



**TP CENTRAL ODISHA DISTRIBUTION LIMITED**  
(A Tata Power & Odisha Govt. joint venture)  
Procurement Department  
2nd Floor, IDCO Tower, Janpath Bhubaneswar, Odisha 751022

NIT No.: TPCODL/P&S/204/2020-21

## **Open Tender Notification**

**for**

**SITC for UG cabling work across Railway line near Mancheswar  
Railway Station under BED, Bhubaneswar**

**Tender Enquiry No.: TPCODL/P&S/204/2020-21**

**Due Date for Bid Submission: 19.03. 2021 [15:00 Hrs.]**

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



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**Procurement Department**

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

**-: Steps for E-tender submission:-**

| Tender Enquiry No        | Work Description   | EMD (Rs.) | Tender Participation Fee (Rs.) | Last Date and Time for payment of Tender Participation Fee |
|--------------------------|--|-----------|--------------------------------|--|
| TPCODL/ P&S/ 204/2020-21 | SITC for Conversion of 33 KV over head feeder to UG cable across Railway line near Mancheswar Railway Station at Rangamatia under BED, Bhubaneswar | 4 Lakh    | 5,000/-                        | 03.03.2021,<br>15.00 Hrs                                   |

**Please note that corresponding details mentioned in this document will superseded any other details mentioned anywhere else in the Tender Document.**

**Step 1:**

The bidder can get primary information about the tender from the NEWSPAPER advertisement / TPCODL website (in case of open tender) / invitation through e-mail (in case of limited tenders)

**Step 2:**

First the prospective Bidder who intends to participate in an open tender should deposit the requisite tender fee as mentioned in the tender document through NEFT/ RTGS in the a/c of TPCODL as mentioned in the tender document. Deposit of the Tender fee should be made within the scheduled time for such deposit as indicated in the Tender document.

**Step 3:**

After deposit of the tender fee, the bidder should furnish the following information through e-mail to the contact person indicated in the tender document.

| Sl No | Description                               | Bidder's Response |
|-------|---|-------------------|
| 1     | Tender Enquiry No.                        |                   |
| 2     | Description of materials / Works Tendered |                   |
| 3     | Name of the bidding company               |                   |



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|    |   |  |
|----|---|--|
| 4  | Place & Detail Address of the Company   |  |
| 5  | Postal Code (PIN Code)  |  |
| 6  | Name of the authorized contact person of the Bidder                                       |  |
| 7  | Contact No./Mobile No. authorized person  |  |
| 8  | E-mail Id of the contact person   |  |
| 9  | Tender Fee details (Bank Name / Amount/NEFT-RTGS UTR No/ Date) (attach transaction proof) |  |
| 10 | GST No.   |  |

**Step 4:**

After receipt of the above information through e-mail, Vendor will get an invitation e-mail from ARIBA System which is the e-tendering platform of TPCODL. In this mail there will be an online link as Click Here to participate in the tender.

**Step 5:**

Click "Click Here" to access this event.

**Step 6:**

If you are 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.

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

**Step 7:**

Click Continue. The simple one-page registration screen will open for first time user. All\* mark mandatory field to be filled in.

**Step 8:**

You will be able to see the RFQ ( i.e Detail Tender document).

**Step 9:**

After review and downloading of all documents click on "Accept Review Pre-requisites" i.e acceptance of terms and conditions.

**Step 10:**



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Review and accept "Bidder Agreement".

**Step 11:**

You can see attached tender document in PDF format 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.)

**Step 13:**

Uploading of Price Bid

Price schedule is attached in envelope.3.1 of ARIBA. 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. For Price Bid put all the unit price and taxes and duties in provided field. Put "0" (ZERO) in not applicable field.

In addition, the bidder has to upload the editable form of the price bid in EXCEL format in envelope 3.2 of ARIBA system.

**Step 14:**

After uploading successfully Techno commercial offer and price part then click on "Submit Entire Response"

Note: Once user ID and password created, bidder can also login to ARIBA site through the following URL:

<https://service.ariba.com/Sourcing.aw/124997008/aw?awh=r&awssk=oxt0s1BN&dard=1>



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## 1.0 Event Information

### 1.1 Scope of work

Open Tenders are invited through e-tender bidding process from interested Bidders for entering into a Contracts as defined below :

| Line Item no. | Work Description  | EMD Amount (Rs.) | Tender Fee (Rs.) |
|---------------|---|------------------|------------------|
| 1.            | SITC for Conversion of 33 KV over head feeder to UG cable across Railway line near Mancheswar Railway Station at Rangamatia under BED , Bhubaneswar | 4 Lakh           | 5,000/-          |

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 19.02.2021 Onwards                                      |
| (b) | Date by which Interested and Eligible Bidder to pay Tender Fee and confirm participation as mentioned in "Procedure to Participate in Tender" | 03.03.2021, 15:00 Hrs  |
| (c) | Last Date of receipt of pre-bid queries, if any   | 08.03.2021 up to 15:00 Hours                                 |
| (d) | Last Date of Posting Consolidated replies to all the pre-bid queries as received  | 15.03.2021   |
| (e) | Last date and time of receipt of Bids through AIBA E-Tender Portal  | 19.03.2021 up to 15:00 Hours                                 |
| (f) | Date & Time of opening of Price of qualified bids   | Bidders Will be notified to successful bidder through e mail |

**Note :-** In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for 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.

### 1.4 Mandatory documents required along with the Bid

- 1.4.1 EMD of requisite value and validity
- 1.4.2 Tender Fee of requisite value
- 1.4.3 Price Bid as per the Price Schedule mentioned in Annexure-I (BOQ).



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- 1.4.4 Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document.
- 1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.
- 1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.
- 1.4.7 Duly signed and stamped "Acceptance Form for participation in Reverse Auction" As per Annexure VI on bidder's letter head.
- 1.4.8 Proper authorization letter/ Power of Attorney to sign the tender on the behalf of bidder.

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

### 1.5 Deviation from Tender

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

### 1.6 Right of Acceptance/ Rejection

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

- 1.6.1 EMD of requisite value and validity
- 1.6.2 Tender fee of requisite value
- 1.6.3 Price Bid as per the Price Schedule mentioned in Annexure-I (BOQ).
- 1.6.4 Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document.
- 1.6.5 Filled in Schedule of Deviations as per Annexure III
- 1.6.6 Filled in Schedule of Commercial Specifications as per Annexure IV
- 1.6.6 Acceptance Form for participation in Reverse Auction" as per Annexure VI
- 1.6.7 Receipt of Bid within the due date and time

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

### 1.7 Qualification Criteria

1. The bidder should have average annual turnover of **Rs. 05 Crore in last three years (FY 17-18, FY 18-19 and FY 19-20)**. Audited balance sheet, profit and loss account and auditors report from the statutory auditors of the company required.
2. Work Experience: Bidder should have **at least five years work experience of minimum 3 projects involving 33 kV / 11 kV UG cable supply and installation with a cumulative length of minimum 5 km**
3. Bidder must have all statutory compliance like valid PAN, ESI registration, EPF registration and GSTN registration.



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- Bidder should have a valid HT Electrical license issued by Govt. of Odisha for carrying out electrical works in Odisha Copy of license required. In case bidder is not having this license bidder shall submit an undertaking that in case they are successful bidder, license shall be obtained before execution of contract.

### 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

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on **overall all-inclusive price of tender BOQ** as calculated in Schedule of Items [Annexure I] .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.
- Bidder has to mandatorily quote as per schedule of item [Annexure-I]. 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 bidder prior to technical qualification. 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.





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### **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

2<sup>ND</sup> 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.**



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**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. Arabinda Sahu, AM- Procurement

Contact No: 9438319343

E-Mail ID: [arabinda.sahu@tpcentralodisha.com](mailto:arabinda.sahu@tpcentralodisha.com)

**Escalation Matrix**

Name: Mr. D.P. Das, Sr.GM-Procurement

Contact No: 9438297571



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E-Mail ID: [debaprasad.das@tpcentralodisha.com](mailto:debaprasad.das@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 Divisions (Packages) as per the Price schedule attached in Annexure I. Also bidder need to quote for all the items mentioned in each Division (Package) with a break up of prices for supply and erection of individual items and Taxes & duties. 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 denominated in any of the following form:



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- 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 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.



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

In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and TPCODL reserves the right to award other suppliers who are found fit.



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### 6.0 Order of Preference/Contradiction:

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

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

### 7.0 Post Award Contract Administration

#### 7.1.1 PRICE & TAXES

After finalization of tender, work order shall be issued on successful bidder. Prices shall remain firm till validity of contract. Within the validity of contract and as per requirement of material, release order shall be issued time to time. Any change in statutory taxes, duties and levies during the contract period shall be borne by TPCODL. However, in case of delay in work execution owing to reasons not attributable to TPCODL, any increase in total liability shall be passed on the BA, whereas any benefits arising owing to such statutory variation in taxes and duties shall be passed on TPCODL. Price shall remain firm and fixed and not subject to escalation till the execution of this contract, even if the completion/execution of the contract takes longer time than the specified period.

