of deductions from wages, if any

Men	Women	Children	Total

Whether the following have been provided –

(i) Canteen : _____

(ii) Rest rooms : _____

(iii) Drinking water **:** _____

(iv) Crèches **:** _____

(v) First Aid **:** _____

Signature of contractor

Place _____

Date _____

ANNEXURE – H

UNDERTAKING FOR COMPETENCE OF WORKMEN

Name of Associate :

Tender No. :

Item :

With reference to the tender mentioned above, I/We _____, hereby undertake that the workmen/ employee(s) engaged by M/s _____ for the job against said tender shall be competent in all respect, commensurate to the nature of job.

Date:

_____

( )

Authorized Signatory

For M/s

Seal

ANNEXURE-I

BUSINESS ASSOCIATE FEEDBACK FORM

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

You are associated with us as
☐ OEMs ☐ Service Contractor ☐ Material Suppliers ☐ Material & Manpower Supplier

You are associated with us for
☐ Less than 1 year ☐ More than 1 year but less than 3 years ☐ More than 3 years

Your office is located at
☐ Bhubaneswar ☐ Within 200 kms from Bhubaneswar ☐ More than 200 kms from Bhubaneswar

Your nearly turnover with TPCODL
☐ Less than 25 Lacs ☐ 25 Lacs to 1 Crore ☐ More than 1 Cr.

Additional information

Your Name	
Your Designation	
Your Organization	
Contact Nos.	
Email	

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

SECTION - A

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

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

S. No.	Parameters	1	2	3	4	5	Remarks/ Suggestion
		Do Not Agree	Slightly in Agreement	In Fair Agreement	Mostly in Agreement	Fully Agree	
11	TPCODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	BIRD (Bill Inward Receipt Desk) initiative has improved payment disbursement process						
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPCODL never defaults on contractual terms						
15	In TPCODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPCODL Employees follow Ethical behaviour						

SECTION - B

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

SN	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPCODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	Division / Sub-Division						
1.3	Projects/HOG						
1.4	Inspection & Quality Assurance						
1.5	Stores						
1.6	Metering & Billing						
1.7	Accounts / Finance						
1.8	Administration						
1.9	IT & Automation						
2	How would you rate TPCODL in comparison to your other clients in terms of **fairness of treatment and transparency** with its Business Associates?						
3	How would you rate TPCODL in comparison to your other clients in terms of **processes and systems to manage partnership** with its Business Associates						
4	How would you rate TPCODL in comparison to your other clients in terms of **building long term & mutually relations**hip with its Business Associates						

SECTION–C

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

SNo	Parameters	Certainly NO	Probably NO	Probably YES	Certainly YES	Remarks/ Suggestion
1	Based on your experience with TPCODL, would you like to continue your relationship with TPCODL?					
2	If someone asks you about TPCODL, would you talk “positively” about TPCODL?					
3	Would you refer TPCODL name to others in your community, fraternity and society as a professional & dynamic organization?					

SECTION - D

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

1	2	3	4	5	6	7	8	9	10

SECTION – E

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

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

Please spare your thoughts for TPCODL's improvement in particular areas of major concerns for you. We also welcome your suggestions to adopt any best practices, altitudes that you have observed / experienced elsewhere in Indian/ International organization.

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

We thank you for your time and courtesy!!

ANNEXURE-J

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

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

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

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

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

Signature & Seal of the Bidder

ANNEXURE-K

To,

DGM (Finance)

The TP Central Odisha Distribution Limited
Bhubaneswar

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

Dear Sir,

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

Vendor Code :

Title of Account in the Bank :

Account Type :

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

Bank Account Number :

Name & Address of Bank

:

Bank Contact Person's Names :

Bank Tele Numbers with STD Code :

Bank Branch MICR Code :

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

Bank Branch IFSC Code :

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

:

Email Address of accounts person (to

send payment information)

Name of the Authorized Signatory :

Contact Person's Name :

Official Correspondence Address :

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

Thanking you,

For _____

(Authorized Signatory)

(Signature with Rubber Stamp)

Certification from Bank:

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

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

(Manager's/ Officers Signature under Bank Stamp)

ANNEXURE-L

CONTRACTOR SAFETY MANAGEMENT SYSTEM

1. OBJECTIVE

The objective of the Contractor Safety Management System is to lay down clear guidelines for all Business Associates (including their associates, staff and agents) which would facilitate them to observe all statutory rules and regulations, comply with applicable standards of Central Electricity Authority (Measures relating to safety and electric supply) Regulations, 2010 & (safety requirements for construction, operation and maintenance of electrical plants and electric lines) Regulations,2011, TPCODL Safety Manual and Guidelines and thus, ensure creation of safe working environment for all stakeholders of our network.

2. SCOPE

All contracts (minor and major) will be subject to the provisions of this document.

Minor Contracts: Contracts which satisfy all the criteria listed under the head "Minor Contracts".

Major Contracts: Contracts which satisfy any two or more criteria listed under the head "Major Contracts"

Criteria	Minor Contracts	Major Contracts
Value of Contract	< Rs. 1500000/- (less than Rs. Fifteen Lac)	>= Rs. 1500000/- (Equal or more than Rs. Fifteen Lac)
Period	Period less than 1 year	Any period
Working on energized electrical equipment	No	Yes
Working on height (above 1.8 Mtrs from ground)	No	Yes
Work involving construction activity	No	Yes
Working with hazardous goods or chemicals	No	Yes
Work involving danger to general public	No	Yes

Note: *Exceptions for major and minor contract are – in house software development, supply of material or equipment but no direct or indirect installation of the same material, administration contracts (courier, water supply, printing, security, transport, etc.), minor civil work like plastering at ground level or flooring, etc. The facility management (housekeeping) contract will always be treated as a minor contract.*

3. INFORMATION REQUIRED AT TIME OF VENDOR REGISTRATION OR BEFORE COMMENCEMENT OF CONTRACT

3.1 Business Associate is required to fill the Safety Management System Questionnaire as per *annexure 1* and submit along with the vendor registration process / bid / tender document. The filled questionnaire will be scrutinized by Engineer In-charge / indenting group and recommend suitability of the BA with respect to safety requirements. The fulfilment of statutory requirements for vendor registration pertaining to labour laws etc. shall be done by BA Cell on being referred to it.

3.2 Business Associate is required to take suitable risk control measures mentioned against the identified Hazards and Risk document provided for all contracts as per *annexure 2*. The primary objective of this is to evaluate the understanding of the BA towards risk mitigation and employment of safe work procedures. BA is required to conduct the Hazard identification and Risk Assessment study as per the procedure and deploy more or other measures if deemed necessary.

3.3 Business Associate shall comply with **Statutory Requirements related to Safety and Occupational Health** and submit the "Safety Undertaking" as per *annexure 4*.

4. GENERAL SAFETY CONDITIONS REQUIRED TO BE FULFILLED BY BUSINESS ASSOCIATES

The requirements of the contractor safety management system applicable to the minor or major contracts related to various groups are as following –

4.1 Maintenance of Distribution Network – *Annexure 3.1*
4.2 Distribution Projects – *Annexure 3.2*
4.3 EHV Projects – *Annexure 3.3*
4.4 Maintenance of Sub transmission network – *Annexure 3.4*
4.5 Civil / Generation Projects – *Annexure 3.5*
4.6 Meter Management Group (MMG), Revenue Recovery Group (RRG), Energy Auditing Group, AMI, MRG, etc. – *Annex3.6*
4.7 Maintenance and Operation of Street Light. **–** *Annexure 3.7*

1. *Please note that hydra cranes used by any dept should be ACE Model No. FX 150 ACE SX 150, Escorts Model No. TRX 1550 or contemporary. Use of old generation hydra cranes like ACE 14XW or ACE 12 XW, etc are prohibited.*

(*Details as per Annexure attached)*

Note: *For minor contracts, the BA shall assign the duties of Safety Representative to the Work Supervisor. Work Supervisor will deliver all duties and responsibilities of Safety Supervisor as detailed in this document.*

The Business Associate (BA) having major contract will appointing Safety supervisor, engineer / manager for the TPCODL work. The BA shall make all necessary arrangements for getting their workforce safety trained and competency checked from the concerned official of TPCODL before deployment in the field. BA Cell shall recommend the suitability after competency checked by Engineer In-charge and SAFETY group (or his representative) of TPCODL. After getting the clearance from concerned official, BA cell and receiving temporary I-card issued by TPCODL, Business Associate shall commence the working.

Safety Representative of Business Associates will formally become the nodal point for safety concerns for TPCODL. ***BA shall not frequently transfer or terminate the services of any of the safety representatives appointed for TPCODL work site. BA needs to ensure***

***that Safety representative is available at all points of time; failing which the work being carried out in the interim (period when Safety representative is not available) shall be treated as working under improper supervision and due penal provisions shall be initiated against the BA*.** BA will be required to provide all applicable infrastructure and power to ensure smooth working of the safety representative to maintain a sound safety management system. **In all contracts safety representative will not be assigned any other activity at site apart from the works related to safety management. The duties are detailed in clause 5.5 of this document.** TPCODL will be auditing the facilities provided to the BA`s safety team time to time.

The Safety Representative of the BA shall be required to meet and follow the instructions of the Engineer In-charge and SAFETY Group of TPCODL. He shall be responsible for providing the MIS and/or any other relevant information, as and when desired, within the stipulated time frame as per the requirements of TPCODL. Any non-conformance to safety will lead to the negative marking or issue of safety violation challan/ tokens which shall affect the monthly evaluation and performance of BA.

All contracts where BA has to depute vehicle for their staff and equipment to move from one location to other, the BA shall ensure that vehicle complies all required statutory clearances and requirement as per The Motor Vehicle Act, 1988 as well as TPCODL Road Safety Policy and are in good & safe state of working.

5. QUALIFICATION AND EXPERIENCE OF THE SAFETY AND SITE PERSONNEL

Qualification and experience required for the safety and site personnel are as following:

5.1 Safety Supervisor: It is mandatory that educational qualification of safety supervisor be ITI (of relevant trade) / Diploma (Any branch of engineering) and he has a working experience on electrical system / relevant field of work at least 5 yrs for ITI and 3 years for Diploma holder. Having formal experience of the safety systems will be an added advantage

5.2 Safety Engineer: It is mandatory that educational qualification of safety engineer be at least Diploma (relevant branch) and he has working experience on electrical system of at least 3 yrs. Having the formal experience of the safety systems will be an added advantage.

5.3 Safety Manager: The educational qualification of safety manager should be graduate engineer with working experience on electrical system / network of at least 3 yrs. OR Diploma in Industrial Safety with working experience of 05 years including at least 02 years on electrical network.

However, clause 5.1, 5.2 and 5.3 are not applicable for minor contracts. In such cases, BA shall assign the duties of Safety Representative to the Work Supervisor. Work Supervisor will deliver required duties of Safety Representative (as per clause 5.5) in addition to other duties without diluting the importance of safety.

5.4 Site Skilled Personnel: For all responsibility related to site activities and operations, the BA shall employ only qualified and skilled persons and shall comply the provisions of section 19 & 29 of Central Electricity Authority (Measures relating to safety and electric supply) Regulations, 2010. Persons holding valid approvals only by any Government approved agency or a competency assessment panel or a team set up by TPCODL

shall be allowed to perform the High Risk / High Hazard activities (refer page 1). The skill / qualification required for the electrician and electrical supervisor are given in *annexure 5*. The contracts related to maintenance of Distribution Network, Distribution Projects, EHV Projects, maintenance of Sub-Transmission Network, MMG & EAG, maintenance and operation of street lights, shall preferably have at least 20 per cent of ITI qualified electricians in the first year of the contract. This figure shall preferably be incremented by 15 per cent every subsequent year.

Note: For the competency assessment may please refer the work instructions. An employee shall have to necessarily undergo the competency assessment check once in every eighteen months.

5.5 **Requirements from the Safety Representative(s) of the Business Associate:**

5.5.1 Safety training of 2 hrs/employee/month and one day of safety induction training to all new employees joining the BA will be conducted by the BA as per Safety training modules of TPCODL.

5.5.2 Safety Talk / tool box talk before start of shift to BA employees.

5.5.3 Ensuring the availability & proper usage of the standard safety equipment (PPE)

5.5.4 Periodic inspection of PPE to ensure their serviceability and maintaining the 10% buffer stock of standard PPEs.

5.5.5 Ensuring the adherence to standard operating procedures of TPCODL as mentioned in TPCODL Safety standard and O & M and concerned function's manual.

5.5.6 Safety inspections / audits as per the process of TPCODL

5.5.7 Working in close coordination SAFETY Group of TPCODL.

5.5.8 Reporting of unsafe acts, unsafe conditions, near miss, incident or accident to Engineer In-Charge and SAFETY Group of TPCODL immediately after its occurrence.

5.5.9 Regular HIRA at site and comply the control measures as stated in the detailed HIRA as per the *annexure 2*. Also deployment of JSA based checklist shall be ensured.

5.5.10 Ensuring compliance with safety and other laws as may be applicable and providing for safety assurance.

5.6 **Training and Syllabus:** The BA shall not deploy any person at work place / site or send newly recruited personnel directly to concerned official for competency assessment without Safety Induction Training.

5.6.1 All new BA employees have to necessarily undergo one and half days Safety training and Competency assessment at training centre of BA cell. This training will be conducted once in a week. After the completion of Safety training & Competency assessment I-card will be issued to all competent BA employees

5.6.2 BA is expected to initially train and judge the capability of the workman at his own end before further recommending the workmen for Competency assessment. If any BA workman sent for competency assessment. In case any BA workman fails in the Competency test at concerned official, it will be deemed that BA has not imparted sufficient training at his end and actual cost of training ₹ 7500/ BA employee/ failed attempt will be recovered.

5.6.3 The workers who have imparted Safety Training and issued I-Cards of TPCODL, are not deployed at TPCODL worksites/ voluntarily left the job by workers/ used somewhere else other than TPCODL by the BA, in that case Management reserves the rights to intervene and recover the actual cost of training i.e. ₹ 7500/BA employee. (*Exempted for attrition rate of BA workers less than or equal to 10% of total workforce deployed at TPCODL)*

5.7 It is desired that Safety representative of the BA to impart the general safety training to each employee of duration 2 hrs per month. The training will be organized at BA level and the record to be sent to engineer in-charge and SAFETY group of TPCODL every month. Please refer schedule and syllabus in *annexure 6*.

List of Personal Protective Equipment (PPE) and Maintenance schedule: BA shall commence the project or any work only when the required PPE are made available to the team of employees involved in the work. Each PPE of BA shall be checked / inspected by the safety representative / supervisor at zone before the work start or as prescribed in the list. Safety representative shall regularly check the healthiness of each PPE allocated to lineman. Suitable record shall be maintained at zone. Defective PPE shall be immediately replaced or within 24 hours by the BA. In no case linemen or any other official of BA may be allowed to work with defective PPE. It is preferred that BA ensures minimum stock of each PPE at zone for immediate replacement with defective one. The PPE shall be IS / BS / CE marked and exactly as per the standard or specification mentioned in the *annexure 7*. Working without PPE / non-standard PPE shall be treated as safety violation and penalty as stated in section 6.0 of this document. If TPCODL finds that BA has not provided the adequate / appropriate PPE to their staff, TPCODL reserves the rights to stop the work and call the BA to provide appropriate PPEs at the risk. If the BA fails to provide the required PPEs at the risk then the same shall be provided by TPCODL at the actual cost of the PPE. The amount shall be charged to BA and same shall be first recovered from the current bill of BA or any future payment to be made to BA. In the event of any balance amount still left for recovery, the same shall be adjusted against retention amount or by invoking bank guarantee submitted by BA.

5.8 Safety Audit / Inspection & HIRA: The BA shall get the required safety inspection / audit conducted by his technical team comprising of safety representative as per the *annexure 8*. The safety representative will be required to conduct the HIRA (Hazard Identification and Risk Assessment) *as per annexure 2* of the process and work undertaken at least two times in a year or every time if a new process / activity / machine is introduced or whenever an accident take place. The risk identified to be addressed suitably with –

- Engineering Control
- Management Control, and
- Personal Protective Equipment.

The safety representative of BA shall inform and educate for the identified risk and hazard control methods to employees, supervisor and engineer as well as the engineer in-charge and SAFETY group of TPCODL.

5.9 Safety Performance and Safety MIS: The BA shall maintain good practice of safety all through the contract duration. Safety shall always be of paramount importance during the contract period. Safety performance will be monitored on yearly basis throughout the period and no relaxation will be given for bad performance. BA with good track record and excellent performance will be rewarded suitably as per clause 6.0 of this document. The BA has to provide monthly "Performance Report – Safety" to engineer in-charge and SAFETY group TPCODL this shall be part of monthly bill along with training details. Performa of the report is enclosed as *annexure 9*.

5.10 Pre – Employment Medical Check-up and Fitness of employees engaged for the critical works: The BA shall submit the health fitness certificate for all those workers involved in climbing the pole or working at height for following diseases:

5.10.2 Epilepsy

5.10.3 Colour blindness
5.10.4 Deafness
5.10.5 Vertigo & height phobia

Every year BA will give an undertaking stating that all the employees are fit to work and have not developed aforesaid diseases. The Record of such medical check-ups shall be submitted to BA Cell before issue of temporary identity card. The records shall be maintained at BA Cell. All such medical check-ups shall be repeated once in a year for all workers involved in climbing the pole or working on electrical network.

6. REWARD AND PUNITIVE MEASURES

6.1 To support the enforcement of good SHE & DM practices by the Business Associate and to eliminate repeated or continuing safety violations, use of appropriate reward and punitive measures shall be made. Each unsafe act or violation of the safety guidelines as described in the Safety Manual of the TPCODL will be audit criteria of this system. Broadly the measures identified are following:

6.1.1 Working without PPE/ Safety Gadgets
6.1.2 Working without proper tools and tackles, barricading, Poor condition of Crane / Hydra / Vehicle, using without certification / Licence, Incompetent driver/ Helper
6.1.3 Working without creation of effective safety zone
6.1.4 Improper Supervision at worksite, Lineman/ Supervisor working without competency
6.1.5 Working without adherence to PTW process or authorization/ not adherence to SOPs / W.I. of TPCODL.
6.1.6 Improper Working at height equal to or above 1.8 mtrs without taking proper fall protection measures/ Poor condition of Ladder

6.2 Measures of Reward and Punitive Measures

The Engineer In-Charge, NSO, SC, ASOs, CSI / SIs and SHE &DM group will conduct the surprise audits of the work / project and if any non-conformance is found the same will be booked and entered in the format “Safety Violation Record” *annexure 10*. The flow of the information is given below:

Safety Violation Escalation & Monitoring process	
Action	**Responsibility**
Safety Violation form has been filled and counter foil sent to SAFETY team for information. The main form is to be given to BA supervisor / Engineer in-charge. *(Automatically generated if Site audit done through Mobile App.)*	Engineer In-charge/ NSO / SC / SAFETY Group /CSI/ ASO/ Any authorised TPCODL official.
↓	
Entry of the violation in the master record and sending the information to concerned Manager, HoG, HoD, Head and Chief (O &S). *(Automatically generated if Site audit done through Mobile App.)*.	SAFETY Group
↓	
Forwarding the information Centralized Account Payable (CAPS) for amount deduction from the current bill of the BA,	Engineer In-charge

if any.	
↓	
HoG (Safety – II) & HoG (Safety & Quality – Commercial) and CAPS to generate the MIS of the violations and the amount deducted.	SAFETY Group
↓	
The pool of the amount generated after the deduction to be utilized in safety welfare of BA employees.	SAFETY Group with approval of CFO/Chief (O & S) /CEO&MD

The safety violations have been rated from 1 to 5 (figure 6.3) as per the gravity of the violation. If the same violation is repeated it may escalate into a higher penalty. If a particular Business Associate employee violates safety norms three times, he shall not be allowed to work in TPCODL for a period of one year from the date of the 3rd violation.