#### 7.1.2 SCOPE OF WORK

The scope of work shall include providing engineering drawing, GTP, shop testing, loading, unloading, transportation, supply of all the materials & equipments and installation, erection, commissioning & dismantling (if any) to complete the works in all respect. The details scope of work is mentioned at schedule of items (Annexure-I) & Scope of Work (Annexure-II). The quantities mentioned in schedule of items may vary from either side. In case of any changes envisaged in scope of work, at any given point of time during the contract execution period, prior approval may be taken from the Engineer In Charge. Billing to done as per actual requirement.

#### 7.1.3 COMPLETION PERIOD:

Time being the essence of the contract; the work shall be completed **within 4 Months maximum** from the date of issue of work order including supply of all the materials, erection, testing, dismantling (if any), Electrical inspection (if any) & commissioning. The work shall be treated as complete item wise when one item shall be complete in all respects with all mountings, fixtures and standard accessories which are normally supplied even though not specifically detailed in the specification.



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**7.1.4. ENGINEER IN CHARGE :-**

The SE, Electrical Circle, Bhubaneswar or his authorized representative of TPCODL shall be the Engineer in charge for the Project. All supervision, erection, testing at site and commissioning of the project shall be carried out in coordination with the Engineer in Charge along with project department.

**7.1.5. TERMS OF PAYMENT :-**

- A. 70% (Seventy percent) of contract price on pro-rata basis along with taxes and duties shall be paid progressively for each portion of proportionally completed items (Supply and erection at site only) of work as per the agreed Bill of Materials subject to certification by Purchaser's Engineer-in-charge.
- B. Balance 30% (Thirty percent) payment of the actual executed WO shall be paid after completion of acceptance test and Taking Over of the complete systems specified in the enquiry, including clearance of Electrical Inspection (if any), 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.

**7.1.5.1 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 in triplicate have been certified by Engineer-In-Charge on the basis of actual measurement of works.

**7.1.5.2. Bills & Invoices**

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 TPCODL, Idco Tower, Bhubaneswar

All Bills shall be supported by joint measurement of work done, quality test report, MDCC, Electrical inspection report (in case final bill) 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, GST 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.

**7.1.5.3 Payment & Statutory Deductions**



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Payment shall be released within **45 days** from the submission of the bills. The associate shall submit “No Demand Certificate” in the format as per Annexure-D of the tender specification at the time of receipt of full and final payment. 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.

**7.1.5.3.1 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.

**7.1.6. GUARANTEE:**

The materials to be supplied by the contractor shall be guaranteed for satisfactory operation against defects in design and workmanship for a **period of 24 months** for the work from the date of handing over the completed installations.

**7.1.7. RIGHT OF WAY :**

Right of way issues, if any, arising during execution of the works shall have no liability of TPCODL. These issues shall be settled at the sole discretion of the Contractor with compensation (if any). TPCODL shall however extend all possible help to the Contractor including discussion with the local authorities for early resolution of these issues.

**7.1.8. 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. 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.

**7.1.8.1 LD Waiver Request**

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

**7.1.9. CONTRACT PERFORMANCE BANK GUARANTEE:-**





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Within 30 days of issue of the Work Order, the Contractor shall submit Contract Performance Bank Guarantee issued by a scheduled Bank, in favour of TPCODL, covering **10% of the total value of the work order**. The Contract Performance Bank Guarantee shall remain valid for a period not less than 1 month over and above the guarantee period, basing on stipulated completion period in the W.O. towards security and acceptance thereof.

**7.1.10. SAFETY PRECAUTIONS:-**

All jobs are to be executed strictly in compliance to the Safety terms and Conditions of Tata Power. Please refer Safety terms and conditions for details. Violation of Safety norms will result in Penalty as mentioned in the document. Any compensation due on account of any type of accident at site shall be to the contractor's account.

**7.1.11. SETTLEMENT OF DISPUTES:**

- a) Any disputes arising out of this contract shall be referred by the CEO, TPCODL, who shall decide the case as sole arbitrator.
- b) For the purpose of dispute resolution, this agreement shall be governed by the provision of Arbitration and Conciliation Act, 1996.
- c) All disputes shall be subjected to exclusive jurisdiction of the Courts at Bhubaneswar and the writ jurisdiction of Hon'ble High Court of Odisha at Cuttack.

**7.1.12. WORKMAN COMPENSATION:**

The Contractor shall take out a comprehensive insurance policy under the Workman Compensation Act 1923, to cover such workers, who will be engaged to undertake the jobs covered under this Work Order and a copy of this insurance policy will be given to Engineer-in-charge solely for their information, reference and records and Official use. The Contractor shall ensure that such insurance policies are kept at all times valid.

**7.1.13. SUBMITTALS REQUIRED AFTER AWARD OF CONTRACT :**

The BA shall provide the following documents to the Project Department

Outline program of survey, production, inspection, testing, delivery, survey, erection, pre-commissioning and commissioning in chart form. Included in the program will be the detailed schedule of drawing to be submitted. Along with, the periodic progress report shall be submitted. The Drawings and Guaranteed Technical particulars (GTP), Type test report, QAP of all bought out material of approved make specified in the tender shall be submitted prior to inspection.

**7.1.14. INSPECTION:**



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i) PRE DISPATCH INSPECTION – The BA shall give advance notice for testing of all bought out materials as per approved make. The required DI shall be issued after which the BA shall lift the materials. The total quantity of each bought out material shall be inspected and delivered within maximum two lot. The contractor shall ensure that all the inspected materials along with intact seal at site and the same will be again cross checked and certified in the presence of Engineer in charge.

ii) POST DELIVERY & WORK INSPECTION – The Engineer in charge will inspect all required materials delivered at work site and will inspect the execution of work from time to time up to final completion.

iii) INSPECTION OF COMPLETED WORK – The work after due completion under the supervision of “The Engineer in Charge shall be inspect with the competent authority of Electrical Inspectorate, Govt. of Odisha (if any). All arrangement for this inspection shall be the responsibility of the BA. The statutory fees as applicable regarding Electrical Inspection for entire scope of work shall be deposited by TPCODL.

However, such Inspection and Testing shall not relieve Contractor of his obligation to execute the contract by letter of spirit. Any defects pointed out by the Electrical Inspector (if any), shall be corrected or attended by the BA at his own cost.

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

### 7.6 Climate Change

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

### 7.7 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.



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Any ethical concerns with respect to this tender can be reported to the following e-mail ID: [pravin.jain@tpcentraodisha.com](mailto:pravin.jain@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.



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**ANNEXURE I**

**Schedule for Items (BOQ)**

Rate to be quoted as per BOQ given below:

**SITC for UG cabling work across Railway line near Mancheswar Railway Station under BED,  
Bhubaneswar**

- Scope :
1. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable in open trench Method in RCC cable trench (565 x 4 x 2) = 4520 Mtr (Double CKT)
  2. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable under the railway track through HDD method (100 x 4 x 2) = 800 Mtr (Double CKT)
  3. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable at Canal Crossing (40 mtr ) (55 x 4 x 2) = 440 Mtr (Double CKT)
  4. Construction of 6 Pole structure with 12mtr long 150x150mm RS joist with Isolator provision = 2 Nos
  5. Dismantling of NBLS tower- 3 nos. and 220KV OC+6type tower - 2 nos.= Total 5 Nos with all fitting and its conductor



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| Sl. No. | Name of Materials                                  | Unit | Quantity | Unit Rate<br>(Excluding GST)<br>( Rs./Unit) | Unit GST<br>(Rs./Unit) | Unit Rate<br>(Including<br>GST)<br>(Rs./ Unit) | Total<br>Amount<br>( Rs.) |
|---------|--|------|----------|---|------------------------|--|---------------------------|
| a       | b  | c    | d        | e   | f                      | g= e+f   | h= dxg                    |
|         | <b>Supply of Materials</b>                         |      |          |   |                        |  |                           |
| 1       | EARTHING DEVICE 40 MM DIA X3 METER (LINE)          | EA   | 16       |   |                        |  |                           |
| 2       | G.I. FLATS 40 X 6 MM                               | KG   | 280      |   |                        |  |                           |
| 3       | R.S.JOIST 116 x 100 MM,10MTR/ 230KG (GI)           | KG   | 920      |   |                        |  |                           |
| 4       | COIL EARTHING                                      | EA   | 4        |   |                        |  |                           |
| 5       | GI STRANDED WIRE BARBED WIRE                       | KG   | 48       |   |                        |  |                           |
| 6       | R.S.JOIST150X150MM 12M LONG 415.2KG/<br>PIECE (GI) | KG   | 4982.4   |   |                        |  |                           |
| 7       | G.I. CHANNEL 100 X 50 X 6 MM CHANNEL               | KG   | 1200     |   |                        |  |                           |
| 8       | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL                | KG   | 550      |   |                        |  |                           |
| 9       | G.I. ANGLE 50 X 50 X 6MM                           | KG   | 410      |   |                        |  |                           |
| 10      | H.T. STAY SET COMPLETE                             | SET  | 6        |   |                        |  |                           |