6.3 Safety Violation Escalation Matrix

6.3.1

Consequence of Safety Violation Observed (Not related to Incident/ Accident)		Violation				
S.No.	Safety Violation	1st	2nd	3rd	4th	Subsequent Violations
1	Working without PPE (Helmet/Gloves/Safety Harness/ Safety Shoes etc.)	A	B	C	D	Will attract the same penality as applicable in the 4th violation.
2	Improper Working at Height	A	B	C	D	
3	Working without proper tools and tackles	A	B	C	D	
4	Poor condition of Crane/Hydra/ Vehicle/Incompetent driver/ Helper	A	B	C	D	
5	Violation of SOP/ WI	B	C	D	E	
6	Working without adherence to PTW process or authorization/ Safety Zone	C	D	E		

Legend	Action to be taken	Responsibility	Penality Amount (in Rs.)	
A	Warning letter	Engineer Incharge	Nil	The number of violations are to be calculated cumulatively over the contract period and not on monthly basis.
B	Levy of Penalty	Engineer Incharge	2,000	
C	Memo to BA & Levy of Penalty	Head of Group	4,000	
D	Memo to BA & Levy of Penalty	Head of Department	10,000	
E	Memo to BA, Levy of Penalty and termination of Contract	Head of Department	1,00,000	

Figure 6.3 (1a)-Penality Matrix for Safety violation (Applicable for Minor Contracts)

Consequence of Safety Violation Observed (Not related to Incident/ Accident)		Violation				
S.No.	Safety Violation	1st	2nd	3rd	4th	Subsequent Violations
1	Working without PPE (Helmet/Gloves/Safety Harness/ Safety Shoes etc.)	B	C	D	D	Will attract the same penality as applicable in the 4th violation.
2	Improper Working at Height	B	C	D	D	
3	Working without proper tools and tackles	A	B	C	D	
4	Poor condition of Crane/Hydra/ Vehicle/Incompetent driver/ Helper	B	C	D	E	
5	Violation of SOP/ WI	C	D	E		
6	Working without adherence to PTW process or authorization/ Safety Zone	C	D	E		

Legend	Action to be taken	Responsibility	Penality Amount (in Rs.)	
A	Levy of Penalty	Engineer Incharge	5,000	The number of violations are to be calculated cumulatively over the contract period and not on monthly basis.
B	Memo to BA & Levy of Penalty	Engineer Incharge	10,000	
C	Memo to BA & Levy of Penalty	Head of Group	25,000	
D	Memo to BA & Levy of Penalty	Head of Department	50,000	
E	Memo to BA, Levy of Penalty and termination of Contract	Head of Department	1,00,000	

Figure 6.3 (1b)-Penality Matrix for Safety violation (Applicable for Major Contracts)

Once the BA reaches the "BLACK" (color – "5") category, i.e. highest level of safety violation, "Termination" notice to BA will be issued from the office of the Head of Department (equivalent to GM/ Sr. GM level) and further, *if required,* continuation / extension of contract will only be initiated by Functional Chief / Head of the department (equivalent to Sr. GM / Chief level) and approved by CEO & MD. Till the extension, the contract will remain suspended.

TPCODL encourages the reportage of the safety violation during the contract work by BA. Any TPCODL employee can register a safety violation against the BA in the "Safety Violation Form" *annexure 10*. Initially the observer has to fill the form and handover the counterfoil (lower portion) of the document to the supervisor of the BA, inform the site engineer of TPCODL and send the top portion of the Safety Violation Form to SAFETY group for the further necessary action against the BA. ***The cumulative nos. of Safety Violations pertaining to any particular BA shall be calculated on yearly basis.***

Safety violations resulting in incident / accident will be treated as per gravity of the injury / fatality and its impact as well as type i.e. minor or Major. Consequences of incident / accident are shown in the matrix (figure 6.3(2) for major and 6.3(3) for minor) below. In case of any accident, findings and recommendations of Accident Enquiry Committee will be final and binding and will supersede the arbitration clause of GCC.

Consequence Of an Incident / Accident (In case of MAJOR contract)		Incident / Accident				Action Required
Sl. No	Type of the injury	1st	2nd	3rd	4th	
1	Slight injury (First Aid Case)	F (Strengthening of process through continuous improvement in the work procedure)				Take risk reduction measures
2	Minor injury (No or Hospitalization less then 48 Hrs)	F	G	G	H	
3	Major injury (Bone injury or burn or Hospitalization more then 48 Hrs)	G	G	H	I	
4	Single fatality	J	K			Intolerable
5	Multiple fatalities (Two or more fatalities during one event)	K				

Legend	Action to be taken	Responsibility	Penalty (in Rs.)	
F	Memo to BA and levy of penalty	Engineer Incharge	5,000/-	*The number of violations are to be calculated cumulatively over the contract period and not on monthly basis.*
G	Memo to BA and levy of penalty	Head of Group	20,000/-	
H	Memo to BA and levy of penalty	Head of Group	50,000/-	
I	Memo to BA and levy of penalty	Head of Department	2,00,000/-	
J	Memo to BA and levy of penalty	Head of Department	5,00,000/-.	
K	Memo to BA, levy of penalty, termination of contract and black listing of BA	Functional Head	10,00,000/-	

Figure 6.3 (2) - Penalty Matrix for Incident / Accident in Major Contracts

(*For example: In major contracts, if there is first incidence of major injury say bone injury (Cat. 3) where worker was hospitalized for more than 48 hrs then a penalty of amount Rs.20000/- will be deducted from the current bill produced for the payment. This penalty will be similar for first two incidents. However, it will increment to next higher category i.e. Rs. 50,000/- on subsequent incidents as per the above matrix)*

Consequence Of an Incident / Accident (In case of MINOR contract)		Incident / Accident				Action Required
Sl. No	Type of the injury	1st	2nd	3rd	4th	
1	Slight injury (First Aid Case)	L (Strengthening of process through continuous improvement in the work procedure)				Take risk reduction measures
2	Minor injury (No or Hospitalization less then 48 Hrs)	L	M	M	N	
3	Major injury (Bone injury or burn or Hospitalization more then 48 Hrs)	M	M	N	O	
4	Single fatality	P	Q			Intolerable
5	Multiple fatalities (Two or more fatalities during one event)	Q				

Legend	Action to be taken	Responsibility	Penalty (in Rs.)	
L	Memo to BA and levy of penalty	Engineer Incharge	5,000/-	*The number of violations are to be calculated cumulatively over the contract period and not on monthly basis.*
M	Memo to BA and levy of penalty	Engineer Incharge	10,000/-	
N	Memo to BA and levy of penalty	Head of Group	25,000/-	
O	Memo to BA and levy of penalty	Head of Department	1,00,000/-	
P	Memo to BA and levy of penalty	Head of Department	3,00,000/-.	
Q	Memo to BA, levy of penalty, termination of contract and black listing of the BA	Functional Head	5,00,000/-	

Figure 6.3 (3) - Penalty Matrix for Incident / Accident in Minor Contracts

(*For example: In minor contracts, if a worker meets with a non-fatal accident say bone injury (Cat. 3) where he was hospitalized for more than 48 hrs then a penalty of amount Rs. 10,000/-, will be charged from the current bill produced for the payment. This penalty will be similar for first two incidents. However, it will increment to next higher category i.e. Rs. 25,000/- on subsequent incidents as per the above matrix.)*

In case of single or multiple fatalities described under legends J&K of 6.3(2) and P&Q of 6.3(3), the concerned BA may be debarred from extension of contract or participate in new contract. In such event the approval of Chief (O & S) will be necessary for extension or award of new contract to concerned BA.

6.3.2 COMPENSATION FOR BA PERSONNEL

In the event of any untoward incident/ accident, the Business Associate shall ensure prompt medical assistance such as treatment, sickness benefit, etc. is provided to the victim(s) as per the Employees' Compensation Act, 1923 or Employees' State Insurance Act, 1948, as applicable. Also, the BA will be required to take adequate measures for compensating the victim(s) or his/her/their kin as follows:

I. <u>For Death or Permanent / Total Disablement</u>

The BA shall take an insurance coverage of at least Rs. 15 lakhs for each engaged employee, to cover any incidence of Death or Permanent / Total Disablement (Permanent/Total Disability shall be considered as defined under Employees' Compensation Act, 1923). In the event of any such unfortunate incident, the BA would ensure that adequate compensation is paid immediately to the family of the victim(s) from his own resources. This compensation shall be covered under the insurance policy subscribed by the BA mentioned earlier and the arrangement should be such that it would get reimbursed to the BA by the insurance agency subsequently.

II. For Permanent Partial Disablement and Temporary Total Disablement

The compensation in this case will be as per provisions of the Employees' Compensation Act, 1923 or Employees' State Insurance Act, 1948, as applicable.

Accordingly, the BA shall obtain a suitable Insurance Policy on award of Contract and submit documentary evidence of the policy to the BA Cell before commencement of work. The BA shall ensure that the Insurance policy is active at all times and all employees are covered in all respects till the conclusion of contract period or till working with TPCODL. The BA shall submit a copy of the policy after periodic renewals to the BA Cell.

However, on occurrence of such unfortunate incident, if it is found that the victim(s) is/are not covered under any insurance policy, the BA shall be liable to pay the entire sum of Rs. 10 lakhs from his own resources.

Further, in case of an accident resulting in Death or Permanent / Total Disablement while on duty, the appointed BA Nodal Officer will ensure that the BA complies with all statutory provisions and benefits i.e. PF, Compensation, Gratuity etc., and that all these are made available to the employees' nominee(s) as per the stipulated timelines.

6.3.3 TPCODL rewards the BA with good track record of safety management. It is proposed that BA complying with Contractors Safety Management, Safety Manual and Safety process will be rewarded suitably as per the procedure, rule and regulations of the TPCODL. In any case major accident is reported during an assessment period BA will not be eligible for this reward scheme. Assessment of contracts will be once in year. Generally the assessment cycle is calendar year and guidelines will be declared time to time.

Abbreviations Used in the Document

TPCODL	TP Central Odisha Distribution Limited
BA	Business Associate
HIRA	Hazard Identification & Risk Assessment
JSA	Job Safety Analysis
EHV	Extra High Voltage
SAFETY	Safety, Occupation Health, Environment & Disaster Management
MMG	Meter Management Group
EAG	Energy Audit Group
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures
CSI/SI	Circle Safety In-charge / Safety In-charge
ASO	Area Safety Officer
NSO	Nodal Safety Officer
SC	Safety Coordinator
HoG / HoD	Head of Group / Head of Department
AGM / GM / VP	Assistant General Manager / General Manager / Vice President

CFO / Chief (O & S)/ CEO & MD	Chief Finance Officer / Chief (Operating & Safety) / Chief Executive Officer & Managing Director
COS	Corporate Operation Services
CAP	Centralized Account Payable System
PTW	Permit To Work
GCC	General Conditions of Contract.

- END -

Annexure 1 (Refer Para 3.1)

Business Associate Safety Management System Questionnaire

	Certification			
	The information provided in this questionnaire is a summary of the company's occupational health and safety management system.			
	Company Name:			
Turnover and experience:			Name of top officer:	
Date:			Position	
	Contract Details			
Contract Name			Contract Number:	

Business Associates Safety Management System Questionnaire	Marks	Yes	No	Score achieved
Safety Policy and Management				
- **Is there a written company Safety policy?** - If yes provide a copy of the policy, if No please refer Note 1.	1			
- **Does the company have an Safety Management system** - If yes provide details, if No please refer Note 1.	1			
- **Is there a company Safety Management System manual or plan?** - If yes provide a copy of the content page(s), if No please refer Note 1.	2			
- **Are Safety and occupational health responsibilities clearly identified for all levels of Management and staff?** - If yes provide details, if No please refer Note 1.	2			
Safe Work Practices and Procedures				
- **Has the company prepared safe operating procedures or specific safety instructions relevant to its operations and relevant work as per contract?** - If yes provide a summary listing of procedures or instructions, if No please refer Note 2.	1			

Certification				
- Comments				
- **Is there a register of injury or accident?** - If yes provide a copy (format)	1			
- **Is there a documented incident or accident investigation procedure?** - If yes provide a copy of a standard incident report form, if No please refer Note 2. - Comments	1			
Safety Training				
- **Describe how occupational health and safety training is conducted in your company** If No please refer Note 1.	2			
- **Is a record maintained of all training and induction programs undertaken for employees in your company?** - If yes provide examples of safety training records, if No please refer Note 2.	1			
- **Are regular safety inspections / audits are undertaken at worksites?** -If yes provide details (formats), if No please refer Note 3.	1			
- **Is there a procedure by which employees can report hazards at workplaces?** - If yes provide details if No please refer Note 1.	1			
Safety Monitoring				
- **Is there an officer / supervisor responsible for monitoring workplace / worksite safety?**	1			

Certification				
- If yes provide details				
Safety Performance Monitoring				
- **Are employees regularly provided with information on company health and safety performance?** - If yes provide details	1			
- **Has the company ever been convicted of an occupational health and safety offence?** - If yes provide details	NO Marks *(Negative mark ONE for each case)*			
- Has there been any major accident of employee at TPCODL site in past	NO Marks *(Negative mark ONE for each case*			
- Has there been any fatal accident of employee at TPCODL site in past. - (Note: Bid evaluation committee has to take cognizance of the incident and shall evaluate the bid only after formal approval of competent authority i.e. CTO. - In case of yes please refer Note 4.	NO Mark (Negative mark FIVE for each case)			
Minimum of 75% marks is required for qualification.		Total Marks achieved		
Company Reference				
1. Name of company *2. Name of company*				

Note

1: If company does not have formal procedure on Safety Management System than vendor may submit proposed Safety road map along with safety action plan and brief safety policy on his letter head signed by head of the organization.

2: The vendor may submit the same in the Safety Action Plan.

3: The vendor may utilize the same format of TPCODL or on request SAFETY group will assist the vendor in developing the audit system. For other points also vendor may take the assistance of SAFETY group for development of Safety management system.

4: The vendor may submit the Safety Improvement Plan and Safety Action Plan for his employees based on following points.

i. *Action plan for enhancing safety awareness*
ii. *Action plan for safety training of employee*
iii. *Action plan for increasing safety audit in field*
iv. *Action plan for provision and utilization of safety PPE.*
v. *Action plan for fatality reduction.*
vi. *Action plan for enhanced supervision at site*
vii. *Action plan for making employee more responsible and accountable for safety.*
viii. *Action plan for availability and utilization of all required tool and equipment.*
ix. *Safety Improvement done in last two years, specially highlighting those which have been taken after the fatal accident along with results.*
x. *Safety initiatives planed or started recently.*
xi. *Any other point.*

Based on above points and documentary evidences vendor will be required to submit a detailed report in support of his bid. The bid evaluation committee and competent authority will scrutinize the facts and the evidence submitted. If found satisfactory competent authority i.e. CTO may accord his approval for bid opening otherwise his tender shall be disqualified.

Annexure 2 (Refer Para 3.2 and 5.8)

Risk Assessment Form

Business Associate:
Scope of the work:
BA's Representative:
Telephone:
Signature: Date:

Specific Task/Activity	Potential Hazards/Consequences	Class of Risk	Control Measures
Working at Height	Fall from height	2	1. Mandatory usage of JSA checklist prior to start of work 2. Use appropriate ladder 3. Use full body safety harness having double lanyard. 4. Use Electrical Safety Shoes if working on electrical network otherwise use safety shoes. 5. Use Safety helmet. 6. Use PPE as per the annexure 7 of this CSM document 7. Refer Work instruction related to Working at Height for other details 8. Use of metal scaffold to be ensured in height work (cup lock type) 9. Deploy competent workforce who are medically fit

Specific Task/Activity	Potential Hazards/Consequences	Class of Risk	Control Measures
Working on electrical equipment / network	Electric flash / electrocution	3	1. Mandatory usage of JSA checklist prior to start of work 2. Use Electrical Safety Shoes while working on electrical network. 3. Use Electrical Safety gloves of appropriate voltage rating. 4. Use face shield / visor attached with helmet. 5. Use Safety helmet. 6. Use PPE as per the annexure 7 of this CSM document 7. Mandatory usage of Insulated tools & tackles on electrical system 8. Mandatory compliance for Lock Out & Tag out system. Refer Work instruction related to Working on electrical equipment / network for other details
Excavation / Civil work	Collapse of soil, Fall in excavated pit leading to Injury	2	1. Use safety shoes. 2. Use Safety helmet. 3. Use PPE as per the annexure 7 of this CSM document 4. Hard Barricading of the worksite. 5. Refer Work instruction related to excavation / civil work for other details
Material lifting & Mechanical Erection work	Fall of material/object, Topple of crane,	2	1. Mandatory compliance of crane checklist 2. Visual condition check of lifting tools and tackles such as wire rope sling,belt sling, chain, pulley block, D-shackles, etc. shall be ensured. 3. The operator's physical fitness and alertness should be judged by sup. / EIC. 4. Use PPE as per the annexure 7 of this CSM document 5. Refer Work instruction related to Material lifting & Mechanical Erection work
Road Safety	Road Accidents	3	1. Mandatory compliance of TPCODL Road Safety policy W07(COR-P-12)

Specific Task/Activity	Potential Hazards/Consequences	Class of Risk	Control Measures
Note: This information for the general indication purpose. The detailed risk assessment shall be conducted before start of the work by the authorized representative of the BA. The report of same shall be submitted to engineer in-charge along with annexure 4 of the CSM document.			

Guidelines for filling the Risk Assessment Form

- *Specific Task/Activity* - The documentation of each major task associated with the contract.
- *Potential Hazards* - The identification of hazards associated with each activity or task to be carried out.
- *Class of Risk* - Each hazard should be evaluated as a level of risk, described as Risk Class 1, 2 or 3 defined above.
- *Control Measure* - The identification and documentation of actions required to eliminate or reduce the hazards that could lead to accident or injury.

Hazard / Risks shall be classified according to the following schedule:

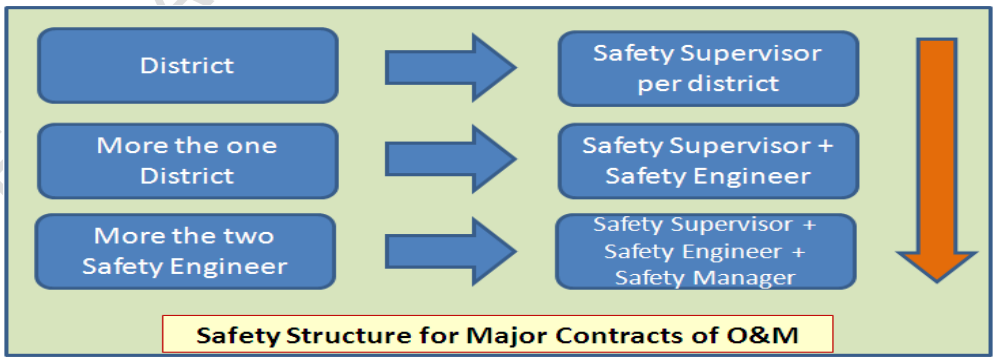
- Class 1: Potential to cause injury treatable with first aid
- Class 2: Potential to cause death or permanent injury
- Class 3: Potential to cause more than one or more lost time injuries.

Annexure 3.1 *(Refer Para 4.0)*

General Safety Conditions for the Maintenance of Distribution Network Contracts:

A BA awarded a contract (O&M) work of maintenance of distribution network will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in *annexure 7.*
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in a district. In case the BA has been awarded work in more than one district, then the following safety structure will be adopted.

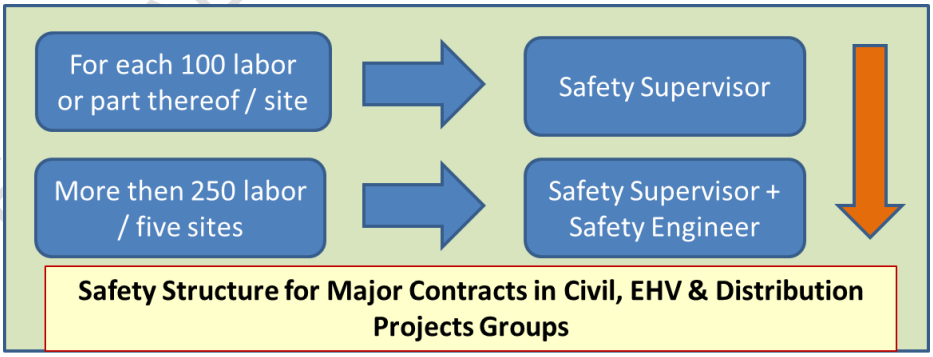


Annexure 3.2 *(Refer Para 4.0)*

General Safety Conditions for the Distribution Projects Major Contracts:

A BA awarded a major contract work of TS&P in area of a circle will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1.
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in the area. In case the BA has been awarded work in more than one circle, then the following safety structure will be adopted.



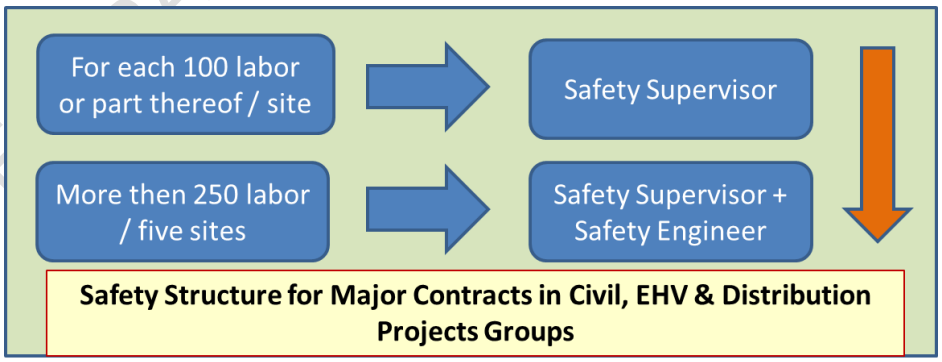
Safety Structure for Major Contracts in Civil, EHV & Distribution Projects Groups

Annexure 3.3 *(Refer Para 4.0)*

General Safety Conditions for the major EHV Projects Contracts:

A BA awarded a major contract work of EHV projects will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in the area. In case the BA has been awarded work in more than one circle, then the following safety structure will be adopted.
- BA shall refer Construction Safety Manual in TPCODL Safety Manual for details.

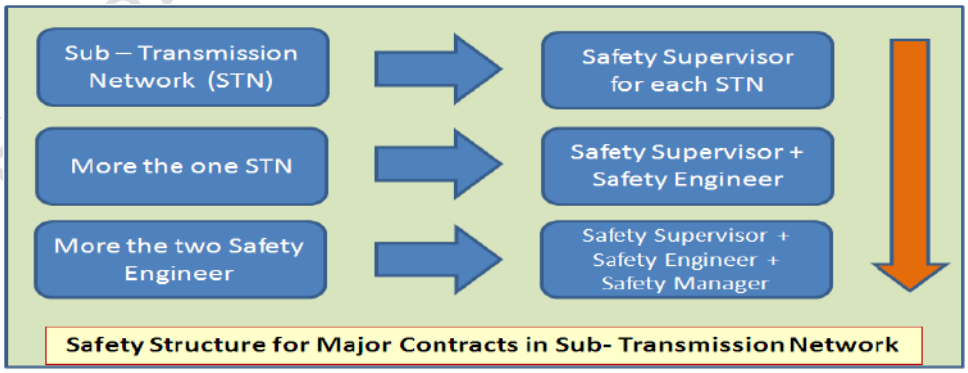


Annexure 3.4 *(Refer Para 4.0)*

General Safety Conditions for the Maintenance of Sub – Transmission Network Contracts:

A BA awarded a major contract work of maintenance of sub – transmission network in area of a power system will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Coordinator for managing a complete safety management system in the area. In case the BA has been awarded work in more than one area power system, then the following safety structure will be adopted.



Annexure 3.5 *(Refer Para 4.0)*

General Safety Conditions for the major contract work in Civil / Generation Projects:

A BA awarded a major contract work of / in civil or Generation project will be required to fulfil the following safety conditions:

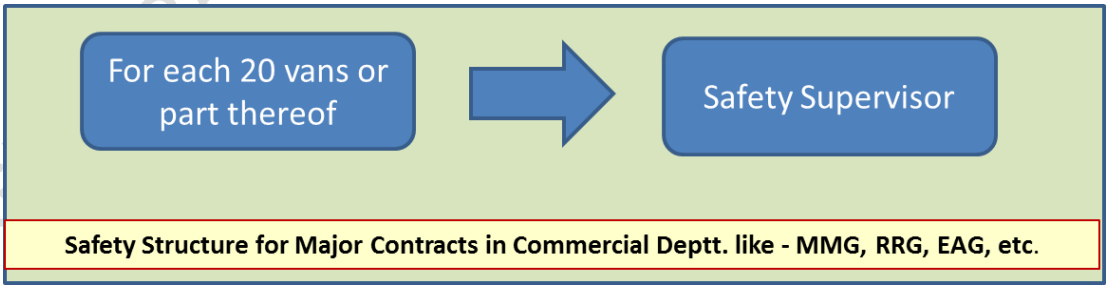
- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor (for workforce upto 100 at site) / a safety engineer (for workforce upto 250 at site) / safety manager (for more than two safety engineers) for managing a complete safety management system at the project site. In case the BA has been awarded more than one major contracts, then the following safety structure will be adopted.
- BA shall refer Construction Safety Manual in TPCODL Safety Manual for details.

Annexure 3.6 *(Refer Para 4.0)*

General Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc.:

A BA awarded a major contract work in meter management group & energy auditing group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system for the work as per the following safety structure.
- The BA for the RRG work shall depute one Safety supervisor.



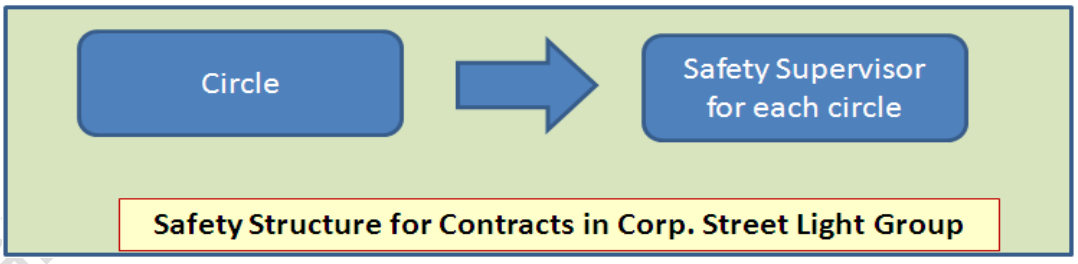
Safety Structure for Major Contracts in Commercial Deptt. like - MMG, RRG, EAG, etc.

Annexure 3.7 *(Refer Para 4.0)*

General Safety Conditions for the major contract work in O&M of street light group:

A BA awarded a major contract work in operation and maintenance of street light group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment PPE as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9)* to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- Each BA shall ensure to depute a Safety Supervisor for managing a complete safety management system for the work awarded as per the below structure.



Annexure 4 *(Refer Para 3.3)*

Safety Undertaking by way of Affidavit

I_____ s/o_____R/o_____ (AUTHORIZED REPRESENTATIVE/PARTNER/DIRECTOR/PROPRIETOR) of M/S _____(name of company/firm)__ having its office at (Complete address of Company), authorized vide power of attorney dated ------/Board resolution dated----/letter of authority dated----, hereinafter referred to as **Contractor [or Business Associate (BA)]** which expression shall, unless it be repugnant to or inconsistent with the meaning or context thereof, be deemed to include its heirs, executors, administrators, and assigns do hereby affirm and undertake as under :

1. The present undertaking shall remain in force from the date of execution of contract awarded by TPCODL and shall be valid till the date of termination of the said contract by either parties. The undertaking is binding on me (contractor) as well as my sub-contractor and its employees, representatives etc.
2. That I(the contractor) will be responsible and liable to comply and abide by all the safety rules, instructions and regulations as may be specified and laid down by The TP Central Odisha Distribution Limited (TPCODL) so as enable TPCODL to achieve its goal of Zero On site incidences.
3. That the Contractor shall be fully responsible for ensuring occupational health and safety of its employees, representatives, agents as well as of its subcontractor's employees, at all times during the discharge of their respective obligations under the contract including any methods adopted for performance of their tasks / work.
4. That Contractor shall ensure ,at its own expense to arrange for and procure, implement all requisite accident prevention tools, first aid boxes, personal protective equipment, fire extinguisher, safety training, Material Safety Data Sheet, pre-employment medical test, etc. for operations & activities including as & when so specified by TPCODL specifically. , failing which TPCODL shall be entitled, but not obliged, to provide the same and recover the actual cost thereof from the Contractor's payments.
5. That the Contractor shall engage adequate and competent Safety – Supervisor / Engineer / Manager / Skilled persons at site as per the Para 5 (Qualification and experience of safety personnel) and Annexure 3 of Contract Safety Management.
6. That the Contractor shall engage the competent Site – Supervisor with each group of workers for safe and correct workmanship, proper co-ordination of material and site work as per contract.

7. That the Contractor shall immediately replace supervisor in case it is found to be not up to the level of skill and experience required as in skill and experience required in *annexure 5* of this document, but any such replacement shall be only with the prior concurrence of TPCODL .
8. That the Contractor and its subcontractors shall abide by all the safety guidelines as per Safety Manual, Contract Safety Management and other guidelines issued from time to time by TPCODL during the contract period.
9. That in case the Contractor and/or any of its Subcontractor fail to ensure the compliance as required in terms of this undertaking the Contractor shall keep and hold TPCODL / its directors / officers / employees indemnified against any / all losses / damage / expense / liability / fines / compensation / claims / action / prosecutions or the like which might be suffered by TPCODL or to which TPCODL might get exposed to as a result of any breach /wilful negligence /deliberate default on the part of the Contractor /Subcontractor in complying with the same. Contractor shall also furnish any press release, clarification etc. if sought by TPCODL for any near miss or safety violations, accidents, which are attributable to fault of Contractor.

DEPONENT

VERIFICATION

Verified at Bhubaneswar on this _Day of _____20__ that the contents of the above affidavit are true and correct and nothing material has been concealed therefrom

DEPONENT

Annexure 5 *(Refer Para 5.4)*

SKILL / QUALIFICATION REQUIRED FOR ELECTRICIAN AND ELECTRICAL SUPERVISOR

Skill / Qualifications Required for Electrician *(Certificate of Competency Class-II)*:

1. Formal education in ITI – Wireman/ Electrician trade.

   OR

2. Working experience of minimum three years of practical wiring.

   OR

3. Have completed three years apprenticeship course through Apprenticeship Advisor, Govt. of Odisha / other state Govt. in the trade of Lineman / Wireman / Electrician.
4. A candidate must have attained the age of Eighteen years.

Skill / Qualifications Required for Electrical Supervisor (*Certificate of Competency Class-I)*:

1. Have at least five years' experience of practical wiring after passing the certificate of competency class-II i.e. electrician.

   OR

2. Recognized Degree or Diploma or equivalent qualification in Electrical Engineering from any Technical institute / College or University recognized by the Board.

   AND

   Must have completed the training/job in rectifying the common defects in electrical line and power installation for a period of one and three years after passing Degree or Diploma respectively

   OR

3. Possessing the valid certificate of certificate of competency class – 1 (Electrical Supervisor)

Annexure 6 (*Refer Para 5.6)*

Training Module for BAs Worker & Supervisor

Training for BA Supervisor **Duration – 02 Hrs / Month**

Methodology: **Lecture and Practical Demonstration of Safety Zone Creation**

Session: 1

Topic: **Electrical Safety Aspects**

Sub Topics:

1. Learning specifics of HT & LT Network of zone
2. Major type of HT / LT / service lines / street light maintenance works
3. Understanding the need of Safety
4. Understanding the safe process of maintenance :
    - Planning of the maintenance job
    - Availability of men, material & machine, PPEs, Safety gear and approved PTW
    - Briefing of the job by the supervisor of the TPCODL
    - Identification of Risks associated with the maintenance work and planning for controlling measures by TPCODL supervisor
    - Creation of safety zone by TPCODL supervisor and satisfying that the network is dead – Use of Neon Tester, Shorting Chain and Safety Tagging
    - Start of the work – Right person for the right job
    - Alert supervision
    - Completion of the job – Check points
    - Energization of network
    - Actions to be taken in case of some accident

Session: 2

Topic: **Use of Electrical Testing Equipment**

Methodology: **Lecture and Practical Demonstration**

Sub Topics:

1. Meggar, Hi Pot, Clamp On Meter, Neon Tester, Discharge Rod, Line tester etc.

Session: 3

Topic: **Awareness of Electrical Safety Aspects**

A. Understanding the need of this Training and Safety
B. Learning specifics of HT & LT Network
C. Major type of work to be carried out in zones
D. Switching Operations (Do's & Don'ts) including Street Light Switching
E. Working on Height *(practical demo also)*
F. Understanding the Safe Process of Maintenance / Working:
    - Planning of the job
    - Availability of men, material & machine, PPEs, Safety gear and approved PTW
    - Briefing of the job by the supervisor
    - Permit to Work
    - Safety Tagging and Lock Out Tag out

- Identification of Risks associated with the work to be carried out and planning for controlling measures by proper supervision
- Concept of "***Safety Zone***"
- Identification and use of Neon Tester, Shorting Chain, Clamp On Meter, Hi Pot, Meggar etc.
- Completion of the job – Check points
- Accident Theory & Incident Reporting
- Actions to be taken in case of some accident

Session: 4

Topic: Identification, Demonstration and Usages of Tools, PPEs and other Safety Gears and demonstration of working on HT pole

Session: 5

Topic: Practical demonstration of Safety Zone creation

FREQUENCY

Regular Safety Training Program

- It will be conducted for all field & supervisor staff of BA in such a manner that all BA Personnel attend at least two hours safety training during every month.

One Day Induction Safety Training Programs:

- This training will be for the new BA's personnel, who have been cleared by the Cross Functional Panel to undergo Safety training and who are likely to be deployed at various work sites of TPCODL by the BA, as a part of AMC / Work Contract.

Duration / Periodicity:

- Duration and periodicity has been defined above. However, this is subject to change at the discretion of TPCODL.

Annexure 7 *(Refer Para 5.7)*

LIST OF PERSONAL PROTECTIVE EQUIPMENT AND TESTING FREQUENCY

Sl. No.	Name of PPE	IS / EN Standard	Testing Frequency	Remarks	Ref Brand & Model
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298 (Part-2)	Monthly and visual check every day for any crack or damage in the leather or sole.		BATA (Model No.- Endura L/C) Liberty (Model No. – 7198-01 HT Barton Black – Warrior)
02	HDPE Safety helmet with chin strap and ratchet type for adjustment.	IS:2925-1984	Monthly and visual check every day for any crack in shell.		Karam (PN Safetech) Joseph Leslie Accent Industries Honeywell
03	Full body harness (Safety belt)	EN 361	Monthly and visual check every day of the bends and the harness.		Karam (PN Safetech) Joseph Leslie Accent Industries
04	Electrical Safety Gloves	EN: 60903 CE marked	Weekly and visual check for any crack and blow test before every work.	Manufactured not beyond 12 months.	Make Sparian / Sumitech / CATU supplied with inner cotton glove with over glove of split leather.
05	Full face visor with safety helmet	EN: 166 CE marked (Visor)	Monthly and visual check every day for any crack in shell.	Clear acrylic visor attached with safety helmet.	Karam (PN Safetech) Joseph Leslie Accent Industries Honeywell
06	Fire Proof jacket for chest protection		Monthly and visual check every day.		
07	Safety Chain for shorting cum earthing.	As per TPCODL standard	Weekly and visual check before every work.	Made of brass, Total length – 5.5 meters and made of 12 SWG.	

Note:

1. *Any other Personal Protection Equipment required beyond above list will be according to BIS or EN Standards.*
2. *All Personal Protection Equipment will be checked by the engineer in-charge or SAFETY group of TPCODL.*
3. *Safety Representative of the BA has to maintain the record of the availability, condition and checking of the PPEs.*
4. *All tools required as per the contract must be according to respective IS / EN standards.*
5. *TPCODL may revise or add the above list of PPE and their specifications as and when feel necessary. The information about new specifications /models will be circulated by the Engineer In-charge (EIC), which shall adhere by the business associated in the shortest possible time. The EIC shall issue a memo / instruction to BA with timeline for implementation. Any delay will be treated as non- compliance / safety violations. Refer picture of each PPE given in next page.*

Pictures of PPE for reference purpose.

Sl. No.	Name of PPE	IS / EN Standard	Picture
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298(Part-2) and with test report of electrical resistance.	
02	HDPE Safety helmet with chin strap and ratchet type for adjustment.	IS:2925-1984	
03	Full body harness (Safety belt) The straps at shoulder and thigh shall have full pad for comfort. The back shall be so designed that harness straps do not tangle with each other.	EN 361:2002 EN 358 : 2000 IS: 3521:1991/2002	

04	Electrical Safety Gloves – Composite type Soft electrical gloves as per size of individual.	EN: 60903 CE marked	
05	Full face visor with safety helmet	EN: 166 CE marked (Visor)	
06	Fire Proof jacket for chest protection		
07	Safety Chain for shorting cum earthing.	As per TPCODL standard	  
08	Reflective jacket to each workmen	As per TPCODL standard	

Note : Picture shown are for indicative purpose only. Actual product may differ.

Annexure 8 *(Refer Para 5.8)* LIST OF AUDITS TO BE CONDUCTED

Audits	Responsibility	Freq.	Ref. Doc.
Permit to Work & Field Audit	BA Safety Representative	Weekly	F04 (COR P - 12)
Tool Bag & PPE's Audit		Weekly	F06 (COR P - 12)
First Aid Box Maintenance Record		Fortnightly	F08 (COR P - 12)
Fire Extinguisher Record ***(Applicable for the BA involved in major construction works and have storage of flammable material at worksite)***		Monthly	F09 (COR P - 12)
Safety Talk Register		Weekly	F18 (COR P - 12)
Site Safety Audit		Daily	F29A (COR P - 12)

Note:

1. *(BA Safety Representative has to use the formats as per Safety process COR – P – 12 of TPCODL)*

Annexure 9 (*Refer Para 5.9)*

PERFORMANCE REPORT – SAFETY

FOR THE MONTH OF……

Name of BA : ……..

Name of the Project and Purchase order No: ……

Date of commencement of work: ……

Man Hour Worked in this month (No. of employees X 8 Hrs + Overtime): ……

Cumulative Man Hour worked: ……

Total Number of Minor Injury (this month): …… Minor Injury (Total)…….

Major Injury (this month): …….. Major Injury (Total): ……

Detail of the Incident / Sub Standard Acts and Condition

Activity	This Month	Cumulative (Total)	Day Lost (this month)	Days Lost (Cumulative)
No. of the Incident				
No. of lost time injuries				
No. of dangerous occurrences				
No. of near miss reported				
Substandard Act/Conditions observed			Attach details of observation of this month	
Safety Violation Notice received (from TPCODL) (both in numbers and in Rs.)	No.	No.	No. of violation letter received and compliance report for the TPCODL.	
	Rs.	Rs.		

Note: Cumulative means total from date of commencement of work according to the contract.

Detail of the Accident / Near Miss Incidents:

Date and Time	Type of the incident	Name of Employee	Brief Description	Corrective and Preventive actions recommended

Details of the Safety Violations:

Date and Location	Brief Description	Name of employee involved	Action Taken

Detail of the Safety Talk / Tool Box Talk / Safety Training

Date and Location	Topic (s)	Total Number of employees (Worker / Supervisor)	Number of participants (Worker / Supervisor)

Detail of the Safety Meeting

Date and Location	Number of participants	Topics discussed	Major Observations / Innovation

Detail of the Safety Inspection /Audit: (as per TPCODL site audit checklist F29A(COR-P-12)

Date	Area / Location	Major Observations	Recommendations	Action Taken

Any other Safety, Occupational Health, Environment & Disaster Management Promotional Activity (During this month):

Date	Location	Activity	Level of Participation	Number of participation

Signature of the BA Safety Representative Signature of ZM / HoG

Name, E. No. and Date Name, E. No. Date.