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|    |   |    |      |  |  |  |  |
|----|---|----|------|--|--|--|--|
| 11 | GI STRANDED WIRE 7/10 SWG-7/3.25 MM     | KG | 90   |  |  |  |  |
| 12 | INSULATOR STAY HT                       | EA | 6    |  |  |  |  |
| 13 | LINE&SIDE STAY CLAMP 150X150 RS JST     | EA | 6    |  |  |  |  |
| 14 | INSU. DISC POLYMER 33KV B&S 90 KN       | EA | 240  |  |  |  |  |
| 15 | H/W/F, B/S 120 KN 33 KV                 | EA | 60   |  |  |  |  |
| 16 | PIN INSU. POLYMER 33KV 24MM FRP DIA     | EA | 24   |  |  |  |  |
| 17 | GI PIN&WASHER FOR PIN INSULATOR 33KV    | EA | 24   |  |  |  |  |
| 18 | ISOLATORS 33 KV 1250 A 25 KA WITHOUT ES | EA | 4    |  |  |  |  |
| 19 | Conductor- 570 SQR MM AAAC MOOSE        | M  | 400  |  |  |  |  |
| 20 | RED OXIDE PAINT                         | L  | 15   |  |  |  |  |
| 21 | ALUMINIUM PAINT                         | L  | 15   |  |  |  |  |
| 22 | ENAMEL PAINT BLACK                      | L  | 5    |  |  |  |  |
| 23 | GI BOLTS & NUTS ASSORTED DIMENSION      | KG | 300  |  |  |  |  |
| 24 | BOARD DANGER 33 KV                      | EA | 16   |  |  |  |  |
| 25 | CABLE 33 KV AL 1CX630 SQMM XLPE ARM     | M  | 5760 |  |  |  |  |



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|           |  |     |        |  |  |  |  |
|-----------|--|-----|--------|--|--|--|--|
| 26        | JT. KIT ST.TH. 33KV 1X630                          | EA  | 16     |  |  |  |  |
| 27        | JT. KIT 33KV 1X630 O/D                             | EA  | 24     |  |  |  |  |
| 28        | PIPE HDPE 110MM DIA PN8 PE 80                      | M   | 1280   |  |  |  |  |
| <b>29</b> | <b>Service/ Erection of Materials</b>              |     |        |  |  |  |  |
| 29.01     | EARTHING DEVICE 40 MM DIA X3 METER (LINE)          | EA  | 16     |  |  |  |  |
| 29.02     | G.I. FLATS 40 X 6 MM                               | KG  | 280    |  |  |  |  |
| 29.03     | R.S.JOIST 116 x 100 MM,10MTR/ 230KG (GI)           | KG  | 920    |  |  |  |  |
| 29.04     | COIL EARTHING                                      | EA  | 4      |  |  |  |  |
| 29.05     | GI STRANDED WIRE BARBED WIRE                       | KG  | 48     |  |  |  |  |
| 29.06     | R.S.JOIST150X150MM 12M LONG 415.2KG/<br>PIECE (GI) | KG  | 4982.4 |  |  |  |  |
| 29.07     | G.I. CHANNEL 100 X 50 X 6 MM CHANNEL               | KG  | 1200   |  |  |  |  |
| 29.08     | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL                | KG  | 550    |  |  |  |  |
| 29.09     | G.I.ANGLE 50 X 50 X 6MM                            | KG  | 410    |  |  |  |  |
| 29.10     | H.T. STAY SET COMPLETE                             | SET | 6      |  |  |  |  |



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|       |   |    |     |  |  |  |  |
|-------|---|----|-----|--|--|--|--|
| 29.11 | GI STRANDED WIRE 7/10 SWG-7/3.25 MM     | KG | 90  |  |  |  |  |
| 29.12 | INSULATOR STAY HT                       | EA | 6   |  |  |  |  |
| 29.13 | LINE&SIDE STAY CLAMP 150X150 RS JST     | EA | 6   |  |  |  |  |
| 29.14 | INSU. DISC POLYMER 33KV B&S 90 KN       | EA | 240 |  |  |  |  |
| 29.15 | H/W/F, B/S 120 KN 33 KV                 | EA | 60  |  |  |  |  |
| 29.16 | PIN INSU. POLYMER 33KV 24MM FRP DIA     | EA | 24  |  |  |  |  |
| 29.17 | GI PIN&WASHER FOR PIN INSULATOR 33KV    | EA | 24  |  |  |  |  |
| 29.18 | ISOLATORS 33 KV 1250 A 25 KA WITHOUT ES | EA | 4   |  |  |  |  |
| 29.19 | Conductor- 570 SQR MM AAAC MOOSE        | M  | 400 |  |  |  |  |
| 29.20 | RED OXIDE PAINT                         | L  | 15  |  |  |  |  |
| 29.21 | ALUMINIUM PAINT                         | L  | 15  |  |  |  |  |
| 29.22 | ENAMEL PAINT BLACK                      | L  | 5   |  |  |  |  |
| 29.23 | GI BOLTS & NUTS ASSORTED DIMENSION      | KG | 300 |  |  |  |  |
| 29.24 | BOARD DANGER 33 KV                      | EA | 16  |  |  |  |  |
| 29.25 | JT. KIT ST.TH. 33KV 1X630               | EA | 16  |  |  |  |  |





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|           |  |    |     |  |  |  |  |
|-----------|--|----|-----|--|--|--|--|
| 29.26     | JT. KIT 33KV 1X630 O/D   | EA | 24  |  |  |  |  |
| <b>30</b> | <b>Supply &amp; Service/Erection for Civil work, Dismantling and other works</b>   |    |     |  |  |  |  |
| 30.01     | RCC Cable Trench:<br><br>Excavation of all type of soil and Construction of RCC cable trench of internal width 1 mtr and 1 mtr depth. The RCC trench should have RCC wall of 200 mm and RCC base of 200 mm. The cable shall be laid in the trench. The trench should be filled by river sand before after cable laying. Finally, trench shall be covered with removable RCC slab of 150 mm thick for protection of cable as per IS 1255-1983. The details as per the direction of the Engineer in charge | M  | 550 |  |  |  |  |
| 30.02     | High potential testing   | EA | 8   |  |  |  |  |
| 30.03     | Placement of cable root marker   | EA | 16  |  |  |  |  |
| 30.04     | Cable loop chamber (RCC) (15'x15'x5') :<br><br>Excavation of all type of soil and construction of RCC Cable loop chamber of size 15 Feet x 15 Feet x 5 Feet depth. The RCC wall & RCC base   | EA | 8   |  |  |  |  |



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|       |  |    |     |  |  |  |  |
|-------|--|----|-----|--|--|--|--|
|       | of chamber should be of 6 inch concrete. The cable shall be looped inside the chamber. Chamber shall be filled by river sand before and after looping of cable and then putting of PCC tiles on the filled sand. Finally, the chamber shall be filled by soil. The details as per direction of Engineer In charge. |    |     |  |  |  |  |
| 30.05 | Earthing complete with supply of charcoal, salt etc (excluding earthing device)  | EA | 16  |  |  |  |  |
| 30.06 | Laying of Cable in HDD method :<br>Laying of cable through HDPE pipe in HDD method in all types of soil as per the tender specification and as per direction of Engineer In Charge   | M  | 880 |  |  |  |  |
| 30.07 | Concreting of pole pit as per drawing and specification (angle point pole) of tender   | EA | 16  |  |  |  |  |
| 30.08 | Couping of pole as per the drawing and specification (angle point pole ) of tender   | EA | 16  |  |  |  |  |
| 30.09 | Concreting of stay pit :<br>Excavation of in all type of soil and fixing of stay set with 0.5 Cum Cement concrete foundation 1:3:6 size (900mm   | EA | 6   |  |  |  |  |

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|       |   |     |    |  |  |  |  |
|-------|---|-----|----|--|--|--|--|
|       | x600mmx900mm ) using 40 mm BHB metal  |     |    |  |  |  |  |
| 30.10 | Concrete bed across canal with laying of 8 run of cable through HDPE pipe as per direction of Engineer In Charge  | GRO | 1  |  |  |  |  |
| 30.11 | Hoisting of cable through 110 MM DIA HDPE pipe in 6 pole/DP structure with clamps & fittings (excluding HDPE pipe)  | EA  | 16 |  |  |  |  |
| 30.12 | Dismantling of NBLS tower- 3 nos. and 220KV OC+6type tower - 2 nos.= Total 5 Nos with all fitting and its conductor and Transportation of all dismantled materials to Central Store | GRO | 1  |  |  |  |  |
| 30.13 | Sundries for whole project  | GRO | 1  |  |  |  |  |
|       | <b>Total</b>  |     |    |  |  |  |  |

Figures : Rupees .....Only

**Signature & Seal of the Bidder**



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**NOTE:**

- \* Bidder should quote as mentioned in "Item description" column
- \* The bids will be evaluated commercially on the overall all inclusive price of tender BOQ.
- \* All materials shall be supplied and erected by the bidder.
- \* The unit price should be inclusive of freight, insurance and other levies (if any) and exclusive of GST. GST to be mentioned separately.
- \* The bidders are advised to quote prices strictly in the above format. Failing to do so, bids are liable for rejection.
- \* The bidder must fill each and every column of the above format. Mentioning "extra/inclusive" in any of the column may lead for rejection of the price bid.
- \* No cutting/ overwriting in the prices is permissible



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## **ANNEXURE II**

**Technical Specification attached separately with the tender**

**ANNEXURE III**

**Schedule of Deviations**

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

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

| <b>S. No.</b> | <b>Clause No.</b> | <b>Tender Clause Details</b> | <b>Details of deviation with justifications</b> |
|---------------|-------------------|------------------------------|---|
|               |                   |                              |   |
|               |                   |                              |   |
|               |                   |                              |   |
|               |                   |                              |   |

*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  
SELF DECLARATION FORM**

Sir,

I/We the undersigned do hereby declare that, I/We have never been blacklist and/or there were no debaring actions against us for any default in supply of material/ equipments or in the performance of the contract entrusted to us in any of the electricity utilities of *India*.