Note: The original form to be deposited with Engineer in-charge and a copy to SAFETY group on or before 5th of every month along with bill. List of training of the current month and status of PPE to be also mentioned individual wise.

BA may include additional lines if required. The TPCODL may revise the format as and when deemed required.

ANNEXURE-M

VENDOR APPRAISAL FORM

TO BE SUBMITTED BY VENDOR (To be filled as applicable)			
VENDOR:			
1.0	**DETAILS OF THE FIRM**		
	1.1	NAME (IN CAPITAL LETTERS)	:
	1.2	TYPE OF CONCERN (PROPRIETORY) Partnership, Pvt. Ltd., Public Ltd. etc.	:
	1.3	YEAR OF ESTABLISHMENT	:
	1.4	LOCATION OF OFFICE POSTAL ADRESS TELEGRAPHIC ADDRESSES, TELEX NO. FAX NO.	:
	1.5	LOCATION OF MANUFACTURING UNITS	:
		i) UNITS 1	:
		ii) OTHER UNITS	:
2.0	**PRODUCTS MANUFACTURED**		:
3.0	**TURNOVER DURING THE LAST 3 YEARS (TO BE VERIFIED WITH THE LATEST PROFIT & LOSS STATEMENT).**		:
4.0	**VALUE OF FIXED ASSETS**		:
5.0	**NAME & ADDRESS OF THE BANKERS**		:
6.0	**BANK GUARANTEE LIMIT**		:
7.0	**CREDIT LIMIT**		:
8.0	**TECHNICAL**		
	8.1	NO.OF DESIGN ENGINEERS (INDICATE NO.OF YEARS EXPERIENCE IN RELATED FIELDS)	:
	8.2	NO.OF DRAUGHTSMEN	:
	8.3	COLLABORATION DETAILS (IF ANY)	:
		8.3.1 DATE OF COLLABORATION	:
		8.3.2 NAME OF COLLABORATOR	:

		8.3.3 RBI APPROVAL DETAILS	:
		8.3.4 EXPERIENCE LIST OF COLLABORATOR	:
		8.3.5 DURATION OF AGREEMENT	:
	8.4	AVAILABILITY OF STANDARDS / DESIGN PROCEDURES / COLLABORA-TOR'S / DOCUMENTS (CHECK WHETHER THESE ARE LATEST/CURRENT	:
	8.5	TECHNICAL SUPPORT, BACK-UP GUARANTEE, SUPERVISION, QUALITY CONTROL BY COLLABORATOR (WHEREVER ESSENTIAL). (THIS CLAUSE IS RELEVANT WHEN VENDOR'S EXPERIENCE IS INADEQUATE)	:
	8.6	QUALITY OF DRAWINGS	:
9.0	**MANUFACTURE**		
	9.1	SHOP SPACE, LAYOUT LIGHTING, VENTILATION, ETC.	:
	9.2	POWER (KVA)	:
		MAINS INSTALLED	:
		UTILISED	:
		STANDBY POWER SOURCE	:
	9.3	MANUFACTURING FACILITIES (ATTACH LIST OF EQUIPMENT AS APPLICABLE)	:
		9.3.1 MATERIAL HANDLING	:
		9.3.2 MACHINING	:
		9.3.3 FABRICATION	:
		9.3.4 HEAT TREATMENT	:
		9.3.5 BALANCING FACILITY	:
		9.3.6 SURFACE TREATMENT PRIOR TO PAINTING/ COATING, POLISHING, PICKLING, PASSIVATION, PAINTING, ETC.	:
	9.4	SUPERVISORY STAFF	:
	9.5	ADEQUACY OF SKILLED LABOURS (MACHINISTS, WELDERS, ETC.)	:
	9.6	NO. OF SHIFTS	:
	9.7	TYPE OF MATERIAL HANDLED (SUCH AS CS, SS, ETC.)	

	9.8	WORKMANSHIP	:
	9.9	MATERIAL IN STOCK AND VALUE	:
	9.10	TRANSPORT FACILITIES	:
	9.11	CARE IN HANDLING	:
10.0	**INSPECTION / QC / QA / TESTING**		
	10.1	NUMBER OF PERSONNEL (INDICATE NO.OF YEARS OF EXPERIENCE)	:
	10.2	INDEPENDENCE FROM PRODUCTION	:
	10.3	AVAILABILITY OF PROCEDURAL WRITE UP/QUALITY PLAN	:
	10.4	INCOMING MATERIAL CONTROL AND DOCUMENTATION	:
	10.5	RELIABILITY/REPUTATION OF SUPPLY SOURCES	:
	10.6	STAGE INSPECTION AND DOCUMENTATION	:
	10.7	SUB-ASSEMBLY & DOCUMENTATION	:
	10.8	FINAL INSPECTION AND DOCUMENTATION	:
	10.9	PREPARATION OF FINAL DOCUMENTATION PACKAGE	:
	10.10	TYPE TEST FACILITIES	:
	10.11	ACCEPTANCE TEST FACILITIES	:
	10.12	CALIBRATION OF INSTRUMENTS AND GAUGES (WITH TRACEABILITY TO NATIONAL STANDARDS) (ATTACH LIST)	:
	10.13	STATUTORY APPROVALS LIKE BIS, IBR, ETC.(AS APPLICABLE)	:
	10.14	SUB-VENDOR APPROVAL SYSTEM AND QUALITY CONTROL	:
	10.15	DETAILS OF TESTS CARRIED OUT AT INDEPENDENT RECOGNISED LABORATORIES	:
		i) FURNISH LIST OF TESTS CARRIED OUT AND THE NAME OF THE LABORATORY WHERE THE TESTS WERE CONDUCTED	:
		ii) CHECK AVAILABILITY OF CERTIFICATES AND REVIEW THESE WHEREVER POSSIBLE	:
11.0	**EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)**		:
12.0	**SALES, SERVICE AND SITE ORANISATIONAL DETAILS**		:

13.0	**CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)**	:
14.0	**POWER SITUATION**	:
15.0	**LABOUR SITUATION**	:
16.0 *	**APPLICABILITY OF SC/ST RELAXATION (Y/N)** **IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED**	
17.0	**ORGANIZATIONAL DETAILS** 1. PF NO 2. ESI NO 3. INSURANCE FOR WORK MAN COMPENSATION ACT NO 4. ELECTRICAL CONTRACT LIC NO 5. ITCC / PAN NO 6. SALES TAX NO 7. WC TAX REG. NO	:
18.0	**DOCUMENTS TO BE ENCLOSED:** 1. FACTORY LICENSE 2. ANNUAL REPORT FOR LAST THREE YEARS 3. TYPE TEST REPORT FOR THE ITEM 4. PAST EXPERIENCE REPORTS 5. ISO CERTIFICATE –QMS, EMS, OHAS, SA 6. REGISTRATION OF SALES TAX 7. COPY OF TIN NO. 8. COPY OF SERVICE TAX NO. 9. REGISTRATION OF CENTRAL EXCISE 10. COPY OF INCOME TAX CLEARANCE. 11. COPY OF PF REGISTRATION 12. COPY OF ESI REGISTRATION 13. COPY OF INSURANCE FOR WORK MAN COMPENSATION ACT NO 14. COPY OF ELECTRICAL CONTRACT LIC NO 15. COPY OF PAN NO 16. COPY OF WC TAX REGISTRATION 17. DOCUMENTS IN SUPPORT OF SC/ST RELAXATION AT S.NO.16.0 18. GST Registration No	

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

- **Proprietorship/ Single Ownership Firm:** Proprietor of the firm should be from SC/ST community. Governing document shall be Proprietorship Deed.
- **Partnership Firm:** Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed.
- **Private Limited Company:** Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

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

ANNEXURE-N

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date: …….

Tender Enquiry No.: ……..

To,

Chief (Procurement & Stores)

TP Central Odisha Distribution Limited,
Bhubaneswar

Sir,

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

…….

and to subsequently negotiate and sign the Contract.

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

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

Yours Sincerely,

For ……..

Authorized Signatory

Annexure VIII

Safety Policy and Safety Terms and Conditions

Contractor's Safety Code of Conduct

Reason for Change	Prepared By	Checked By	Approved by
Revision to accommodate Existing changes in org structure and to simplify the procedure	Rajesh Sharma *(Head-Safety Generation)*	Suresh Khetwani *(Chief - Safety & Environment)* Monish Kumar *(Chief -Corporate Contract)*	V. V. Namjoshi (Chief Generations)

INDEX

1. Objective

The Tata Power engages contractor workforce to execute, run and maintain various operating sites and facilities across locations for various business verticals including Generation, Transmission, Distribution and Renewable. The activities range from project execution, operation, maintenance to facilities management.

The management of contractor safety represents a significant challenge for management. Tata Power has a responsibility to ensure that contractors are provided with enough information and support to enable them to conduct their roles safely and without endangering health and safety of their own workforce or that of our staff.

To ensure reduction in reportable injuries and achieve goal of zero accidents, first edition of contractor safety code of conduct was launched successfully in the year 2014. Since last four years after the launch of CSCC, Tata Power could achieve the objective of reduction in reportable injuries and fatalities.

Over the period, as the system was being matured, a need was felt to make second revision of the CSCC process. Objective of second revision is improve existing CSCC system and make it user friendly.

2. Scope:

This procedure applies to all operating and project sites of The Tata Power Company Ltd and Group companies including new businesses like EV charging, Home Automation etc.

3. Definitions

3.1. **Order Manager:** Order Manager is the Tata Power representative, who has the ownership of the given job.

3.2. **Site Safety Management Plan**: It is the safety plan agreed between Contractor and Tata Power. It will contain the entire job specific safety requirement and will be signed by the contractor.

3.3. **Contractor**: An individual or a company that provides services to Tata Power under a signed contract.

3.4. **Emergency:** a serious, unexpected or dangerous situation requiring immediate action, which may result in loss of revenue/property, business discontinuity. In case of Emergency*, services may be procured by selecting the qualified vendor based on the vendor category without the safety bid evaluation. It must be approved by MB level and above.

3.5. **Expert Service jobs:** Jobs which needs expert services of contractor which does not involve direct exposure to the potential risk or work which involves only

supervisory work such as expert for turbine overhaul, expert for boiler overhaul, expert for pump and motor, expert for compressor overhaul.

3.6. **Head of the Division:** Business in charge of the division who is overall custodian of the generating station or transmission division or distribution division.

3.7. **Category A Vendor:** Vendor eligible to carry out Very High & High risk (as per Tata Power Hazard Identification and Risk Analysis Procedure) and /or Long-Term Contract related to operation and maintenance (O&M) of plant. Vendors must fulfil the requirement specified for Category A in Appendix 12-CSMF-5 of this document.

3.8. **Category B Vendor:** Vendors eligible to carry out technical jobs, that are classified under Medium /low risk. Vendors must fulfil the requirement specified for Category B in Appendix 12-CSMF-5 of this document.

3.9. **Category C Vendor:** Vendors eligible for to carry out low or very low risk administrative and office jobs. For this he must fulfil the requirement specified for Category C in Appendix 12-CSMF-5 of this document.

3.10. **Category D Vendor:** All Consultants, Medical Practitioners or vendors taking job from Tata Power and working from their own premises (e.g. motor rewinding at vendor's shop floor, equipment sent for repair to vendor's works etc.) are classified as Category D Vendor

3.11. **High Risk Jobs:** A Job or its activities are considered as Very High or High Risk when Order manager apply the "Tata Power Hazard Identification and Risk Analysis" procedure and found safety risk associated with are under Very High or High category. Indicative lists of jobs are given in appendix 15 of this document**.**

3.12. **Medium Risk Jobs:** Jobs or its activities are considered as medium risk when Order manager apply "Tata Power Hazard Identification and Risk Analysis" procedure and found the same as Medium Risk.

3.13. **Low Risk Jobs:** Any job or its activities are considered as Low or Very low risk while Order manager, calculate it by applying "Tata Power Hazard Identification and Risk Analysis" procedure and found it under Low or Very Low category.

3.14. **Long Duration Jobs:** When the duration of job is 12 months or more, it is considered as Long duration job

3.15. **High Value Jobs:** When the value of the job contract is Rs. One Crore or more it will be considered as High value job**.**

4. Responsibilities

4.1 Order Manager: Order Manager is the Tata Power representative, who is responsible for:

4.1.1 Finalizing the Site Safety Management Plan along with Contractor, Safety Concurrences Group, Divisional Safety Head and Expert (External or Internal) if required.

4.1.2 Supervise and ensure work is carried out as per the Site Safety Management Plan including agreed Risk Assessment (HIRA/JSA) and Method Statement.

4.1.3 Conduct audit and evaluate Safety Performance of contractor.

4.1.4 Ensure contractors adhere to all statutory provisions.

4.1.5 In case any deviation is needed in agreed safety management plan or in CSCC process for execution of job, Management of Change procedure will be applicable, and approval may be obtained from divisional head /Cluster head.

4.2 Contractor: The person, entity or organisation who is executing the job for Tata Power under a contractual agreement and will be responsible for the following

4.2.1 To follow all Tata Power Critical Safety Procedure, Rules and guidelines given in Safety Terms and Conditions

4.2.2 Undertake job as per Site Safety Management Plan CSM-F10 and method statements agreed with Tata Power.

4.2.3 Raise any concerns with regard to their work and its safety with the Tata Power Order Manager.

4.2.4 Report all injuries, near misses, unsafe acts/conditions, and occurrences to the Tata Power Order Manager immediately.

4.2.5 Ensure that all sub-contractors follow the Tata Power Safety Procedure and agreed Site Safety Management Plan CSM-F10.

4.2.6 To follow all statutory requirements as per the laws of the land.

4.2.7 All vendors applying for A category jobs or submitting quote for high risk jobs shall obtain certificates of ISO 9001, ISO14001 and ISO45001 before submitting quote for high risk Jobs.

4.3 Safety Concurrence Group: It is Cross Functional Team constituted by Corporate Safety Team, which will have representatives from Execution department, Divisional safety and Corporate / Divisional contracts. SCG will be responsible for the following

4.3.1 Assessment of Safety Potential of new vendor before registration as per CSM-F1-Safety Category Qualification Form.

4.3.2 Safety Evaluation of the bids as per evaluation format CSM-F-9 Safety Bid Evaluation Criteria

4.3.3 Finalization of the Site Safety Management Plan CSM-F-10 submitted by the contractor.

4.3.4 Corporate Safety Team / Cluster Safety Head will be part of SCG during Safety Bid Evaluation for following types of jobs

4.3.4.1 High-Risk jobs to be carried out in Annual Overhaul / Major Shutdowns and Outages.

4.3.4.2 Capex jobs of High-Risk Category

5.1 Vendor Registration

For Vendor Registration, Corporate Contract will issue following documents for evaluation of contractor's safety capability

1) CSM-F1 –Safety Category Qualification Form
2) Safety Terms and Conditions

The document Safety Terms and Conditions provides the information about Tata Power safety System to the contractor. Contractor will submit the CSM-F1- Safety Category Qualification Form with all relevant details and documents to Vendor Registration Initiator, which will in turn forward it to Safety Concurrence Group (SCG) for evaluation. The SCG will evaluate the details submitted by the contractor based on a predetermined criteria CSM-F-5 Safety Potential Evaluation Criteria for Vendor Registration and will determine the category (Category A/B/C/D) for which the contractor will be registered. As mentioned in the above criteria, a site visit may also be organized by SCG prior to registration under Category A and B. In case, the contractor does not qualify the safety criteria, the contractor will not be registered. However, he may apply afresh for registration after 6 months. Please refer Appendix 1: Process Flow Chart for Vendor Registration.

5.2 Bid evaluation

At the time of placing the Purchase Requisition (PR), Order Manager is required to declare the risk involved in the of the job (i.e. High Risk / Medium Risk / Low Risk jobs, based on the RPN in HIRA. If the Job is "High Risk" or "Long Duration", then RFQ will be attached with following documents:

1) CSM-F7- Blank Safety Competency Form
2) CSM-F8 PPE requirements
3) Safety Terms and Conditions
4) Job Specific Safety Requirement (Educational and Professional Qualification, Skill & Experience Manpower, Tools and Tackles (e.g. man lifter, use of drone, use & availability of rescue kit), Work Methodology etc.)

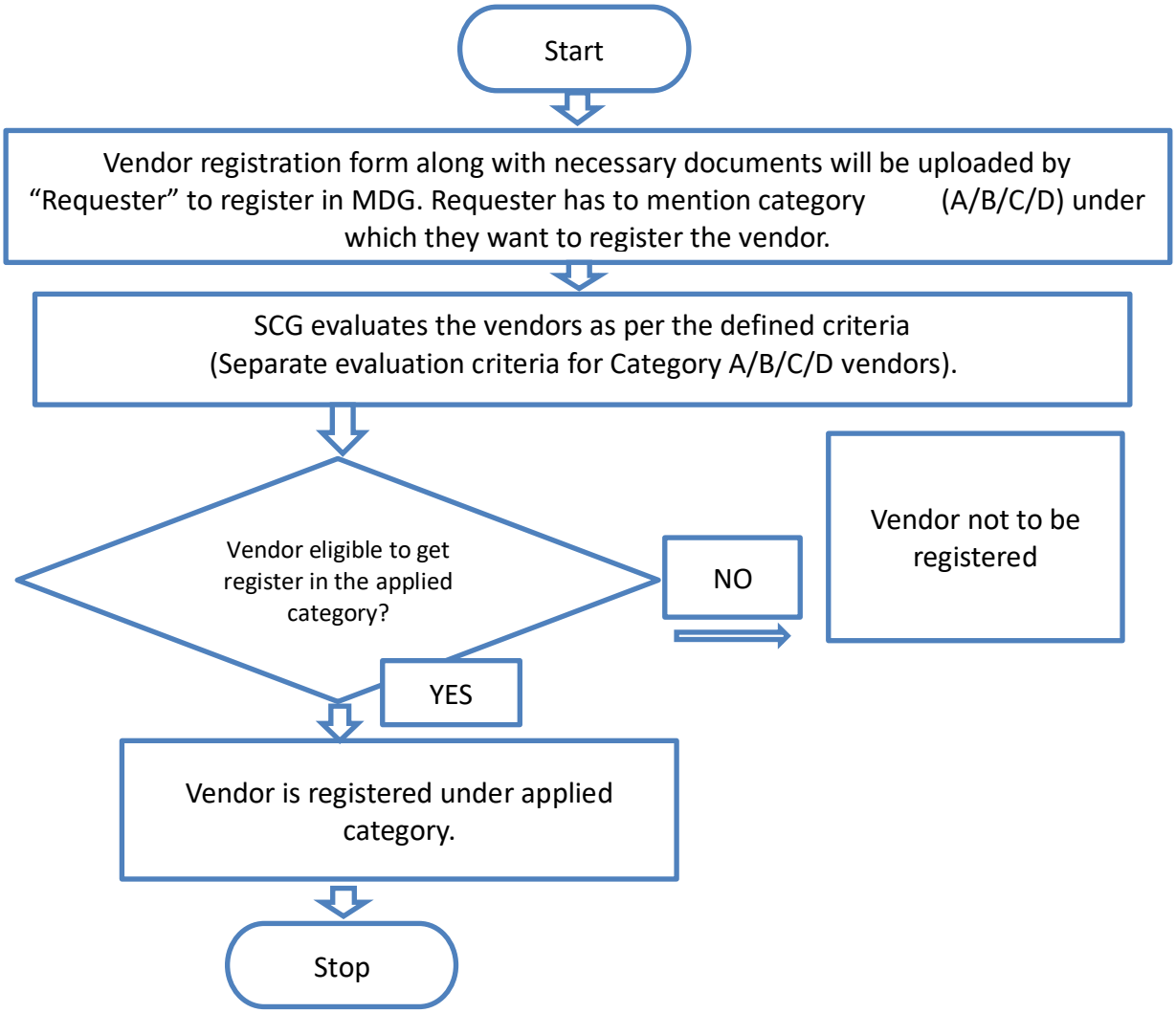
Otherwise the RFQ will be attached only with Safety Terms and Conditions. Long term and low value jobs (see definition) are exempted from the CSCC process.

Corporate Contracts will collect duly filledCSM-F7 Safety Competency Form along with the bid. All other stakeholders will also put their efforts to get all relevant safety data during meeting / discussions with the vendor. SCG will evaluate the document as per the CSM-F9 Safety bid evaluation criteria. If any specific condition related to Contract is required to convey to contractor, Site safety team will attach the same as Annexure for specific conditions of job and submit it to contract team along with safety bid evaluation form. Commercial bid of contractor will be considered for evaluation by contract team only if contractor is qualified in safety bid. Site Safety Management Plan, defining the complete procedure of executing the job at site will be signed by the contractor and SCG after mutual agreement. CC will attach a copy of site safety Management Plan and any specific condition of contract along with PO to the successful bidder. Please refer Appendix 6: Process Flow Chart for issuing RFQ and PO significant health and safety risk associated with it.

5.3 Safety Performance Evaluation

During the time of job execution, regular site inspection will be carried out by the Tata Power officials and violations will be dealt as per CSM–F4 Safety Violation Penalty Criteria. Apart from this, monthly safety performance of the contractor will be evaluated based on the predetermined criteria as per CSM-F11 safety Performance Score and monthly score will be maintained by the Order Manager. Certain percentage of each running bill will be retained as Safety Retention amount and will be released on the basis of Safety Performance Score at certain intervals as defined in CSM- F-3- Safety Performance Evaluation Criteria. Please refer Appendix 10: Process Flow Chart for Safety Performance Evaluation. Percentage of retention amount is mentioned in safety terms and conditions.

Appendix 1: Process Flow Chart for Vendor Registration



Appendix 2: CSM-F-1 Safety Category Qualification form

1. "**Safety Category Qualification Form**" is part of vendor registration form. It needs to be filled by the contractor at the time of Registration and should submitted to Requester / order manager with all relevant documents.
2. The same will be evaluated by Safety Concurrence Group of the Division (SCG) as per the criteria given in CSM-F-5.
3. Information provided by contractor will be verified during site visit.

Safety Category Qualification Form

Please Consider my application for

Category A Vendor: Vendor eligible to carry out Very High- and High-risk O&M jobs
Category B Vendor: Vendors eligible to carry out technical jobs, classified as Medium / low risk
Category C Vendor: Vendors eligible for to carry out low or very low risk administrative and office jobs
Category D vendor: All Consultants, Medical Practitioners or vendors taking job from Tata Power and working from their own premises.

<table>
<tr><td colspan="4">Name of the Vendor:</td></tr>
<tr><td>Sr. No</td><td>Safety Information</td><td>Remarks</td><td>Attachment</td></tr>
<tr><td>1</td><td>Certified for
i. OHSAS 18001/ ISO 45001,
ii. ISO: 14001
iii. ISO: 9001
(ISO certificates to be issued from reputed accreditation agencies specified by Tata Power)</td><td>i. Y/ N
ii. Y/ N
iii. Y/ N</td><td>Attach copy of the certification</td></tr>
<tr><td>2</td><td>Safety Statistics for Last Three (3) Years
- LTIFR
- LTISR</td><td>Yes/No</td><td><table><tr><td></td><td>Year 1 (Last FY)</td><td>Year 2</td><td>Year 3</td></tr><tr><td>LTIFR</td><td></td><td></td><td></td></tr><tr><td>LTISR</td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>3</td><td>Do you have Safety Policy?</td><td>Yes/No</td><td>Attach copy of the safety policy.</td></tr>
<tr><td>4</td><td>Do you have Safety training process?</td><td>Yes/No</td><td>Attach safety training process.</td></tr>
<tr><td>5</td><td>Do you have Safety organization structure e.g. Safety Officers and Safety Committees?</td><td>Yes/No</td><td>Attach copy of the safety organization structure.</td></tr>
<tr><td>6</td><td>Name and address of sites where work is in progress or worked earlier</td><td>Yes/No</td><td>Site details to be attached for inspection by Officials.</td></tr>
</table>

Signature :
Name and Designation :
Stamp of Organization :

Appendix 3: Safety Terms and Conditions

Please refer the attached document Safety Terms and Conditions.

Appendix 4: CSM- F-3- Safety Performance Evaluation Criteria

1. A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. The retention amount will be calculated based on contract value as below.

Contract Value	Retention Amount (%)
Up to 10 Lakhs	2.5
10 – 50 lakhs	2
0.5 to 10 Cr	1.5
>10 Cr	1

2. The evaluation criteria include Lead Indicators such as CFSA (Contractor Field safety Audit) score, percentage of workers trained in TPSDI, inspection of critical equipment. Lag indicators such as Fatalities, LWDC and man days lost.
3. The retention amount saved will go to a separate Safety Improvement Fund.
4. For the contract value of more than Rs 1 Cr or contract duration more than 12 months, the retention amount shall be released half yearly based on safety performance. For all remaining contracts, the retention amount will be released with the final bill.
5. Long term jobs with low value (Less than Rs. 1 Cr.) are exempted from the safety retention. Invoice of these type of jobs can be cleared without safety retention.
6. In case of job stoppage due to safety violations / unsafe observations at the site, no time extension shall be given to the contractor, if such delays are attributable to contractor.
7. In case of fatality, limb loss or loss of property, vendor must pay for liability, legal, statutory and additional mutually agreed settlement charges imposed by the appointed committee. This charge is over and above the retention amount.
8. The committee will finalize an amount between 5 -50 lakhs based on factors such as advise by statutory authorities, contract value and impact of accident etc.
9. Safety performance bonus 1% (limiting to 50 lakhs) of the invoice value will be considered at the end of the job if the contractual safety performance score 100%.
10. During the progress of the work, concerned Supervisor/Engineer will visit and inspect the work site regularly and evaluate the safety performance of the contractor based on matrix attached herewith and apply the Consequence management policy as applicable.
11. Order Manager, divisional chief and SBU head have the authority to terminate the contract in case of three consecutive serious violations.

Safety Performance Evaluation report- CSM-F-3

	Lead Indicators	Unit Of measurement	Target	weight age
1	% of Employee certified in TPSDI/Authorized agency	%	50%	10
2	CFSA score (Annexure 6.1)	Average Severity of Violations	1.49	20
3	Monthly inspection completed by contractor for Critical Equipment, lifting Tools & Tackles and hand tools used at site as per Tata Power Checklist	%	80	5
4	Revalidation of Condition of tools, tackles and equipment by Order Manger.	%	100	15
	Lag Indicators			
1	Number of Fatalities	No.	0	30
2	Number of Lost workday case (LWDC)	No.	0	10
3	Man-days Lost	No.	0	10

Appendix 5: CSM- F-4 Safety Violation Penalty Criteria

Penalty shall be imposed on the contractors under the following circumstances for breaching the contractual agreements:

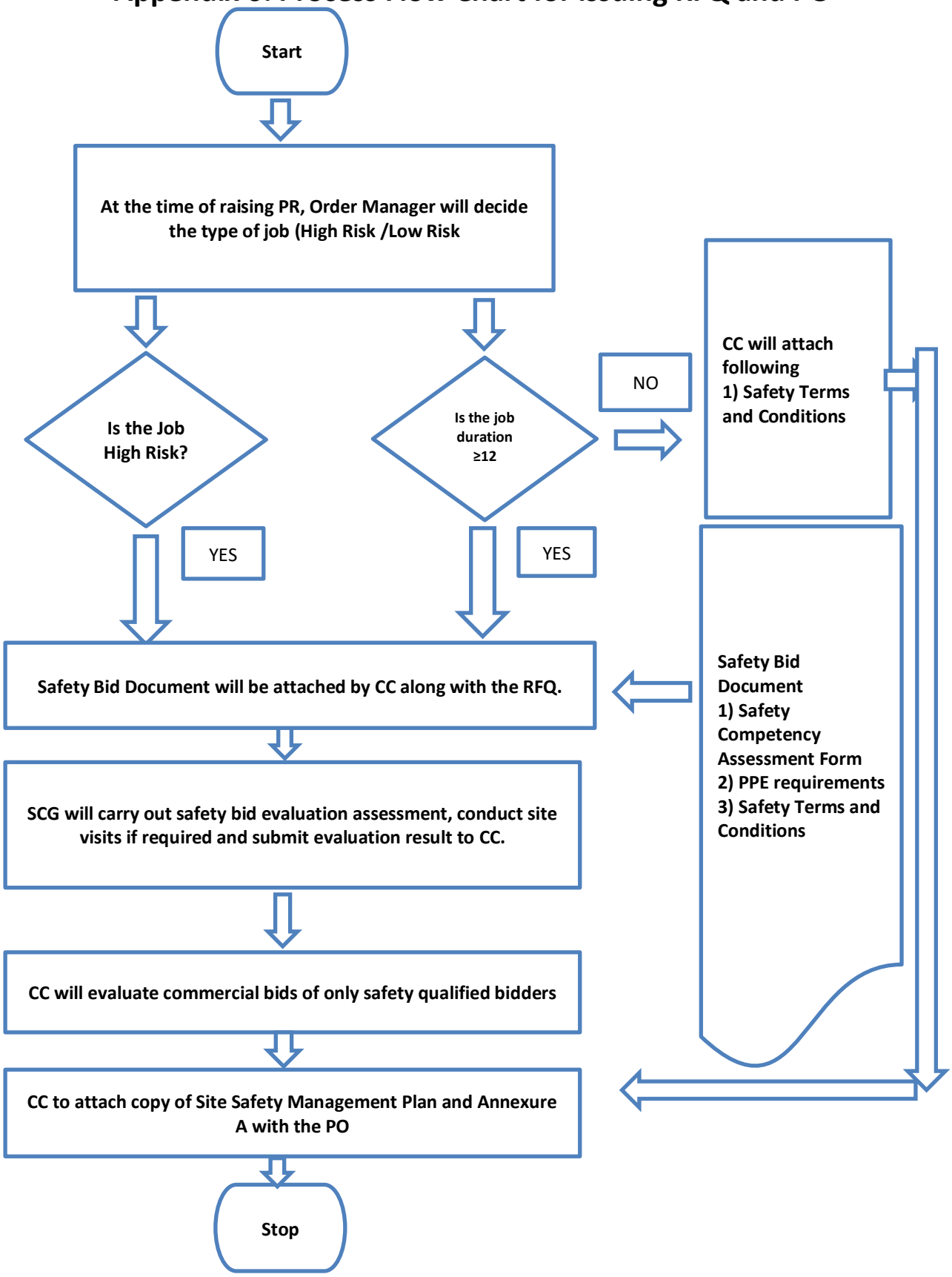
Sr No	Description of violation	Severity	Penalty
1.	Working without Permit	5	5000/-
2.	Untrained (TPSDI) worker on high-risk jobs.	5	5000/-
3.	Unhygienic/Bad condition of PPE	2	250/-
4.	Not following Tata Power Procedure & Standard	4	2000/-
5.	Unsafe Act/Condition of Severity 4	4	2000/-
6.	Unsafe Act/Condition of Severity 5	5	5000/-
7.	No Earthling of Electrical equipment	5	5000/-
8.	Damaged welding cable	5	5000/
9.	Violation of Positive Isolation Procedure (LOTO Not followed)	5	5000/
10.	ELCB of more than 30 mA/ELCB not working	5	5000/
11.	On/Off switch of welding m/c not working	5	5000/
12.	Electric cable tied with metal wire	5	5000/
13.	Leakage found DA hose / cylinder	5	5000/
14.	Use of LPG	5	5000/
15.	Use of IC engine based Three-wheeler at the work site.	5	5000/
16.	Starting the job without Toolbox Talk	5	5000/
17.	Spatter falling on DA hose / Gas-line/ pathways / Equipment	5	5000/
18.	No safety latch in crane hook	5	5000/
19.	Load raised or swung over people or occupied areas of buildings	5	5000/
20.	Persons standing in swing area of construction equipment.	5	5000/
21.	Using damaged slings.	5	5000/
22.	Unstable scaffolding/nonstandard Scaffolding in use	5	5000/
23.	Handrails and mid-rails are missing	5	5000/
24.	Safety Harness not anchored with lifeline/fixed structure	5	5000/
25.	Fall arrestor not provided/ Not being used.	5	5000/
26.	Double lifeline not used for working at height	5	5000/
27.	No rubber mat in Electrical Distribution (DB) room	4	2000/-
28.	Water found accumulated in Electrical Distribution room/near welding machine.	4	2000/
29.	Inserting electric cables into socket, without using plug.	4	2000/
30.	Use of damaged electrical cable/two core cables.	4	2000/
31.	Inflammable material found in Distribution Room / welding areas.	4	2000/
32.	Loose material falling into excavated pit	4	2000/
33.	Water logging into excavated pit /trenches	4	2000/

34.	No / inadequate Barricade	4	2000/
35.	Undercut / cave-in found on sides of excavated pits	4	2000/
36.	Grinding wheel/ Coupling/ Piling winch/other rotating parts without guard	4	2000/
37.	The HMV/Mobile Crane operator does not have a valid HMV driving license.	4	2000/
38.	The loading area is not leveled properly.	4	2000/
39.	Ladder not anchored at top	4	2000/
40.	Opening found in working platform of scaffolding/floor	4	2000/
41.	Inadequate illumination at the working area	4	2000/
42.	Loose material lying on Gantry, platform	4	2000/
43.	Cleaning with Compressed Air.	3	500/-
44.	Gas Cylinders using without cap.	3	500/
45.	Gas Cylinders stored without securing	3	500/
46.	Bringing inside any other chemicals, apart from approved by Safety dept.	3	500/
47.	Using drum for sitting or accessing height.	3	500/
48.	Misusing emergency facilities like fire hydrant line/ hose box/ spray system/ eye wash etc.	3	500/
49.	No provision of Safety net where falling materials or tools may occurs	3	500/
50.	Taking electrical supply from non-designated outlet (other than socket).	3	500/
51.	Restricted gangways due to unwanted materials.	3	500/
52.	Not reporting incident.	3	500/
53.	Entering into restricted area like switch yard/ hazardous storage	3	500/
54.	Work without supervision	3	500/
55.	Parking of vehicle without applying wheel choke at right front-front and left rear-rear wheels other than passenger cars.	3	500/
56.	Heavy Vehicle without helper or co-driver.	3	500/
57.	Not wearing florescent safety jacket at site.	3	500/
58.	People travelling in load body of vehicle.	3	500/
59.	Parking of vehicles at non designated area.	3	500/
60.	Shifting heavy materials without guide ropes.	3	500/
61.	Using other than 24V lamp inside the confined space/Use of other than 24V lamps.	3	500/
62.	Angular loading/ lifting with Crane or hoist.	3	500/
63.	By passing the limit switch/ Safety Interlock.	3	500/
64.	Housekeeping activities on road without proper barricade.	3	500/
65.	Trying to board or alit from running vehicle.	3	500/
66.	Cylinder Valves of Gas cylinders not closed when not in use.	3	500/
67.	Flash-back arrester not used.	3	500/

68.	Hand Trolley wheel found damaged.	3	500/
69.	Guy ropes of required length on both sides of object are not used during movement with load.	3	5/ 00/
70.	Scotch block/wedge not provided, when the vehicle is parked.	3	500/
71.	Suitable Trolley not provided to hold the cylinders.	3	500/
72.	Locked First Aid box	3	500/
73.	Caution boards, danger signs (luminescent /red) along with emergency contact number are not found displayed.	3	500/
74.	Person found jumping barricading tape	3	500/
75.	Stacking of pipes, pile casing, drums without chock blocks/wedges	3	500/
76.	The terrain on which Heavy Equipment/Machinery moves is not reasonably hard.	3	500/
77.	Without Safety Helmet at working sites	4	250/-
78.	Without Crash Helmet (on bikes)	4	500/-
79.	Without Full body double lanyard Safety Harness (for work at height)	5	5000/-
80.	Without Hand gloves - Material Handling, Welding, Cutting,	4	100/-
81.	Without Safety goggles/ face shield - Welding/Cutting /Grinding	5	5000/-
82.	Handling Chemical without PVC Apron	5	5000/-
83.	Smoking in prohibited area (Closed Go-downs, Storage of flammable material, Storage of Gas cylinders)	5	1000/-
84.	Sleeping at Workplace	3	100/-
85.	Driving beyond speed limit	3	1000/-
86.	Seat Belt While Driving (for front seat passengers and driver)	3	500/-
87.	Driving without license	4	1000/-
88.	Heavy Commercial vehicles without reverse horn	3	500/-
89.	Nonfunctional Head light/ taillight and side indicators	3	100/-
90.	Using Mobile Phone During Driving	5	5000/-
91.	Poor visibility of registration number/ without registration number	3	100/-
92.	Broken/ without Side view mirror	3	100/-
93.	Over speeding above specified limit	3	500/-
94.	Broken/ Without Pressure gauge on Oxygen/ LPG / Acetylene cylinder.	3	500/-
95.	Without Flash back arrestor on Industrial Acetylene & Oxygen cylinders.	5	5000/-
96.	Spillage of hazardous material/chemicals during transportation	4	2000/-
97.	Electrical equipment without Earthing/ ELCB/ Double Insulation Cable.	5	5000/-

98.	Lifting Tools & Tackles used without/ expired Test Certificates.	5	5000/-
99.	Housekeeping repeatedly not maintained		
100.	• First Time	3	Warning
101.	• Second Time	4	1000/-
102.	• Third Time	5	5000/-
103.	Serious Violation of House Keeping (after 1st or 2nd warning to be decided by Project Manager depending on the severity)	5	Rs.10000/- and above
104.	Repeat Violation of same nature	5	5 X Penalty for Violation
105.	Appointment of subcontractor without his Safety Bid Evaluation and/or without the permission of engineer in charge or Order manager.	5	5% of Contract Value

Appendix 6: Process Flow Chart for issuing RFQ and PO



Appendix 7: CSM-F-7 Safety Competency Form (Template)

Name of the Vendor/Bidder : -

Name of the Sub Vendor (If job is given to Sub Vendor) : -

Description of the Job : -

Request for Quotation (RFQ) No. :-

Vendor/Bidder to mandatorily provide the below safety competency related information.

1. Proposed Manpower Deployment Schedule : -

Category of Manpower Deployed	Minimum Qualification & Experience	Proposed Numbers against each category month-wise			
		Month 1	Month 2	…	Month n
Project Manager					
Site-In-Charge (Site Manager)					
Shift-in-Charge					
Safety Officers					
Supervisors					
Technicians					
a……					
b……					
Highly Skilled Workmen					
a……					
b……					
Skilled Workmen					
Semi-Skilled Workmen					
Unskilled Workmen					
Total Manpower					

Instructions to Bidder to fill:

1. Bidder to provide the overall site manpower deployment schedule as above.
2. Bidder to indicate (through colour code mentioned below) their direct and sub-contracted employees

Direct bidder employee
Partly Direct / Partly sub-contracted
Sub-Contracted

3. Against each of the category, bidder to indicate the minimum qualification and experience of the proposed manpower.
4. Rows can be added to also identify other specialised manpower e.g. specific details to be included for high risk activities operators
5. Columns can be extended to the actual duration of Site activities.
6. Bidder to note that if operations is in shifts, then Shift-in-charge / safety officers are required for each shift of operation.