*Seal of the Bidder:*

*Signature:*

*Name:*

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## ANNEXURE V

### 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<br>(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)<br>(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<br><br>(If Yes, indicate, MSME Reg'n No.) |

**Seal of the Bidder:**

**Signature:**

**Name:**



## ANNEXURE VI

### 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 /<br>Not Applicable |
|--------|--|------------------------------|
| 1      | EMD of required value  |                              |
| 2      | Tender Fee as mentioned in this RFQ  |                              |
| 3      | Company profile/ organogram  |                              |
| 4      | Signed copy of this RFQ as an unconditional acceptance   |                              |
| 5      | Duly filled schedule of commercial specifications (Annexure V)   |                              |
| 6      | Sheet of commercial/ technical deviation if any (Annexure III)   |                              |
| 7      | Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement  |                              |
| 8      | Acknowledgement for Testing facilities if available (duly mentioned on bidder letter head)                         |                              |
| 9      | List of Machine/ tools with updated calibration certificates if applicable   |                              |
| 10     | Details of order copy (duly mentioned on bidder letter head)   |                              |
| 11     | Order copies as a proof of quantity executed   |                              |
| 12     | Details of Type Tests if applicable (duly mentioned on bidder letter head)   |                              |
| 13     | All the relevant Type test certificates as per relevant IS/ IEC (CPRI/ ERDA/ other certified agency) if applicable |                              |
| 14     | Project/ Supply Completion certificates  |                              |
| 15     | Performance certificates   |                              |
| 16     | Client Testimonial/ Performance Certificates   |                              |
| 17     | Credit rating/ Solvency certificate  |                              |
| 18     | Undertaking regarding non blacklisting (On company letter head) (Annexure IV)                                      |                              |
| 19     | List of trained/ Untrained Manpower  |                              |

## Annexure VII

### 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 VIII**  
**SCOPE OF WORK**

**Scope :**

**1. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable in open trench Method in RCC cable trench (565 x 4 x 2) = 4520 Mtr (Double CKT)**

|   | <b>Supply of Materials</b>  | <b>Unit</b> | <b>Qty</b> |
|---|---|-------------|------------|
| 1 | EARTHING DEVICE 40 MM DIA X3 METER (LINE)   | EA          | 4          |
| 2 | G.I. FLATS 40 X 6 MM  | KG          | 60         |
| 3 | CABLE 33 KV AL 1CX630 SQMM XLPE ARM   | M           | 4520       |
| 4 | JT. KIT ST.TH. 33KV 1X630   | EA          | 16         |
| 5 | JT. KIT 33KV 1X630 O/D  | EA          | 16         |
|   | <b>Service/ Erection of Materials</b>   |             |            |
| 1 | EARTHING DEVICE 40 MM DIA X3 METER (LINE)   | EA          | 4          |
| 2 | G.I. FLATS 40 X 6 MM  | KG          | 60         |
| 3 | JT. KIT ST.TH. 33KV 1X630   | EA          | 16         |
| 4 | JT. KIT 33KV 1X630 O/D  | EA          | 16         |
|   | <b>Supply &amp; Service/Erection for Civil work, Dismantling and other works</b>  |             |            |
| 1 | <b>RCC Cable Trench:</b><br>Excavation of all type of soil and Construction of RCC cable trench of internal width 1 mtr and 1 mtr depth. The RCC trench should have RCC wall of 200 mm and RCC base of 200 mm. The cable shall be laid in the trench. The trench should be filled by river sand before after cable laying. Finally, trench shall be covered with removable RCC slab of 150 mm thick for protection of cable as per IS 1255-1983. The details as per the direction of the Engineer in charge | M           | 550        |
| 2 | High potential testing  | EA          | 8          |
| 3 | Placement of cable root marker  | EA          | 12         |

|   |  |    |   |
|---|--|----|---|
| 4 | <p><b>Cable loop chamber (RCC) (15'x15'x5') :</b></p> <p>Excavation of all type of soil and construction of RCC Cable loop chamber of size 15 Feet x 15 Feet x 5 Feet depth. The RCC wall &amp; RCC base of chamber should be 6 inch concrete. The cable shall be looped inside chamber. Chamber shall be filled by river sand before and after looping of cable and then putting of PCC tiles on the filled sand. Finally, the chamber shall be filled by soil. The details as per direction of Engineer In charge.</p> | EA | 4 |
| 5 | Earthing complete with supply of charcoal, salt etc (excluding earthing device)  | EA | 4 |

**2. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable under the railway track through HDD method (100 x 4 x 2) = 800 Mtr (Double CKT)**

|  | Supply of Materials   | Unit | Qty |
|--|---|------|-----|
| 1  | EARTHING DEVICE 40 MM DIA X3 METER (LINE)   | EA   | 4   |
| 2  | G.I. FLATS 40 X 6 MM  | KG   | 60  |
| 3  | CABLE 33 KV AL 1CX630 SQMM XLPE ARM   | M    | 800 |
| 4  | PIPE HDPE 110MM DIA PN8 PE 80   | M    | 880 |
| <b>Service/ Erection of Materials</b>  |   |      |     |
| 1  | EARTHING DEVICE 40 MM DIA X3 METER (LINE)   | EA   | 4   |
| 2  | G.I. FLATS 40 X 6 MM  | KG   | 60  |
| <b>Supply &amp; Service/Erection for Civil work, Dismantling and other works</b> |   |      |     |
| 1  | Placement of cable root marker  | EA   | 4   |
| 2  | Earthing complete with supply of charcoal, salt etc (excluding earthing device)   | EA   | 4   |
| <b>Laying of Cable in HDD method :</b>   |   |      |     |
| 3  | Laying of cable through HDPE pipe in HDD method in all types of soil as per the tender specification and as per direction of Engineer In Charge | M    | 880 |

**3. Laying of 33 KV 1C x 630mm<sup>2</sup> 33KV XLPE UG Cable at Canal Crossing (40 mtr ) (55 x 4 x 2)  
= 440 Mtr (Double CKT)**

|    | <b>Supply of Materials</b>   | <b>Unit</b> | <b>Qty</b> |
|----|--|-------------|------------|
| 1  | EARTHING DEVICE 40 MM DIA X3 METER (LINE)  | EA          | 4          |
| 2  | G.I. FLATS 40 X 6 MM   | KG          | 100        |
| 3  | R.S.JOIST 116 x 100 MM,10MTR/ 230KG (GI)   | KG          | 920        |
| 4  | COIL EARTHING  | EA          | 4          |
| 5  | GI STRANDED WIRE BARBED WIRE   | KG          | 12         |
| 6  | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL  | KG          | 100        |
| 7  | BOARD DANGER 33 KV   | EA          | 4          |
| 8  | CABLE 33 KV AL 1CX630 SQMM XLPE ARM  | M           | 440        |
| 9  | JT. KIT 33KV 1X630 O/D   | EA          | 8          |
| 10 | PIPE HDPE 110MM DIA PN8 PE 80  | M           | 400        |
|    | <b>Service/ Erection of Materials</b>  |             |            |
| 1  | EARTHING DEVICE 40 MM DIA X3 METER (LINE)  | EA          | 4          |
| 2  | G.I. FLATS 40 X 6 MM   | KG          | 100        |
| 3  | R.S.JOIST 116 x 100 MM,10MTR/ 230KG (GI)   | KG          | 920        |
| 4  | COIL EARTHING  | EA          | 4          |
| 5  | GI STRANDED WIRE BARBED WIRE   | KG          | 12         |
| 6  | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL  | KG          | 100        |
| 7  | BOARD DANGER 33 KV   | EA          | 4          |
| 8  | JT. KIT 33KV 1X630 O/D   | EA          | 8          |
|    | <b>Supply &amp; Service/Erection for Civil work, Dismantling and other works</b> |             |            |

|   |   |     |   |
|---|---|-----|---|
| 1 | <b>Cable loop chamber (RCC) (15'x15'x5') :</b><br>Excavation of all type of soil and construction of RCC Cable loop chamber of size 15 Feet x 15 Feet x 5 Feet depth. The RCC wall & RCC base of chamber should be 6 inch concrete. The cable shall be looped inside chamber. Chamber shall be filled by river sand before and after looping of cable and then putting of PCC tiles on the filled sand. Finally, the chamber shall be filled by soil. The details as per direction of Engineer In charge. | EA  | 4 |
| 2 | Earthing complete with supply of charcoal, salt etc (excluding earthing device)   | EA  | 4 |
| 3 | Concreting of pole pit as per drawing and specification (angle point pole) of tender  | EA  | 4 |
| 4 | Couping of pole as per the drawing and specification (angle point pole ) of tender  | EA  | 4 |
| 5 | Concrete bed across canal with laying of 8 run of cable through HDPE pipe as per direction of Engineer In Charge  | GRO | 1 |