2. List of Tools, Tackles, Machines and Equipment: -

Bidder/ Vendor to provide the list of tools, tackles, equipment **to be used during the job / project execution**. Bidder/Vendor to ensure that all the lifting tools and tackles, pressure vessels are duly certified by the competent person authorised by the Chief Inspector of Factories of the respective state prior to start of the job

Sr. No.	Description of Tools / Tackles	Capacity / Rating	Quantity	Make	Remarks
1					
2					
3					
4					
5					
6					
7					
...					

3. Safety Records:

Bidder to provide the details of fatalities and lost workday cases (LWDC), occurred in last three years (data to be provided for the last completed FY and preceding 2 years).

Description	Safety Data for Last 3 Years		
	Year 1 (Last FY)	Year 2	Year 3
	20__ - __	20__ - __	20__ - __
Fatalities (Nos.)			
Lost Workday Cases (Nos.)			

In case of no fatalities, LWDC during any year, the form may be filled stating NIL against the respective year. Bidders are encouraged to also submit the RCA / incident investigation reports and the learning's implemented out of the above reported incidents

4. Job Safety Plan/ Method Statement:

Bidder to provide / enclose a detailed Site/Job Safety Plan along with a Method statement detailing the execution philosophy (how the bidder intends to execute the Job/Project), identifying all key activities which are required to be performed by the contractor at Site. Bidder to also list down all high-risk activities and provide the Hazard Identification and Risk Assessment (HIRA) for all such high-risk activities involved in the site work.

(Use Method Statement template attached as annexure A and sample as attachment B)

5. Management System Certification: -

Sr.	Certification	Yes / No	If Yes, Year of Certification	If No, Target date for Certification
	ISO 9001			
	ISO 14001			
	OSHAS 18001 / ISO 45001			
	Any other (please specify……			
Note: Please attach certificates to support above. In case not accredited for above but applied for, application letters may be attached.				

Appendix 8: CSM-F-8 PPE requirements

The Contractor shall ensure that the following PPE of Approved standards shall be available at all time and shall be used by his employees with no exception whatsoever.

1	All contractor's employees at site	Safety Florescent Jacket (orange color), Safety helmet & safety shoes with Composite or steel toe cap
2	Workers mixing asphalt, cement, lime / concrete	Safety goggle & protective Hand gloves and footwear, Nose mask.
3	Welders / Grinders	Welding screen/goggles, safety shoes, leather hand gloves, aprons, leg guard
4	Stone breaker	Protective goggle, hearing protection, anti-vibration hand gloves and Protective clothing.
5	Electricians	Rubber hand gloves & Electrical resistant shoes.
6	Workers engaged in insulation using glass wool etc.	Respiratory mask & leather Hand gloves, goggles.
	Workers engaged in coal handling plant, ash handling plant and working in high dust area.	Dust mask, Hand gloves, protective goggles.
7	Workers working at a height of 1.8 Meter or above.	Double lanyard full body harness, fall arrestor and safety net made of reinforced nylon fiber ropes firmly supported with steel structures

• **PPE shall be conforming to BIS/DGMS/DIN specifications, in good condition and shall be comfortable to his employees, when used.**

Appendix 9: CSM- F-10 Site Safety Management Plan / Method Statement

Site Safety Plan / Method Statement (Template)

This Method Statement describes the specific safe working methods which will be used to carry out the described work. It gives details of work procedure with control measures to counter health and safety issues related to this work. The listed content of this Method Statement can be changed/modified subjected to job scope / specifications, but task specific method statement once finalized & approved, that should not be modified during work execution without permission from the approving authority.

Project/Job Name			
Scope of work: -			
Drawing References: -			
Detail of Sub contractors involved: -			
Method Statement Prepared By: - Designation: - (e.g. Site Manager)		Signature	Date

1.0 Introduction (*Describe purpose of the work, give details of type and scope of work being carried out);*

2.0 Location of Work (*Give site address and precise location on site where work is to be carried out.)*

3.0 Safety Document /Specific Approval Required (Details of any safety documents or specific approval i.e. Client specific approval required to undertake the work)

5.0 Role & Responsibilities of Personnel/Parties Involved in activities: -Clearly define role and responsibilities of all personnel involved in activity i.e. Site management staff including subcontractors' parties- Main contractor Project/Site Manager, Sub Contractor Site Manager, Project Engineer, Safety officer, Competent Supervisory Staff)

6.0 Working/Activity Description: - It *is important that all operatives should have clear idea of those operational sequences and responsible supervisor must verify their competency prior to their engagement in operation.*

6.1 Pre-Working Checks

6.2 Resources (Equipment, tools including manpower) Details *i.e. Equipment and Tools, specific operational equipment, test kits, lifting resources, Details of materials to be used in operation, including any reference to COSHH assessments in case of use of any chemicals, Details of the manpower allocated to the task, e.g. titles, qualifications, competences, direct manpower, contractors. Details of plant, tools and equipment to be used for the work, including the availability of relevant statutory documents, checks or inspections etc. Details of fencing, barriers, cones, chains, dangers notices, warning signs etc.*

Tools required for work:

Sr.No	Tools /Equipment /Machine	UOM	Required Qty.	Remark
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

6.4 Operational Sequence of work: - *Full description of the work, setting out the methodology in a sequential manner, including any reference to any identified operational restraints. Also refer here sec. 5.0 responsibilities part for every step of work sequence).*

Sr.No	Activity	Details of job sequence	Risk Involved	Control Checks
1.		1.		
2.				
3				
4				
5.				

6.7 Final Checks & restoration of work area after completion of work :- *Those checks to be carried out by responsible supervisor in witness of his line hierarchy by use of specific checklist of certain operational checks and once those completed satisfactory, PTW (if applicable) to be closed and isolation arrangements to be restored by removing barricades/cautionary tags.*

7.0 Task Specific Hazards: - *Refer to Task Specific Risk Assessment and attach in appendix*
Attachment: - Specific Risk Assessment
In addition, please provide below control measures in risk assessment *(as applicable).*

Fall Protection Measures: (Where Work at height cannot be avoided)							
Control Measures for Electrical Hazards							
Others Hazard if any (please provide details)							
Hazardous Substances to be used in job : (Attach MSDS if required)							
	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No

7.0 Emergency Provisions: -*Relevant operational possibility of a programme in the case of emergency situation i.e. electrical supply restoration. In addition emergency response provisions i.e. first aiders, fire fighting, and first aid arrangements, nearest onsite/offsite emergency response also to be considered during emergency planning.*

8.0 "5S issues" / Waste Disposal/ Housekeeping and Environmental issues: -*Details waste disposal processes and or housekeeping activities, Details of environmental impacts and control measures.*

9.0 Personal Protective Equipment (PPE):- (*Tick on PPE requirements for the task/Job*

Required Personnel Protective Equipment:	 Safety Boots	 Hard Hats	 Safety Gloves	 Hearing Protection	 Eye Protection	 Respiratory Protection	Other: 1. Hi-Viz 2. Coveralls 3.

10.0 First Aid facilities and Nearby Hospitals Details

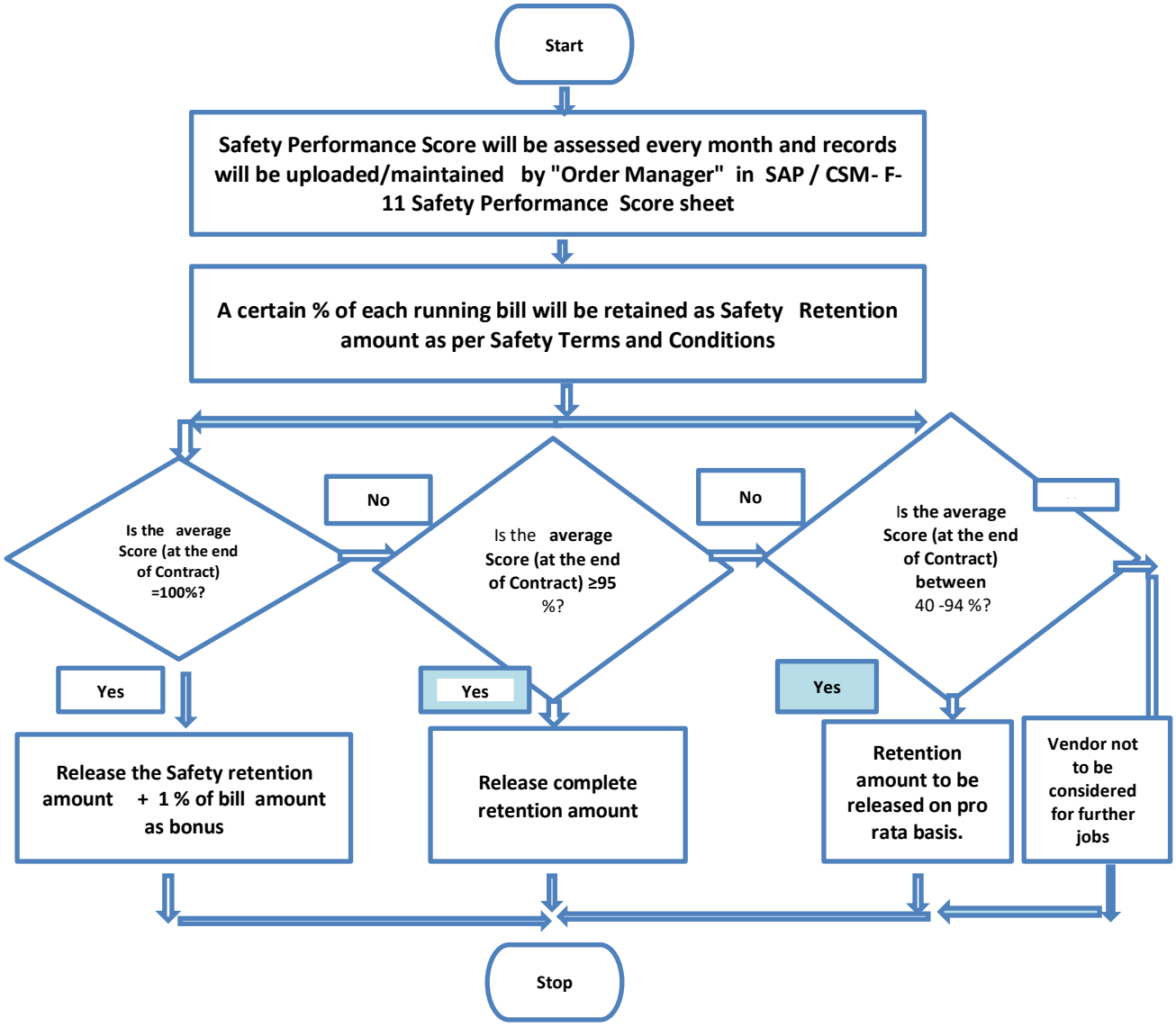
	First Aid Facilities:	Name of On-Site First Aider:	
		First Aid Box Location:	
		Location of Nearest Hospital:	

11.0 Occupational Health, Fitness and COVID-19 related Preparedness:

1. Please give a brief writeup / methodology of your organization planned to avoid impact of the COVID-19 pandemic at Tata Power working site.

2. Please give brief details of occupational health and hygiene related interventions planned by your organisation to ensure good health and fitness of workforce at Tata Power site.

Appendix 10: Process Flow Chart for Safety Performance Evaluation



Appendix 11: CSM- F-11 Safety Performance Score

Sr. No	Parameter	Unit of Measurement	Target	Weightage	Actual Performance	Actual Score
Lead Indicator						
1	% of Employee certified in TPSDI/Authorized agency	Number	50%	10		
2	CFSA score (Annexure 6.1)	Average Severity of Violations	1.49	20		
3	Monthly inspection completed for Critical Equipment, lifting Tools & Tackles and hand tools used at site	Number	80%	10		
4	Condition of critical tools, tackles and equipment	Number	100%	10		
Lag Indicator						
1	Number of Fatalities	No	0	30		
2	Number of Lost workday case (LWDC) (reportable)	No	0	10		
3	Man-days Lost	Man-days	0	10		
					Final Score	
					Invoice Value	
					Amount to be released	

Safety Performance Evaluation Criteria

Lead Indicators

	Target			
% of Employee certified in TPSDI/Authorized agency	50%	100%	Less than 100%	
Score		10	5	
	Target			
CFSA score	<=1.49	1.5 to 2.5	2.51 to 3.5	>=3.51
Score	20	15	10	0
	Target			
Monthly inspection completed for Critical Equipment, lifting Tools & Tackles and hand tools used at site	>=80%	79 to 50%	<50%	
Score	10	7	0	
	Target			
Condition of critical tools, tackles and equipment	100%	<100%		
Score	10	0		

Lag Indicators

Number of Fatalities	0	>0	
Score	30	0	
Number of LWDC (reportable)	0	>0	
Score	10	0	
Number of man days lost	0	1 to 5	>5
Score	10	5	0

Appendix 12: CSM-F-5 Safety Potential Evaluation Criteria for Vendor Registration

At the time of vendor registration, vendor will be registered under 3 categories

1) **Category A**- Vendors eligible to carry out High risk Jobs
2) **Category B**- Vendors eligible to carry out technical jobs that are low risk
3) **Category C**- Vendors eligible to carry out administrative and office jobs
4) **Category D**- Outsourced Jobs / Consultants /Medical Practitioners / Suppliers etc

For vendors to be registered under **Category A**, a safety potential evaluation will be carried out based on following parameters.

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 45001/ OHSAS 18001/ Certification?	30		
2	During site visit check for safety adequacy at site	30		Annexure - 12.1
3	Check the Safety statistics of Contractor	10		Annexure - 12.2
4	Check the Safety orientation & training process of Contractor	15		Annexure 12.3
5	Check the organizational structure for safety professionals & engineers / supervisors.	10		Annexure - 12.4
6	Certified/skilled workers as a percentage of overall workforce	5		
	Total	100		

Evaluation Criteria for Category B

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 9001 certification?	30		
2	During site visit check for safety adequacy at site	30		Annexure -12.1
3	Check the Safety statistics of Contractor	10		Annexure -12.2

4	Check the Safety orientation & training process of Contractor	15		Annexure -12.3
5	Check the organizational structure for safety professionals & engineers / supervisors.	10		Annexure -12.4
6	Certified/skilled workers as a percentage of overall workforce	5		
	Total	100		

Evaluation Criteria for Category C

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 9001 certification?	40		
2	Check the Safety statistics of Contractor	40		Annexure - 12.2
3	Check the Safety orientation & training process of Contractor	20		Annexure - 12.3
	Total	100		

Annexure 12.1: Evaluation Criteria for Category D:

Category D does not require any evaluation as it is for outsourced job outside the Tata Power company premise.

Annexure 12.2

Check List – Adequacy of Safety Statistics of Service Provider			Actual Marks obtained	Remarks
1	Check the safety statistics for last 3 years (LTIFR and LTISR)	Statistics available: 5 Marks Statistics not available: 0 Marks		
2	Check the trend LTIFR for last 3 years	LTIFR value: 0 to 0.2 – 5 Marks; 0.21 to 0.3 – 2.5 Marks; >0.3 – 0 Marks		
3	Check the trend of LTISR last 3 years	LTISR value: 0 to 2 – 5 Marks; 2 to 3 – 2.5 Marks; >3 – 0 Marks		
4	Has there been any Prosecution/Conviction for any contravention with regard to Safety & Health provisions under the Factories Act /Electricity Act/ BOCW Act and Rules framed there under?	No Prosecution: 10 Marks; Prosecution: 0 Marks. To be provided in written on letter head		
	Total	**25**		

Annexure 12.3

Check List – Adequacy of Safety orientation & training process of Service provider			Actual Marks obtained
1	Records of safety trainings provided to safety officer/supervisor/workmen during last 1 year as percentage(%) of total employed by service provider	**Safety Officer** / Marks ≥80% of employees / 5 50 to 79 % of employee / 2.5 <50% / 0 **Safety Supervisor** / Marks ≥80% of employees / 10 50 to 79 % of employee / 6 <50% / 0 **Workmen** / Marks ≥80% of employees / 10 50 to 79 % of employee / 6 <50% / 0	
	Total	25	

Annexure 12.4

Check List – Adequacy of organizational structure for safety professionals & engineers / supervisors.			Actual Marks obtained
1	Check availability of number of safety officers from government recognized institute as per workforce strength.	Marks 1 in 50 employees / 10 1 in 100 employee / 6 Any other / 0	
3	Check availability of qualified workforce from government recognized institute/TPSDI.	Marks 100% of safety officers qualified / 5 50 – 99% of safety officers qualified / 3 <50 / 0	
	Total	15	

Appendix 13: CSM-F-9 Safety Bid Evaluation Criteria.

The User has to select whether the job is high risk/ long duration at time of raising the PR.

1) The decision whether job is "**high risk** "or not has to be made by order manager on the basis of Risk involved (Risk Priority Number in HIRA) of the Jobs. An indicative list of high-risk jobs is attached as annexure
2) If a technical job is of low risk with estimated duration of the contract is 1 year or more the job should be treated as "**long duration**".
3) All Safety bids will be evaluated by Safety Concurrence Group. Structure of SCG will be declared by Corporate safety. Corporate safety team will audit bid evaluation process of a few selected jobs and Quality of evaluated safety Bids.
4) Records of jobs sent by for Safety Bid evaluation shall be maintained by Corporate Contract team in existing tracing sheet along with other jobs.
5) For Safety Bid Evaluation will be based on following parameters.

		Minimum Requirement	**Weightage (%)**	**Score Obtained**
Manpower	**Safety Officer (1 per 500 workers)**	**Qualification-** Officer shall possess Advance Diploma In Industrial Safety by state technical board. **Experience**- Minimum 1-year experience in relevant field as mentioned in the job in PR.	5	
	Safety Supervisor (1 per work site up to max. 50 workers)	**Qualification-** Supervisor shall possess ITI/ Diploma in relevant field. **Experience**- Minimum 2-year experience in relevant field as mentioned in the job in PR. **Training** – Trained and certified by TPSDI or equivalent institute in relevant safety procedures. **Note:** On request of the contractor/Users -TPDSI should vet & certify the skilled & experienced	5	

		Technician if Technical Qualification is not adequate.		
	Technician (Skilled workers as electrician, rigger, fitter, welder, cable jointer, line men etc)	**Experience**- Minimum 2 year experience in relevant field as mentioned in the job in PR. **Training** – Trained and certified by TPSDI or equivalent institute in relevant safety procedures.	5	
Tools & Tackles	Equipment / Machines/ Tools & Tackles(lifting and shifting tools)	The list of Equipment /Machines / Tools and tackles to be used for job to be submitted by the contractor. Evaluation of the list will be carried out based on 1) Suitability as per the relevant job 2) Make and age of the tools from authorized agencies defined by the user. 3) Certification by the competent authority of respective state.	30	
Safety Records	Safety Records	Safety Records for last 3 years (as per vendor or as per our knowledge) – Recommendation?	15	
Safety Plan	HIRA/Contract Job Safety Plan	Adequacy of HIRA and Job Safety Plan with respect to relevant job. More weight age will be given to vendor for using mechanized work and advanced tools and equipment	20	
Accredited Bodies certificate	ISO-9001	ISO-9001	2	
	ISO-14001	ISO-14001	3	
	OHSAS 18001 ISO 45000	OHSAS 18001/ISO 45000	15	
		Total Score		

6) Vendor entitled to carry out the job only when qualified for the safety evaluation as follows:

Contractor is qualified in safety bid only if his total score is more than 70% in all category 1 jobs such as high risk/long duration.