**4. Construction of 6 Pole structure with 12mtr long 150x150mm RS joist with Isolator provision = 2 Nos**

|    | <b>Supply of Materials</b>                      | <b>Unit</b> | <b>Qty</b> |
|----|---|-------------|------------|
| 1  | EARTHING DEVICE 40 MM DIA X3 METER (LINE)       | EA          | 4          |
| 2  | G.I. FLATS 40 X 6 MM                            | KG          | 60         |
| 5  | GI STRANDED WIRE BARBED WIRE                    | KG          | 36         |
| 6  | R.S.JOIST150X150MM 12M LONG 415.2KG/ PIECE (GI) | KG          | 4982.4     |
| 7  | G.I. CHANNEL 100 X 50 X 6 MM CHANNEL            | KG          | 1200       |
| 8  | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL             | KG          | 450        |
| 9  | G.I. ANGLE 50 X 50 X 6MM                        | KG          | 410        |
| 10 | H.T. STAY SET COMPLETE                          | SET         | 6          |
| 11 | GI STRANDED WIRE 7/10 SWG-7/3.25 MM             | KG          | 90         |
| 12 | INSULATOR STAY HT                               | EA          | 6          |
| 13 | LINE&SIDE STAY CLAMP 150X150 RS JST             | EA          | 6          |

|                                       |   |     |        |
|---------------------------------------|---|-----|--------|
| 14                                    | INSU. DISC POLYMER 33KV B&S 90 KN               | EA  | 240    |
| 15                                    | H/W/F, B/S 120 KN 33 KV                         | EA  | 60     |
| 16                                    | PIN INSU. POLYMER 33KV 24MM FRP DIA             | EA  | 24     |
| 17                                    | GI PIN&WASHER FOR PIN INSULATOR 33KV            | EA  | 24     |
| 18                                    | ISOLATORS 33 KV 1250 A 25 KA WITHOUT ES         | EA  | 4      |
| 19                                    | Conductor- 570 SQR MM AAAC MOOSE                | M   | 400    |
| 20                                    | RED OXIDE PAINT                                 | L   | 15     |
| 21                                    | ALUMINIUM PAINT                                 | L   | 15     |
| 22                                    | ENAMEL PAINT BLACK                              | L   | 5      |
| 23                                    | GI BOLTS & NUTS ASSORTED DIMENSION              | KG  | 300    |
| 24                                    | BOARD DANGER 33 KV                              | EA  | 12     |
| <b>Service/ Erection of Materials</b> |   |     |        |
| 1                                     | EARTHING DEVICE 40 MM DIA X3 METER (LINE)       | EA  | 4      |
| 2                                     | G.I. FLATS 40 X 6 MM                            | KG  | 60     |
| 3                                     | GI STRANDED WIRE BARBED WIRE                    | KG  | 36     |
| 4                                     | R.S.JOIST150X150MM 12M LONG 415.2KG/ PIECE (GI) | KG  | 4982.4 |
| 5                                     | G.I. CHANNEL 100 X 50 X 6 MM CHANNEL            | KG  | 1200   |
| 6                                     | G.I. CHANNEL 75 X 40 X 6 MM CHANNEL             | KG  | 450    |
| 7                                     | G.I.ANGLE 50 X 50 X 6MM                         | KG  | 410    |
| 8                                     | H.T. STAY SET COMPLETE                          | SET | 6      |
| 9                                     | GI STRANDED WIRE 7/10 SWG-7/3.25 MM             | KG  | 90     |
| 10                                    | INSULATOR STAY HT                               | EA  | 6      |
| 11                                    | LINE&SIDE STAY CLAMP 150X150 RS JST             | EA  | 6      |
| 12                                    | INSU. DISC POLYMER 33KV B&S 90 KN               | EA  | 240    |
| 13                                    | H/W/F, B/S 120 KN 33 KV                         | EA  | 60     |
| 14                                    | PIN INSU. POLYMER 33KV 24MM FRP DIA             | EA  | 24     |

|  |   |     |     |
|--|---|-----|-----|
| 15   | GI PIN&WASHER FOR PIN INSULATOR 33KV  | EA  | 24  |
| 16   | ISOLATORS 33 KV 1250 A 25 KA WITHOUT ES   | EA  | 4   |
| 17   | Conductor- 570 SQR MM AAAC MOOSE  | M   | 400 |
| 18   | RED OXIDE PAINT   | L   | 15  |
| 19   | ALUMINIUM PAINT   | L   | 15  |
| 20   | ENAMEL PAINT BLACK  | L   | 5   |
| 21   | GI BOLTS & NUTS ASSORTED DIMENSION  | KG  | 300 |
| 22   | BOARD DANGER 33 KV  | EA  | 12  |
| <b>Supply &amp; Service/Erection for Civil work, Dismantling and other works</b> |   |     |     |
| 1  | Earthing complete with supply of charcoal, salt etc (excluding earthing device)   | EA  | 4   |
| 2  | Concreting of pole pit as per drawing and specification (angle point pole) of tender  | EA  | 12  |
| 3  | Couping of pole as per the drawing and specification (angle point pole ) of tender  | EA  | 12  |
| 4  | Concreting of stay pit :<br>Excavation of in all type of soil and fixing of stay set with 0.5 Cum Cement concrete foundation 1:3:6 size (900mm x600mmx900mm ) using 40 mm BHB metal | EA  | 6   |
| 5  | Hoisting of cable through 110 MM DIA HDPE pipe in 6 pole/DP structure with clamp & fitting  | EA  | 16  |
| 6  | Dismantling of NBL tower- 3 nos. and 220KV OC+6type tower - 2 nos.= Total 5 Nos with all fitting and its conductor and Transportation of all dismantled materials to Central Store  | GRO | 1   |
| 7  | Sundries for whole project  | GRO | 1   |



1. The detail route survey to be conducted including route map
2. Complete manufacture, including shops testing & supply of materials from the approved vendor (materials which are to be supplied by the bidder)
3. Providing Engineering drawings related to scope of work for the Owner's approval;
4. Loading, transportation and Unloading from store/ factory to work site or vice versa.
5. Resolve of ROW issue (if any ) by the BA. TPCODL extend support to BA in ROW arrangement.
6. Liaising with autonomous body (Govt. Department- Development Authority /Municipality/NHAI/R&B/ Forest etc.) is under scope of bidder. Fees of Govt Department will be paid by TPCODL.
7. Necessary statutory clearance from Electrical Inspector of Odisha & any other authority for energizing the Circuit shall be in the scope of this tender. However, any statutory fees shall be borne by TPCODL on production of documentary evidence.
8. Bidders are requested to visit the site to understand the scope of work, site conditions and requirement prior to bidding. Hence, no price/time escalation shall be admissible on these accounts.
9. Prior erecting any extra items for these scheme rates should be approved from competent authority.
10. The Bidder should have own Safety equipment like Neon Tester, Portable Earth, Earthing discharge rod etc. along with Calibration certificates of all equipment.
11. BA has to ensure safety and Quality of job at site for whole duration and they have to submit the safety report and quality report to TPCODL if required.
12. Taking Over: After commissioning of the complete system and final approval of Electrical Inspector & compliance to punch points observed to the satisfaction of Projects as per statutory requirements, system shall be handed over to TPCODL.
13. There will be no price escalation given to bidder after issue the RO even if there is delayed the project due to ROW permission.
14. In case any additional material is to be asked to supply after finalization of scope of work in the detailed Engineering, the Extra price and the extension of delivery time (if applicable) as the case may be mutually agreed between TPCODL and Successful Bidder.
15. Proving the steel barricading/ any other (as per site requirement) as per TPCODL specification will be in Bidder scope, TPCODL will not give any additional cost for this activity. This line item is not mentioned in Tender BOQ and no extra item will be paid to successful bidder in future for this activity.
16. Loading, Unloading & Transportation of all the scrap material to be stacked counted (where material supplied by BA) and loading unloading, transportation of this scrap to TPCODL site/Store as per direction of Engg In-Charge will be in bidder scope.
17. Crane/ New Generation Hydra shall be used for loading, unloading, handling & erection of equipments at site. Normal Hydra shall not be used at site. In case of site related issues where crane or New Gen Hydra cannot be used due to site constraint or other reasons, the Normal Hydra can be used only post receipt of permission from TPCODL E-I-C.
18. Sign writing of equipments/ poles where ETC of such equipments is also in bidder scope shall be in bidder scope. No additional price shall be given to BA.

19. Providing Infrastructure and Supporting to Jointer for making the joints in HT/LT in O/H Line and underground line shall be in bidder Scope. This item shall not be paid additional.
20. Watch & Ward, de-watering (normal) shall be in bidder scope.
21. Wherever TPCODL specifications are not available relevant IS/IEC to be followed. All Drawings mentioned in the Tender Specification and other required for the completeness of the tender shall be submitted. Drawing submission process shall not be deemed complete of all the requirements are not complied during the submission of the same.
22. The BA has to follow the Contract safety management (CSM) as per GCC. The penalty will be imposed on the bidder for any safety violation as per CSM matrix.
23. The scope of supply items- includes design, Engineering, Manufacturing; testing, loading, unloading, transportation to site storage, preservation, insurance, along with supply of all accessories, tools, spares, O&M catalogs for successful ITC is in the scope of Bidder.
24. Clearance of Site : The Contractor's shall from time to time during the progress of the Works clear away and remove all surplus materials and rubbish disposal in an approved manner. On completion of the work the Contractor shall remove all Contractors' equipment and leave the whole of the Site clean and in a workable condition, to the satisfaction of the TPCODL. The contractor should rectify any damage occur during execution like road, footpath restoration etc to its original position.