7) The Corporate Contract has to ensure that the vendor provides the filled "Safety Competency Form" along with the quotation.
8) Corporate Contract will forward the Safety Competency Form received from the contractor to the Safety Concurrence Group for evaluation.
9) In case SCG wants to visit the site, the Safety Competency will be based on evaluation at the time of site visit Annexure 13.1

Annexure -13.1:

Checklist to be used: During site visit to check the adequacy Safety systems.			
		Observation	Score* (1-5)
1	Check the adequacy of safety policy and Safety Management system of the contractor.		
2	Does the contractor have written down safety procedures?		
3	Check the records of Near miss, unsafe act, unsafe conditions and incidents.		
4	Check the organization setup to implement the safety systems at site (safety officer, safety supervisor)		
5	Check whether safety meeting and toolbox talk carried out regularly and records maintained or not.		
6	Is the process of incident investigation adequate or not?		
7	Verify incident reporting and recording system		
8	Check the usage of equipment/tools and tackles.		
9	Check for housekeeping at site		
10	Check the use of PPEs and general behavior of workforce towards safety		
	Total Score		
	Site Visit Score		

Score*- rating on the scale of 1-5 to be given based on the observations on site. Score of 1 is the lowest and core of 5 is the highest.

Appendix 14: CSM-F-11.1 CFSA Format

CONTRACTOR FIELD SAFETY AUDIT

Project Name :

Date:

Description of Severity rating:		**Audit Team:**	
	1 = Untidy area, minor issues, sets poor example		
	2 = Restricted access, unacceptable trash, disorderly		
	3 = Rule or procedure violation, potential injury		
	4 = Unsafe condition, serious injury potential		
	5 = Immediate serious injury potential, stop activity immediately and correct	**Audit Time:**	10:00hrs -11:30 hrs
		Weather:	cloudy

	Description	**Responsible**		**Number Personnel Observed**		**Violations**			**Remarks**	Leading Indicators			
		Engineer	**Contractors**	**Good Citizens**	**Violators**	**Number of Violations**	**Severity**	**Violations x Severity**		4 & 5	PPE	Unsafe Act	Unsafe Condition
Area													
1													
	Sub Totals			**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**
	% of Observed People Working Safely												
	Number of Violations												
	Average Severity of Violations												
	Number of Severity 4 & 5 Violations												
	% of 4 & 5 Violations												
	Approximate Number of Workers Observed												
	Number of People on Site												
	% of Workers Observed												

Appendix 15: Indicative List of High-Risk Jobs

To access the exhaustive list of High-risk jobs, please refer the following documents

1) High Risk Jobs- Generation
2) High Risk Jobs- T&D
3) High Risk Jobs- Renewable

Indicative List of High-Risk Jobs -Generation Cluster					
Sl. No.	**Jobs**				
1	Demolition / Painting of Chimney				
2	Survey Sounding Jobs in Sea				
3	Dredging at Coal Birth Jetty				
4	Maintenance / Testing and Replacement of Extra High Voltage (132 KV etc.) Switchyard equipment				
5	Maintenance of EOT Cranes				
6	Deep excavation (5 feet or more) near existing buildings /Structure s				
7	Working inside confined spaces (entry through manhole)				
8	Operation Maintenance of elevators				
9	Working on Live control Circuits for identification of faults				
10	Cable laying and termination Jobs				

Indicative List of High-Risk Jobs - T&D Cluster					
Sl. No.	**Jobs**				
1	Transmission Line Tower Erection on columns, near live lines, In congested areas, In creeks, In the Sea				
2	Conductor Stringing on Tower Using Tensioner & Puller in the area such as Line Crossing, Near Live lines, Congested Areas, Road Crossing, Bridge Crossing, Railway line Crossing, In creeks ,In the Sea				
3	Cable Pulling by Using winch Machine in City and Rural Areas				
4	Hot Washing of HT and Extra HT lines, Towers and switchyards equipment				
5	Installation of Lifts				
6	Installation of EOT Cranes				
7	Tower Dismantling				
8	Working on H Frame /Pole mounted Transformers				
9	Excavation in operational Area heaving power cables in receiving station				
10	Identification and spiking of cable / disconnection of cables from poles				

Indicative List of High-Risk Jobs - Renewable Cluster					
Sl. No.	**Jobs**				
1	Working on Electrical Panels				
2	Hi Potting of Equipment				
3	Battery commissioning and maintenance				
4	Working on the nasal of Wind Turbine				
5	Working on live electrical switchyard, material Handling and Equipment installation				
6	Roof Top Solar Panels Installation and maintenance				
7	Working in live Electrical Switchyard, Material Handling, equipment installation				
8	All maintenance activities that requires climbing on Towers /Structures / Transformer/ GODs				
9	Loading and Unloading of Solar Panels on trucks				
10	Structural Repair /Dismantling work at height.				

Annexure IX

Tata Code of Conduct (TCoC)

TATA CODE OF CONDUCT

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available a tour website:

https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf

The Contractor is requested to bring any concerns regarding this to the notice of our Chief Procurement & Stores e-mailID: pravin.jain@tpcentralodisha.com.

TATA CODE OF CONDUCT 2015

LEADERSHIP THAT INSPIRES

For over 100 years, the Tata group has been led by visionaries who have stayed true to the vision of the founder, Jamsetji Tata.
A vision that placed the greater good of society at par with business growth.
A vision that put into practice pioneering social initiatives that changed the way responsible business was run.
And a vision that brought into the group a strong social conscience.

We do not claim to be more unselfish, more generous or more philanthropic than other people. But we think we started on sound and straightforward business principles, considering the interests of the shareholders our own, and the health and welfare of the employees, the sure foundation of our success.

Jamsetji Tata
Founder of the Tata group
Chairman (1868 – 1904)

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FOREWORD

Tata companies have consistently adhered to the values and ideals articulated by the Founder for over 150 years. The Tata Code of Conduct was first formalized by Mr Ratan Tata. It articulates the Group's values and ideals that guide and govern the conduct of our companies as well as our colleagues in all matters relating to business. Today, the Code is a bedrock on which we base our individual, as well as leadership commitments to core Tata values.

The Tata Code of Conduct outlines our commitment to each of our stakeholders, including the communities in which we operate, and is our guiding light when we are sometimes faced with business dilemmas that leave us at ethical crossroads. The Code is also dynamic in that it has been periodically refreshed in order to remain contemporary and contextual to the changes in law and regulations. However it remains unaltered at its core.

Our stellar reputation and success as a business entity has been defined by the powerful commitment and adherence to the core values and principles expressed in this Code, by all our employees, directors and partners. I trust every Tata colleague and Tata company will continue to not only comply with the laws and regulations that govern our business interests around the world, but will continue to set new standards of ethical conduct that will generate deep respect and inspire emulation by others.

N. Chandrasekaran
21st February, 2017

A. OUR VALUES

TATA has always been values-driven. The five core values that underpin the way we conduct our business activities are:

INTEGRITY

We will be fair, honest, transparent and ethical in our conduct; everything we do must stand the test of public scrutiny.

UNITY

We will invest in our people and partners, enable continuous learning, and build caring and collaborative relationships based on trust and mutual respect.

RESPONSIBILITY

We will integrate environmental and social principles in our businesses, ensuring that what comes from the people goes back to the people many times over.

PIONEERING

We will be bold and agile, courageously taking on challenges, using deep customer insight to develop innovative solutions.

EXCELLENCE

We will be passionate about achieving the highest standards of quality, always promoting meritocracy.

These universal values serve as the foundation for the Tata Code of Conduct. They find expression within the value system of every Tata company.

B. SCOPE AND PURPOSE OF THIS CODE

1. This Code sets out how we behave with:
   - our employees, or those who work with us;
   - our customers;
   - the communities and the environment in which we operate;
   - our value-chain partners, including suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents;
   - our joint-venture partners or other business associates;
   - our financial stakeholders;
   - the governments of the countries in which we operate; and
   - our group companies.
2. In this Code, "we or us" means our company, our executive directors, officers, employees and those who work with us, as the context may require.
3. The term "our group companies" in this Code typically means companies Tata Sons intends for this Code to apply to, and / or to whom Tata Sons has issued this Code.
4. This Code sets out our expectations of all those who work with us. We also expect those who deal with us to be aware that this Code underpins everything we do, and in order to work with us they need to act in a manner consistent with it.

REMEMBER...

It is our commitment to protect our reputation and our brand equity by adhering to the values and principles set out in this Code. By doing so, we strengthen our unique culture and identity.

OUR CORE PRINCIPLES

The Tata philosophy of management has always been, and is today more than ever, that corporate enterprises must be managed not merely in the interests of their owners, but equally in those of their employees, of the consumers of their products, of the local community and finally of the country as a whole.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

C. OUR CORE PRINCIPLES

1. We are committed to operating our businesses conforming to the highest moral and ethical standards. We do not tolerate bribery or corruption in any form. This commitment underpins everything that we do.
2. We are committed to good corporate citizenship. We treat social development activities which benefit the communities in which we operate as an integral part of our business plan.
3. We seek to contribute to the economic development of the communities of the countries and regions we operate in, while respecting their culture, norms and heritage. We seek to avoid any project or activity that is detrimental to the wider interests of the communities in which we operate.
4. We shall not compromise safety in the pursuit of commercial advantage. We shall strive to provide a safe, healthy and clean working environment for our employees and all those who work with us.
5. When representing our company, we shall act with professionalism, honesty and integrity, and conform to the highest moral and ethical standards. In the countries we operate in, we shall exhibit culturally appropriate behaviour. Our conduct shall be fair and transparent and be perceived as fair and transparent by third parties.
6. We shall respect the human rights and dignity of all our stakeholders.
7. We shall strive to balance the interests of our stakeholders, treating each of them fairly and avoiding unfair discrimination of any kind.
8. The statements that we make to our stakeholders shall be truthful and made in good faith.
9. We shall not engage in any restrictive or unfair trade practices.
10. We shall provide avenues for our stakeholders to raise concerns or queries in good faith, or report instances of actual or perceived violations of our Code.
11. We shall strive to create an environment free from fear of retribution to deal with concerns that are raised or cases reported in good faith. No one shall be punished or made to suffer for raising concerns or making disclosures in good faith or in the public interest.
12. We expect the leaders of our businesses to demonstrate their commitment to the ethical standards set out in this Code through their own behaviour and by establishing appropriate processes within their companies.
13. We shall comply with the laws of the countries in which we operate and any other laws which apply to us. With regard to those provisions of the Code that are explicitly dealt with under an applicable law or employment terms, the law and those terms shall take precedence. In the event that the standards prescribed under any applicable law are lower than that of the Code, we shall conduct ourselves as per the provisions of the Code.

REMEMBER...

"Good faith" means having a reasonable belief that the information you have provided is truthful. It does not mean having 'all the evidence' about the potential violation or case reported.

OUR EMPLOYEES

Once you got the best people, the people who shared our values and ideals, we left them free to act on their own. We do not fetter them. We encourage them and give them opportunities for leadership.

J.R.D. Tata
Chairman, Tata Sons (1938 – 1991)

D. OUR EMPLOYEES

Equal opportunity employer

1. We provide equal opportunities to all our employees and to all eligible applicants for employment in our company. We do not unfairly discriminate on any ground, including race, caste, religion, colour, ancestry, marital status, gender, sexual orientation, age, nationality, ethnic origin, disability or any other category protected by applicable law.
2. When recruiting, developing and promoting our employees, our decisions will be based solely on performance, merit, competence and potential.
3. We shall have fair, transparent and clear employee policies which promote diversity and equality, in accordance with applicable law and other provisions of this Code. These policies shall provide for clear terms of employment, training, development and performance management.

Q&A

A job requirement entails extensive travel. One of the candidates has excellent relevant experience and qualifications. However, this candidate is a single parent. As a result, I feel such a situation would significantly hinder this candidate's ability to cope with the job requirement. What should I do?

In accordance with the Code, the decision to recruit an employee should be based upon merit. We cannot make a presumption that the candidate would not be able to meet the travel requirements of the job. All eligible candidates should be provided with equal opportunity to demonstrate or justify that they can cope with the travel requirements of the job. Being a single parent cannot be a ground to be discriminated against at any stage of recruitment or ongoing employment in our company.

REMEMBER...

We do not tolerate harassment in any form and therefore we expect every employee to discourage such misdemeanours in the workplace.

Dignity and respect

4. Our leaders shall be responsible for creating a conducive work environment built on tolerance, understanding, mutual cooperation and respect for individual privacy.
5. Everyone in our work environment must be treated with dignity and respect. We do not tolerate any form of harassment, whether sexual, physical, verbal or psychological.
6. We have clear and fair disciplinary procedures, which necessarily include an employee's right to be heard.
7. We respect our employees' right to privacy. We have no concern with their conduct outside our work environment, unless such conduct impairs their work performance, creates conflicts of interest or adversely affects our reputation or business interests.

Human rights

8. We do not employ children at our workplaces.
9. We do not use forced labour in any form. We do not confiscate personal documents of our employees, or force them to make any payment to us or to anyone else in order to secure employment with us, or to work with us.

Bribery and corruption

10. Our employees and those representing us, including agents and intermediaries, shall not, directly or indirectly, offer or receive any illegal or improper payments or comparable benefits that are intended or perceived to obtain undue favours for the conduct of our business.

REMEMBER...

Violation by even a single employee of any law relating to anti-bribery, anti-corruption, anti-competition, data privacy, etc. could result in severe financial penalties and cause irreparable reputational damage to the company.

Gifts and hospitality

11. Business gifts and hospitality are sometimes used in the normal course of business activity. However, if offers of gifts or hospitality (including entertainment or travel) are frequent or of substantial value, they may create the perception of, or an actual conflict of interest or an 'illicit payment'. Therefore, gifts and hospitality given or received should be modest in value and appropriate, and in compliance with our company's gifts and hospitality policy.

Freedom of association

12. We recognise that employees may be interested in joining associations or involving themselves in civic or public affairs in their personal capacities, provided such activities do not create an actual or potential conflict with the interests of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

REMEMBER...

As a general rule, we may accept gifts or hospitality from a business associate, only if such a gift:

- has modest value and does not create a perception (or an implied obligation) that the giver is entitled to preferential treatment of any kind;
- would not influence, or appear to influence, our ability to act in the best interest of our company;
- would not embarrass our company or the giver if disclosed publicly.

The following gifts are never appropriate and should never be given or accepted:

- gifts of cash or gold or other precious metals, gems or stones;
- gifts that are prohibited under applicable law;
- gifts in the nature of a bribe, payoff, kickback or facilitation payment*;
- gifts that are prohibited by the gift giver's or recipient's organisation; and
- gifts in the form of services or other non-cash benefits (e.g. a promise of employment).

(*'Facilitation' payment is a payment made to secure or speed up routine legal government actions, such as issuing permits or releasing goods held in customs.)

Working outside employment with us

13. Taking employment, accepting a position of responsibility or running a business outside employment with our company, in your own time, with or without remuneration, could interfere with your ability to work effectively at our company or create conflicts of interest. Any such activity must not be with any customer, supplier, distributor or competitor of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

Integrity of information and assets

14. Our employees shall not make any wilful omissions or material misrepresentation that would compromise the integrity of our records, internal or external communications and reports, including the financial statements.

15. Our employees and directors shall seek proper authorisation prior to disclosing company or business-related information, and such disclosures shall be made in accordance with our company's media and communication policy. This includes disclosures through any forum or media, including through social media.

16. Our employees shall ensure the integrity of personal data or information provided by them to our company. We shall safeguard the privacy of all such data or information given to us in accordance with applicable company policies or law.

17. Our employees shall respect and protect all confidential information and intellectual property of our company.

18. Our employees shall safeguard the confidentiality of all third party intellectual property and data. Our employees shall not misuse such intellectual property and data that comes into their possession and shall not share it with anyone, except in accordance with applicable company policies or law.

19. Our employees shall promptly report the loss, theft or destruction of any confidential information or intellectual property and data of our company or that of any third party.

Q&A

I am an accountant in the finance department of my company. Due to my artistic skills, I received an offer to pen cartoons for a children's publication for which I would receive compensation. I plan to undertake this activity during week-ends. What should I do before accepting this offer?

Before accepting the offer, you should ascertain whether the company policies and rules require you to make a disclosure to your supervisor so that the company may determine whether your undertaking this activity adversely affects our company's interests. On confirmation from the company that it does not do so, you would be free to take up the activity. It is also your duty to bring to the attention of the company whenever there is any change in the situation you have disclosed.

20. Our employees shall use all company assets, tangible and intangible, including computer and communication equipment, for the purpose for which they are provided and in order to conduct our business. Such assets shall not be misused. We shall establish processes to minimise the risk of fraud, and misappropriation or misuse of our assets.

21. We shall comply with all applicable anti-money laundering, anti-fraud and anti-corruption laws and we shall establish processes to check for and prevent any breaches of such laws.

Insider trading

22. Our employees must not indulge in any form of insider trading nor assist others, including immediate family, friends or business associates, to derive any benefit from access to and possession of price sensitive information that is not in the public domain. Such information would include information about our company, our group companies, our clients and our suppliers.

Q&A

Our company has recently announced the launch of a new business initiative. In connection with this, your friend who is a journalist with a leading business newspaper has asked you to provide some information that he could cover in his forthcoming article. He has promised not to quote you, or reveal your identity. Should you be giving him this information?

No. You should not be sharing information of this nature with the media, even if it is assured that the source would remain anonymous. Only authorised personnel in the company are permitted to speak to the media and provide information of this nature.

Our company has a "Use of Social Media" policy that lays down the "dos and don'ts" for use of social media even if you may access such media on your own time. Why is there such a policy?

External communication is a serious matter. It must be carefully managed because information put out with reference to our company or its businesses needs to be clear, truthful and not violate any undertakings we have given to other parties. In each business there are managers nominated to authorise and make different types of statements to the outside world. These managers should be consulted about any request for information you may receive or information you think we should give out.
In using social media, in particular blogs or social networking sites, you should exercise great caution while talking about our company or the business we do. It may feel like you are chatting with friends or expressing a personal opinion but even while doing so you cannot share any confidential information of our company.

REMEMBER...

We must respect the property rights of others by never misusing their assets, intellectual property or trade secrets, including the copying or downloading of unauthorised software, trademarks, copyrighted material or logos. We should never make unauthorised copies of computer software programs or use unlicensed personal software on company computers.

Prohibited drugs and substances

23. Use of prohibited drugs and substances creates genuine safety and other risks at our workplaces. We do not tolerate prohibited drugs and substances from being possessed, consumed or distributed at our workplaces, or in the course of company duties.

Conflicts of interest

24. Our employees and executive directors shall always act in the interest of our company and ensure that any business or personal association *including close personal relationships* which they may have, does not create a conflict of interest with their roles and duties in our company or the operations of our company. Further, our employees and executive directors shall not engage in any business, relationship or activity, which might conflict with the interest of our company or our group companies.

25. Should any actual or potential conflicts of interest arise, the concerned person must immediately report such conflicts and seek approvals as required by applicable law and company policy. The competent authority shall revert to the employee within a reasonable time as defined in our company's policy, so as to enable the concerned employee to take necessary action as advised to resolve or avoid the conflict in an expeditious manner.

26. In the case of all employees other than executive directors, the Chief Executive Officer / Managing Director shall be the competent authority, who in turn shall report such cases to the Board of Directors on a quarterly basis. In case of the Chief Executive Officer / Managing Director and executive directors, the Board of Directors of our company shall be the competent authority.

Q&A

You are responsible for maintaining our company's customer database. One of your friends is starting a business venture and requests you to share a few particulars from this database for marketing purposes of his business. He assures you that he would keep the data as well as his source confidential. Should you do so?

No. You should respect the confidentiality of customer information and not share any part of the database with any person without due authorisation.

You have access to revenue numbers of different business units of our company. While having a conversation with you over evening drinks, your friend enquires about the financial performance of our company. You do not share detailed information with your friend, but share approximate revenue figures. Is this conduct of yours correct?

No, it is not. You are not permitted to share financial information of our company with others who do not need to know this information. Financial information should always be safeguarded and disclosed only on a need-to-know basis after obtaining requisite approvals. Sharing of any price sensitive information that is not generally available with the public could also lead to violation of applicable insider trading laws.

27. Notwithstanding such or any other instance of conflict of interest that exists due to historical reasons, adequate and full disclosure by interested employees shall be made to our company's management. At the time of appointment in our company, our employees and executive directors shall make full disclosure to the competent authority, of any interest leading to an actual or potential conflict that such persons or their immediate family (including parents, siblings, spouse, partner, children) or persons with whom they enjoy close personal relationships, may have in a family business or a company or firm that is a competitor, supplier, customer or distributor of, or has other business dealings with, our company.

REMEMBER...

A conflict of interest could be any known activity, transaction, relationship or service engaged in by an employee, his/her immediate family (including parents, siblings, spouse, partner, and children), relatives or a close personal relationship, which may cause concern (based upon an objective determination) that the employee could not or might not be able to fairly perform his/her duties to our company.

Examples of Potential Conflicts of Interest

A conflict of interest, actual or potential, arises where, directly or indirectly, an employee or executive director:

(a) engages in a business, activity or relationship with anyone who is party to a transaction with our company;

(b) is in a position to derive an improper benefit, personally or for any family member or for any person in a close personal relationship, by making or influencing decisions relating to any transaction;

(c) conducts business on behalf of our company or is in a position to influence a decision with regard to our company's business with a supplier or customer where a relative of, or a person in close personal relationship with, an employee or executive director is a principal officer or representative, resulting in a personal benefit or a benefit to the relative;

(d) is in a position to influence decisions with regard to award of benefits such as increase in salary or other remuneration, posting, promotion or recruitment of a relative or a person in close personal relationship employed in our company or any of our group companies;

(e) undertakes an activity by which the interest of our company or our group companies can be compromised or defeated; or

(f) does anything by which an independent judgement of our company's or our group companies' best interest cannot be exercised.

28. If there is a failure to make the required disclosure and our management becomes aware of an instance of conflict of interest that ought to have been disclosed by an employee or executive director, our management shall take a serious view of the matter and consider suitable disciplinary action as per the terms of employment. In all such matters, we shall follow clear and fair disciplinary procedures, respecting the employee's right to be heard.

Examples of activities normally approved (post-disclosure) as per applicable company policy

Acceptance of a position of responsibility (whether for remuneration or otherwise) in the following cases would typically be permitted, provided the time commitments these demand do not disturb or distract from the employee's primary duties and responsibilities in our company, and are promptly disclosed to the relevant competent authority:

(a) Directorships on the Boards of any of our group companies, joint ventures or associate companies.

(b) Memberships/positions of responsibility in educational/professional bodies, where such association will promote the interests of our company.

(c) Memberships or participation in government committees/bodies or organisations.

Q&A

You are in a relationship with a colleague who has been recently moved into your team and would now be reporting to you. What should you do?

Romantic or close personal relationships with another employee where a reporting relationship exists and one is responsible for evaluating the other's performance, is likely to create a conflict of interest. In such a situation, you would need to report the potential conflict to your supervisor.

Your company is submitting a proposal to a company in which you were previously employed. You have confidential information pertaining to your previous employer, which you believe will help your present employer in winning the contract. Should you share this information?

No. You should not share this information with your company since it relates to confidential information of a third party. Your company respects its employees' duty to protect confidential information that they may have relating to their previous employers.

You are the purchasing manager in the procurement department of your company. You receive an invitation from a supplier to attend a premier sporting event as her guest. This particular supplier is one of the vendors who has submitted a proposal for an open tender issued by your company. Should you accept the invitation?

No. You should not accept the invitation in this instance. Since you are in a key decision-making role for the tender, any unusual benefit that you receive could be perceived as an inducement that could compromise your objectivity.

OUR CUSTOMERS

We have continued to enjoy prosperity, even with adverse times to fight against. Our relations with all concerned are the most friendly. We have maintained the same character for straight-forward dealing with our constituents and customers. Our productions have continued to be of the same high quality, and therefore command the best reputation and realise the highest prices. … I mention these facts only to point out that with honest and straight-forward business principles, close and careful attention to details, and the ability to take advantage of favourable opportunities and circumstances, there is a scope for success.

Jamsetji Tata
Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

E. OUR CUSTOMERS

Products and services

1. We are committed to supplying products and services of world-class quality that meet all applicable standards.
2. The products and services we offer shall comply with applicable laws, including product packaging, labelling and after-sales service obligations.
3. We shall market our products and services on their own merits and not make unfair or misleading statements about the products and services of our competitors.

Export controls and trade sanctions

4. We shall comply with all relevant export controls or trade sanctions in the course of our business.

Fair competition

5. We support the development and operation of competitive open markets and the liberalisation of trade and investment in each country and market in which we operate.
6. We shall not enter into any activity constituting anti-competitive behaviour such as abuse of market dominance, collusion, participation in cartels or inappropriate exchange of information with competitors.
7. We collect competitive information only in the normal course of business and obtain the same through legally permitted sources and means.

Dealings with customers

8. Our dealings with our customers shall be professional, fair and transparent.
9. We respect our customers' right to privacy in relation to their personal data. We shall safeguard our customers' personal data, in accordance with applicable law.

Q&A

You are the Regional Sales Manager of our company. You have become a member of an "informal group", on an instant messaging service, whose members are the regional sales heads of our company's competitors. The administrator of the group has requested an in-person meeting to informally discuss market conditions and brainstorm on "pricing strategy" from an industry perspective. What should you do?

Any meeting with competitors, especially to discuss "pricing strategy", could be an attempt to promote an anti-competitive practice or manipulate prices. You should respond by declining this invitation and exiting the "informal group". You should also report this incident to your supervisor and your Legal department.

You are attending a customer meeting with a colleague, and your colleague makes an untruthful statement about the company's services. What should you do?

You should assist your colleague in correcting the inaccuracy during the meeting if possible. If this is not possible, raise the issue with your colleague after the meeting to enable him/her or the company to correct any misrepresentation made to the customer.

While working on a customer project, you receive a call from your colleague. He used to manage that customer account before you took over his role. He recalls that he had worked with the customer on developing a new ordering system which he thinks would be beneficial for another customer and requests you to send him the project details. What should you do?

You must not share this information without specific approval of the customer; you are not permitted to use a customer's assets, including software, for another customer or for any personal use.

REMEMBER...

Striving for excellence in the standards of our work and in the quality of our goods and services is a core Tata value. It is the unwavering practice of this value that builds and sustains customer trust in our brand.

OUR COMMUNITIES AND THE ENVIRONMENT

> In a free enterprise, the community is not just another shareholder in business but is in fact the very purpose of its existence.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

F. OUR COMMUNITIES AND THE ENVIRONMENT

Communities

1. We are committed to good corporate citizenship, and shall actively assist in the improvement of the quality of life of the people in the communities in which we operate.
2. We engage with the community and other stakeholders to minimise any adverse impact that our business operations may have on the local community and the environment.
3. We encourage our workforce to volunteer on projects that benefit the communities in which we operate, provided the principles of this Code, where applicable, and in particular the 'Conflicts of Interest' clause are followed.

The environment

4. In the production and sale of our products and services, we strive for environmental sustainability and comply with all applicable laws and regulations.
5. We seek to prevent the wasteful use of natural resources and are committed to improving the environment, particularly with regard to the emission of greenhouse gases, consumption of water and energy, and the management of waste and hazardous materials. We shall endeavour to offset the effect of climate change in our activities.

OUR VALUE-CHAIN PARTNERS

If we had done some of the things that some other groups have done, we would have been twice as big as we are today. But we didn't, and I would not have it any other way.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

(on the pace of expansion of the Tata group in the 1960s and 70s)

G. OUR VALUE-CHAIN PARTNERS

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

Q&A

You head the procurement function in our company. You have tight budgetary constraints for a project that you are working on. In order to complete the project within the targeted costs, you intend to request your supplier to provide you an exceptional discount on this project order on the understanding that you would "make it up to him" in future orders. Would you be violating the Code?

Yes, you would. Inducement in any form, including future benefits to the supplier, could compromise your ability to act objectively and in the best interests of the company and therefore must be avoided.

REMEMBER...

Our value-chain partners would include our suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents; joint-venture partners and other business associates.

OUR FINANCIAL STAKEHOLDERS

Ethical behaviour in business – in every sphere and with all constituents – has been the bedrock on which the Tata group has built, and operates, its enterprises. This has been an article of faith for the group ever since its inception, a fundamental element of our cherished heritage and the essence of our way of life.

Ratan Tata
Chairman, Tata Sons (1991 – 2012)

H. OUR FINANCIAL STAKEHOLDERS

1. We are committed to enhancing shareholder value and complying with laws and regulations that govern shareholder rights.
2. We shall inform our financial stakeholders about relevant aspects of our business in a fair, accurate and timely manner and shall disclose such information in accordance with applicable law and agreements.
3. We shall keep accurate records of our activities and shall adhere to disclosure standards in accordance with applicable law and industry standards.

GOVERNMENTS

Business, as I have seen it, places one great demand on you; it needs you to impose a framework of ethics, values, fairness and objectivity on yourself at all times. It is not easy to do this; you cannot impose it on yourself forcibly because it has to become an integral part of you.

Ratan Tata
Chairman, Tata Sons (1991 – 2012)

I. GOVERNMENTS

Political non-alignment

1. We shall act in accordance with the constitution and governance systems of the countries in which we operate. We do not seek to influence the outcome of public elections, nor to undermine or alter any system of government. We do not support any specific political party or candidate for political office. Our conduct must preclude any activity that could be interpreted as mutual dependence/favour with any political body or person, and we do not offer or give any company funds or property or other resources as donations to any specific political party, candidate or campaign.

   Any financial contributions considered by our Board of Directors in order to strengthen democratic forces through a clean electoral process shall be extended only through the Progressive Electoral Trust in India, or by a similar transparent, duly-authorised, non-discriminatory and non-discretionary vehicle outside India.

Government engagement

2. We engage with the government and regulators in a constructive manner in order to promote good governance. We conduct our interactions with them in a manner consistent with our Code.

3. We do not impede, obstruct or improperly influence the conclusions of, or affect the integrity or availability of data or documents for any government review or investigation.

OUR GROUP COMPANIES

I do not think anyone was on par with Jamsetji as an industrial visionary. But that is not the sole reason why I have been an admirer of Jamsetji. The major reason was his sense of values, sterling values, which he imparted to this group. If someone were to ask me, what holds the Tata companies together, more than anything else, I would say it is our shared ideals and values which we have inherited from Jamsetji Tata.

J.R.D. Tata
Chairman, Tata Sons (1938 – 1991)

J. OUR GROUP COMPANIES

1. We seek to cooperate with our group companies, including joint ventures, by sharing knowledge, physical resources, human and management resources and adopting leading governance policies and practices in accordance with applicable law including adherence to competition law, where relevant.
2. We shall strive to achieve amicable resolution of any dispute between us and any of our group companies, through an appropriate dispute resolution mechanism so that it does not adversely affect our business interests and stakeholder value.
3. We shall have processes in place to ensure that no third party or joint venture uses the TATA name/brand to further its interests without proper authorisation.
4. Our Board of Directors shall consider for adoption policies and guidelines periodically formulated by Tata Sons and circulated to group companies.

Q&A

You are in the process of selecting potential vendors for an IT project in our company. In the final shortlist of two companies, one is a new start-up with limited references and a lower price-quotation, while the other is a Tata company with thirty years of implementation experience and good references, but a marginally higher quote for the same job. With all other parameters of choice being nearly equal, which company should you select for the job?

While price is undoubtedly an important criterion for decision making, it is clearly not the only one to be evaluated. You may also need to consider good customer references, proven track record and shared value systems in order to decide on your IT partner.

You are in the process of selecting potential vendors for a project. One of the three finalists is a group company. In reviewing the final proposals, you rank the group company second out of the three proposals based on pricing and total cost of ownership, and select the first-ranked vendor. Is this the right decision?

Yes. You should select the vendor that, on its own merits, is the vendor that is most appropriate for your company's requirements. You should not select a group company only because of its affiliation.

RAISING CONCERNS

We encourage our employees, customers, suppliers and other stakeholders to raise concerns or make disclosures when they become aware of any actual or potential violation of our Code, policies or law. We also encourage reporting of any event (actual or potential) of misconduct that is not reflective of our values and principles.

Avenues available for raising concerns or queries or reporting cases could include:

- immediate line manager or the Human Resources department of our company
- designated ethics officials of our company
- the 'confidential reporting' third party ethics helpline (if available)
- any other reporting channel set out in our company's 'Whistleblower' policy.

We do not tolerate any form of retaliation against anyone reporting legitimate concerns. Anyone involved in targeting such a person will be subject to disciplinary action.

If you suspect that you or someone you know has been subjected to retaliation for raising a concern or for reporting a case, we encourage you to promptly contact your line manager, the company's Ethics Counsellor, the Human Resources department, the MD/CEO or the office of the group's Chief Ethics Officer.

My supervisor has asked me to do something which I believe may be illegal. I am afraid if I do not do what I am told, I could lose my job. Should I do it?

No. Breaking the law is never an option. Discuss the situation with your supervisor to be certain that you both understand the facts. If your concerns are not resolved, contact a higher level supervisor, the Ethics Counsellor, the Legal department or report them via the company's confidential reporting system, if available.

I feel that my supervisor is treating me unfairly for reporting a concern to the Ethics Counsellor. What should I do?

Retaliation against anyone who raises a concern is a violation of the Code. You should therefore promptly report this action of your supervisor to the Ethics Counsellor or the MD/CEO of your company or via the company's confidential reporting system, if available.

ACCOUNTABILITY

This Code is more than a set of prescriptive guidelines issued solely for the purpose of formal compliance. It represents our collective commitment to our value system and to our core principles.

Every person employed by us, directly or indirectly, should expect to be held accountable for his/her behaviour. Should such behaviour violate this Code, they may be subject to action according to their employment terms and relevant company policies.

When followed in letter and in spirit, this Code is *'lived'* by our employees as well as those who work with us. It represents our shared responsibility to all our stakeholders, and our mutual commitment to each other.

SPEAK UP...

If you are unsure whether a particular action you are about to take is consistent with the principles set forth in the Code, ask yourself:

- Could it directly or indirectly endanger someone or cause them injury?
- Is it illegal/unlawful or out of line with our policies and procedures?
- Does my conscience reject it? Does it conflict with my personal values?
- Would I feel uncomfortable if the story appeared in the media? Would it shame my company, spouse, partner, parent or child?
- Does it 'feel' wrong?

If the answer to any of these questions is "Yes", please stop and consult your reporting manager, the Ethics Counsellor, the Human Resource department, the Legal department or any member of the senior management team, to assist you in making the decision.

When faced with a dilemma: Stop, Think, Act Responsibly

NOTE

The Code does not provide a comprehensive and complete explanation of all expectations from a company standpoint or obligations from a stakeholder standpoint.

Our employees have a continuing obligation to familiarise themselves with all applicable law, group-level advisories and policies, company-level policies, procedures and work rules as relevant. For any guidance on interpretation of the Code, we may seek support from our company's Ethics Counsellor or from the group's Chief Ethics Officer, as appropriate.

All joint ventures are encouraged to adopt the Tata Code of Conduct (TCOC) or a code of conduct that incorporates all elements of the TCOC.

This version of the Tata Code of Conduct supersedes all earlier versions and associated documents and stands effective from 29th July, 2015.

For any query or clarification on the Code, please contact the office of the group's Chief Ethics Officer via email at: ethicsoffice@tata.com.

TATA CODE OF CONDUCT – 2015

I acknowledge that I have received the Tata Code of Conduct.

I have read the Tata Code of Conduct and I acknowledge that as a Tata employee, I am required to comply with the guidelines described therein and failure to do so may subject me to action as per my employment terms and relevant company policies.

If I have a concern about a violation, or a potential violation of the Tata Code of Conduct, I understand that there are channels available to me in my company to report such concerns. By making use of these channels when necessary, I will play my part in maintaining the high ethical standards to which we hold ourselves.

Signature: _____

Date: _____

Name: _____

Department: _____

Address: _____

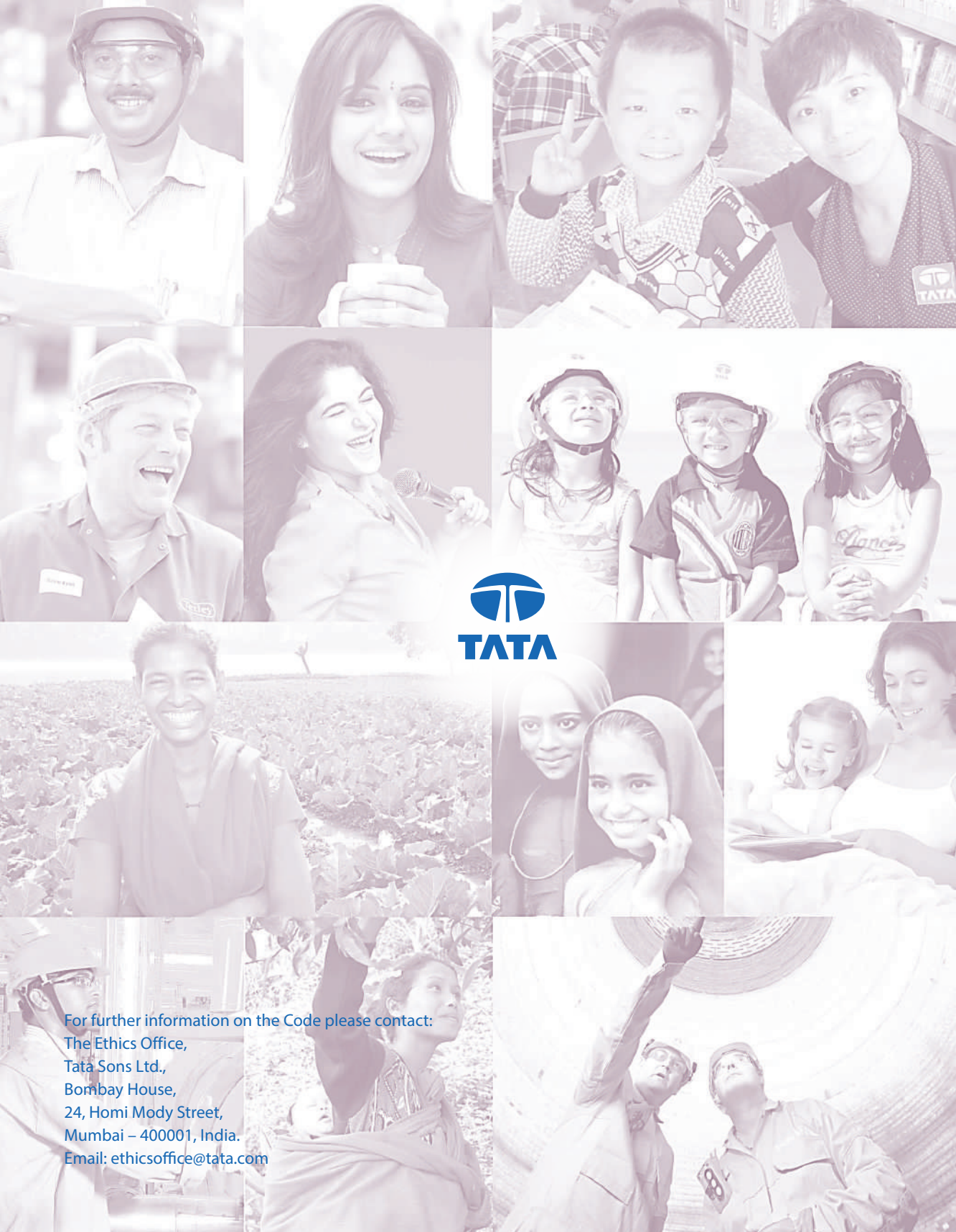
_____

_____

(Please submit this declaration to your Ethics Counsellor or the Human Resource department of your company.)

NOTES

NOTES



TATA

For further information on the Code please contact:
The Ethics Office,
Tata Sons Ltd.,
Bombay House,
24, Homi Mody Street,
Mumbai – 400001, India.
Email: ethicsoffice@tata.com

Annexure X

Environment & Sustainability Policy

ENVIRONMENT & SUSTAINABILITY POLICY

CORPORATE ENVIRONMENT POLICY

Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
  - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
  - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
  - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
  - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
  - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!