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**Annexure IX**

**General Conditions of Contract – Attached separately**

**Annexure X**

**Safety Policy and Safety terms and conditions (Attached separately)**

**Annexure-XI**

**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: [pkjain@tatapower.com](mailto:pkjain@tatapower.com).

## Annexure XII



### **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

A handwritten signature in blue ink, appearing to read 'Praveer Sinha', with a horizontal line underneath.

(Praveer Sinha)  
CEO & Managing Director

Date: 15<sup>th</sup> 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: 15<sup>th</sup> June, 2018

**TATA POWER**  
Lighting up Lives!



**The Tata Power Company Ltd**



*Contractor's Safety Code of Conduct*

*Document No.  
TPSMS/GSP/CSM/015 REV 05*

*Date of Issue:  
30/07/2020*

# Contractor's Safety Code of Conduct

| <b>Reason for Change</b>  | <b>Prepared By</b>                               | <b>Checked By</b>  | <b>Approved by</b>                           |
|---|--|--|--|
| Revision to accommodate Existing changes in org structure and to simplify the procedure | Rajesh Sharma<br><i>(Head-Safety Generation)</i> | Suresh Khetwani<br><i>(Chief - Safety &amp; Environment)</i><br><br>Monish Kumar<br><i>(Chief -Corporate Contract)</i> | V. V. Namjoshi<br><i>(Chief Generations)</i> |

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## 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.)

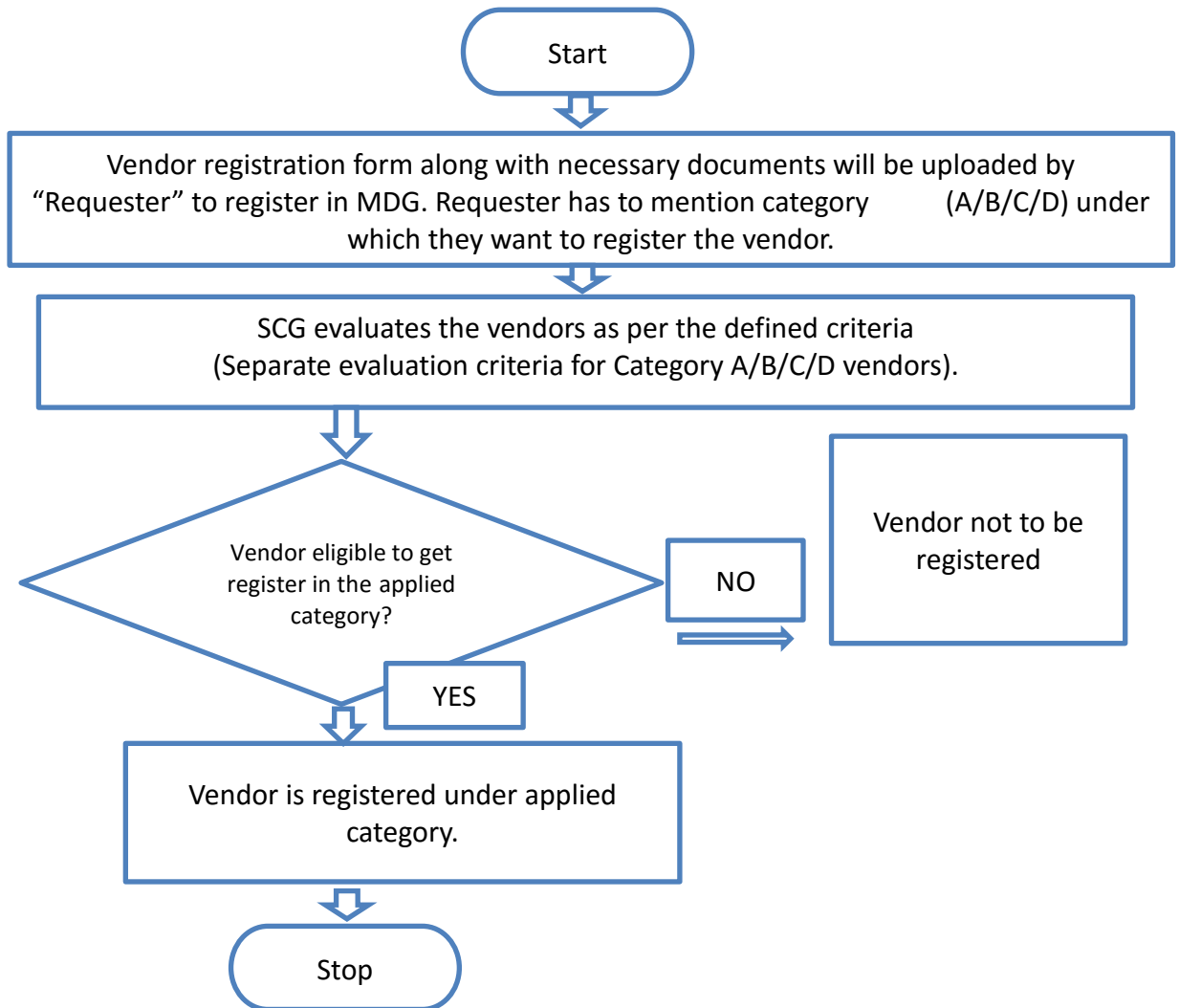
Otherwise the RFQ will be attached only with Safety Terms and Conditions. Long term and low value jobs (see definition) are exempted from the CSCC process.

Corporate Contracts will collect duly filled CSM-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**



|  |   |                                     |
|--|---|-------------------------------------|
| <b>The Tata Power Company Ltd</b>        |  | Contractor's Safety Code of Conduct |
| Document No.<br>TPSMS/GSP/CSM/015 REV 05 |   | Date of Issue:<br>30/07/2020        |

## 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 be 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.

| Name of the Vendor: |  |                                  |  |                     |        |        |
|---------------------|--|----------------------------------|--|---------------------|--------|--------|
| Sr. No              | Safety Information   | Remarks                          | Attachment   |                     |        |        |
| 1                   | Certified for<br>i. OHSAS 18001/ ISO 45001,<br>ii. ISO: 14001<br>iii. ISO: 9001<br>(ISO certificates to be issued from reputed accreditation agencies specified by Tata Power) | i. Y/ N<br>ii. Y/ N<br>iii. Y/ N | Attach copy of the certification                         |                     |        |        |
| 2                   | Safety Statistics for Last Three (3) Years<br>- LTIFR<br>- LTISR   | Yes/No                           |  | Year 1<br>(Last FY) | Year 2 | Year 3 |
|                     |  |                                  | LTIFR  |                     |        |        |
|                     |  |                                  | LTISR  |                     |        |        |
| 3                   | Do you have Safety Policy?   | Yes/No                           | Attach copy of the safety policy.                        |                     |        |        |
| 4                   | Do you have Safety training process?   | Yes/No                           | Attach safety training process.                          |                     |        |        |
| 5                   | Do you have Safety organization structure e.g. Safety Officers and Safety Committees?  | Yes/No                           | Attach copy of the safety organization structure.        |                     |        |        |
| 6                   | Name and address of sites where work is in progress or worked earlier  | Yes/No                           | Site details to be attached for inspection by Officials. |                     |        |        |

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

|   | <u>Lead Indicators</u>   | <u>Unit Of measurement</u>     | <u>Target</u> | <u>weight age</u> |
|---|--|--------------------------------|---------------|-------------------|
| 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                |
|   | <u>Lag Indicators</u>  |                                |               |                   |
| 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:

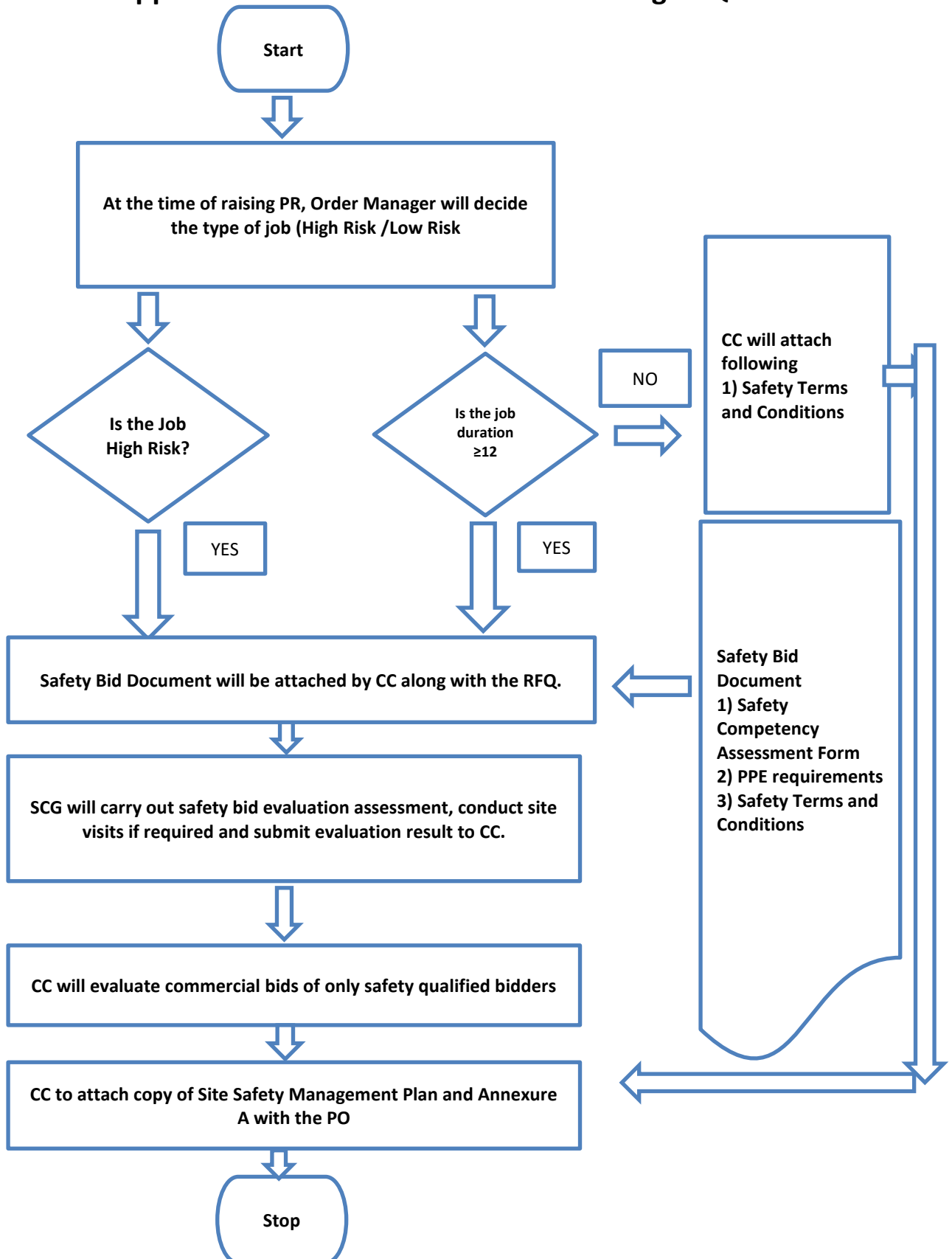
| Sr No | Description of violation  | Severity | Penalty |
|-------|---|----------|---------|
| 1.    | Working without Permit  | 5        | 5000/-  |
| 2.    | Untrained (TPSDI) worker on high-risk jobs.                                   | 5        | 5000/-  |
| 3.    | Unhygienic/Bad condition of PPE   | 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 | 500/   |
| 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 arrester 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. | <ul style="list-style-type: none"> <li>• First Time</li> </ul>   | 3 | Warning                   |
| 101. | <ul style="list-style-type: none"> <li>• Second Time</li> </ul>  | 4 | 1000/-                    |
| 102. | <ul style="list-style-type: none"> <li>• Third Time</li> </ul>   | 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             |                                    |   |         |     |         |
| <b>Total Manpower</b>         |                                    |   |         |     |         |

#### Instructions to Bidder to fill:

- Bidder to provide the overall site manpower deployment schedule as above.
- Bidder to indicate (through colour code mentioned below ) their direct and sub-contracted employees

Direct bidder employee

Partly Direct / Partly sub-contracted

Sub-Contracted

- Against each of the category, bidder to indicate the minimum qualification and experience of the proposed manpower.
- Rows can be added to also identify other specialised manpower e.g. specific details to be included for high risk activities operators
- Columns can be extended to the actual duration of Site activities.
- 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,<br>Year of Certification | If No,<br>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  |  |                  |             |
| <b>Scope of work: -</b>   |  |                  |             |
| Drawing References: -   |  |                  |             |
| Detail of Sub contractors involved: -                                 |  |                  |             |
| Method Statement Prepared By: -<br>Designation: - (e.g. Site Manager) |  | <u>Signature</u> | <u>Date</u> |

#### 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).

|  |  |  |  |   |  |   |   |
|--|--|--|--|---|--|---|---|
| <p><b>Fall Protection Measures:</b><br/>(Where Work at height cannot be avoided)</p> |  |  |  |   |  |   |   |
| <p><b>Control Measures for Electrical Hazards</b></p>                                |  |  |  |   |  |   |   |
| <p><b>Others Hazard if any</b><br/>(please provide details)</p>                      |  |  |  |   |  |   |   |
| <p><b>Hazardous Substances to be used in job :</b><br/>(Attach MSDS if required)</p> | <br>Acute Toxic | <br>Health Hazard | <br>Corrosive | <br>Dangerous For the environment | <br>Oxidising | <br>Highly flammable | <br>Explosives |
|  | 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: | <br>Safety Boots | <br>Hard Hats | <br>Safety Gloves | <br>Hearing Protection | <br>Eye Protection | <br>Respiratory Protection | Other:<br>1. Hi-Viz<br>2. Coveralls<br>3. |
|--|---|--|--|---|---|---|---|

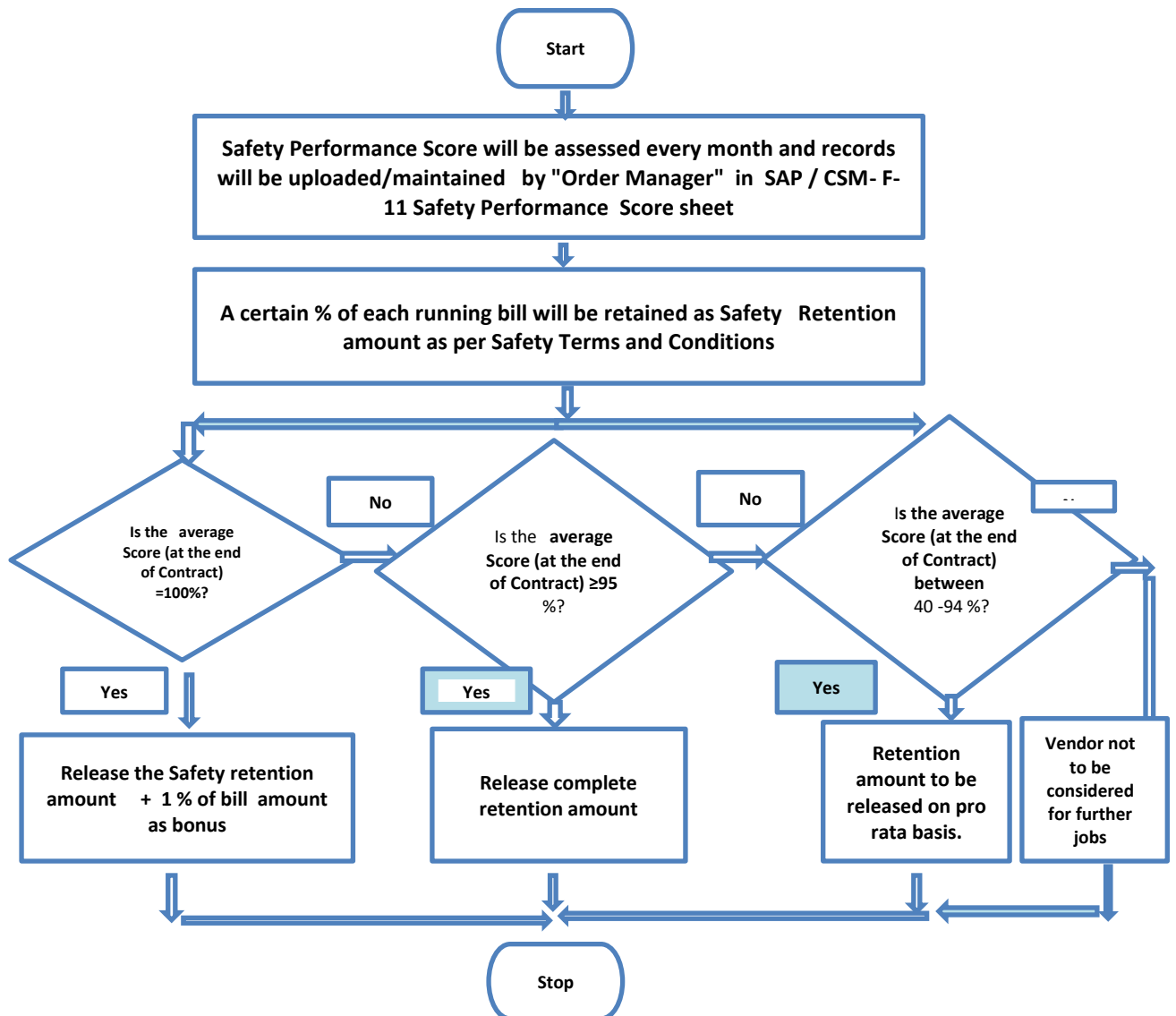
**10.0 First Aid facilities and Nearby Hospitals Details**

|   |                               |  |
|---|-------------------------------|--|
|  | 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 | Weight age | Actual Performance           | Actual Score |
|-----------------------|--|--------------------------------|--------|------------|------------------------------|--------------|
| <b>Lead Indicator</b> |  |                                |        |            |                              |              |
| 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         |                              |              |
| <b>Lag Indicator</b>  |  |                                |        |            |                              |              |
| 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         |                              |              |
|                       |  |                                |        |            | <b>Final Score</b>           |              |
|                       |  |                                |        |            | <b>Invoice Value</b>         |              |
|                       |  |                                |        |            | <b>Amount to be released</b> |              |



**Safety Performance Evaluation Criteria**

**Lead Indicators**

|  |               |            |                |        |
|--|---------------|------------|----------------|--------|
|  | <b>Target</b> |            |                |        |
| % of Employee certified in TPSDI/Authorized agency   | 50%           | 100%       | Less than 100% |        |
| Score  |               | 10         | 5              |        |
|  | <b>Target</b> |            |                |        |
| CFSA score   | <=1.49        | 1.5 to 2.5 | 2.51 to 3.5    | >=3.51 |
| Score  | 20            | 15         | 10             | 0      |
|  | <b>Target</b> |            |                |        |
| Monthly inspection completed for Critical Equipment, lifting Tools & Tackles and hand tools used at site | >=80%         | 79 to 50%  | <50%           |        |
| Score  | 10            | 7          | 0              |        |
|  | <b>Target</b> |            |                |        |
| 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  | Weight  | Actual | Remarks         |
|--------|--|---------|--------|-----------------|
|        |  | age (%) | Score  |                 |
| 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  | Weight  | Actual | Remarks        |
|--------|--|---------|--------|----------------|
|        |  | age (%) | Score  |                |
| 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 |

|  |  |  |
|--|--|--|
| <b>The Tata Power Company Ltd</b>        |  | <i>Contractor's Safety Code of Conduct</i> |
| Document No.<br>TPSMS/GSP/CSM/015 REV 05 |  | Date of Issue:<br>30/07/2020               |

|   |  |            |  |                |
|---|--|------------|--|----------------|
| 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          |  |                |
|   | <b>Total</b>   | <b>100</b> |  |                |

### **Evaluation Criteria for Category C**

| Sr. No | Description   | Weight age (%) | 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 |
|        | <b>Total</b>  | <b>100</b>     |              |                 |

### **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 |
|--|--|--|-----------------------|---------|
| Sr. No   | Description  | Marks                                    |                       |         |
| 1  | Check the safety statistics for last 3 years (LTIFR and LTISR)   | Statistics available                     | 5                     |         |
|  |  | Statistics not available                 | 0                     |         |
|  |  |  |                       |         |
| 2  | Check the trend LTIFR for last 3 years   | LTIFR value                              | Marks                 |         |
|  |  | 0 to 0.2                                 | 5                     |         |
|  |  | 0.21 to 0.3                              | 2.5                   |         |
|  |  | >0.3                                     | 0                     |         |
| 3  | Check the trend of LTISR last 3 years  | LTISR value                              | Marks                 |         |
|  |  | 0 to 2                                   | 5                     |         |
|  |  | 2 to 3                                   | 2.5                   |         |
|  |  | >3                                       | 0                     |         |
| 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                    |         |
|  |  | Prosecution                              | 0                     |         |
|  |  | To be provided in written on letter head |                       |         |
|  | <b>Total</b>   |  | <b>25</b>             |         |

**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 | <b>Safety Officer</b>    | Marks                 |  |
|  |   | ≥80% of employees        | 5                     |  |
|  |   | 50 to 79 % of employee   | 2.5                   |  |
|  |   | <50%                     | 0                     |  |
|  |   | <b>Safety Supervisor</b> | Marks                 |  |
|  |   | ≥80% of employees        | 10                    |  |
|  |   | 50 to 79 % of employee   | 6                     |  |
|  |   | <50%                     | 0                     |  |
|  |   | <b>Workmen</b>           | Marks                 |  |
|  |   | ≥80% of employees        | 10                    |  |
|  |   | 50 to 79 % of employee   | 6                     |  |
|  |   | <50%                     | 0                     |  |
| <b>Total</b>   |   |                          | <b>25</b>             |  |

**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                     |  |
| <b>Total</b>  |   |                                       | <b>15</b>             |  |

### 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   | Weight age (%) | Score Obtained |
|----------|--|---|----------------|----------------|
| Manpower | <b>Safety Officer (1 per 500 workers)</b>                        | <b>Qualification-</b> Officer shall possess Advance Diploma In Industrial Safety by state technical board.<br><br><b>Experience-</b> Minimum 1-year experience in relevant field as mentioned in the job in PR.   | 5              |                |
|          | <b>Safety Supervisor (1 per work site up to max. 50 workers)</b> | <b>Qualification-</b> Supervisor shall possess ITI/ Diploma in relevant field.<br><br><b>Experience-</b> Minimum 2-year experience in relevant field as mentioned in the job in PR.<br><b>Training –</b> Trained and certified by TPSDI or equivalent institute in relevant safety procedures.<br><b>Note:</b> On request of the contractor/Users -TPDSI should vet & certify the skilled & experienced | 5              |                |

|                                      |   |   |    |  |
|--------------------------------------|---|---|----|--|
|                                      |   | Technician if Technical Qualification is not adequate.  |    |  |
|                                      | <b>Technician (Skilled workers as electrician, rigger, fitter, welder, cable jointer, line men etc)</b> | <b>Experience-</b> Minimum 2 year experience in relevant field as mentioned in the job in PR.<br><br><b>Training</b> – Trained and certified by TPSDI or equivalent institute in relevant safety procedures.  | 5  |  |
| <b>Tools &amp; Tackles</b>           | 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<br>1) Suitability as per the relevant job<br>2) Make and age of the tools from authorized agencies defined by the user.<br>3) Certification by the competent authority of respective state. | 30 |  |
| <b>Safety Records</b>                | Safety Records  | Safety Records for last 3 years (as per vendor or as per our knowledge) – Recommendation?   | 15 |  |
| <b>Safety Plan</b>                   | 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 |  |
| <b>Accredited Bodies certificate</b> | ISO-9001  | ISO-9001  | 2  |  |
|                                      | ISO-14001   | ISO-14001   | 3  |  |
|                                      | OHSAS 18001<br>ISO 45000  | OHSAS 18001/ISO 45000   | 15 |  |
| <b>Total Score</b>                   |   |   |    |  |

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:**

| <b>Checklist to be used: During site visit to check the adequacy Safety systems.</b> |  |             |                 |
|--|--|-------------|-----------------|
|  |  | Observation | Score*<br>(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                                   |             |                 |
|  | <b>Total Score</b>   |             |                 |
|  | <b>Site Visit Score</b>  |             |                 |

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              |                    |          |            |                  |
| Area  | 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 |
| 1   |  |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Sub Totals</b>                              |             |             | <b>0</b>                  | <b>0</b>  | <b>0</b>             | <b>0</b> | <b>0</b>              |                     |                    | <b>0</b> | <b>0</b>   | <b>0</b>         |
|   | <b>% of Observed People Working Safely</b>     |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Number of Violations</b>                    |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Average Severity of Violations</b>          |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Number of Severity 4 &amp; 5 Violations</b> |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>% of 4 &amp; 5 Violations</b>               |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Approximate Number of Workers Observed</b>  |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>Number of People on Site</b>                |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |
|   | <b>% of Workers Observed</b>                   |             |             |                           |           |                      |          |                       |                     |                    |          |            |                  |



## 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.  |  |  |  |  |  |

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| <b>NEG-SPEC-17</b>                                |   | <b>Date of Issue: 05/08/2020</b>              |

**Technical Specification  
For  
Specification for 11kV & 33kV HT Cables**

**TP Central Odisha Distribution Limited.  
Network Engineering Group  
2<sup>nd</sup> Floor, IDCO Tower  
Janpath, Bhubaneswar- 751022**


| Rev No. | Description                            | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|--|--------------------|-------------------|------------------------------|
| R0      | Specification for 11KV and 33kv cables | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

|   |   |   |
|---|---|---|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | <b>Specification for 11kV,33KV<br/>cables</b> |
| <b>NEG-SPEC-17</b>                                |   | <b>Date of Issue: 05/08/2020</b>              |

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- 2.0 APPLICABLE STANDARDS**
- 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION**
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- 19.0 GUARANTEED TECHNICAL PARTICULARS**
- 20.0 SCHEDULE OF DEVIATIONS**

| Rev No. | Description                            | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|--|--------------------|-------------------|------------------------------|
| RO      | Specification for 11KV and 33kv cables | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

|   |  |   |
|---|--|---|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b><br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | <b>Specification for 11kV,33KV<br/>cables</b> |
| <b>NEG-SPEC-17</b>                                |  | <b>Date of Issue: 05/08/2020</b>              |

|            |   |   |  |                             |        |        |
|------------|---|---|--|-----------------------------|--------|--------|
| <b>1.0</b> | <b>SCOPE</b>  | This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and delivery at stores/site, performance of 11 and 33kV cable complete with all accessories for trouble free and efficient operations and conform to practices consistent with sound environmental management and local statutes. |  |                             |        |        |
| <b>2.0</b> | <b>APPLICABLE STANDARDS</b>   | Cable covered under this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International standards / IEC and shall conform to the regulations of the local authorities.   |  |                             |        |        |
|            |   | IS 7098 (Part-2)-1985   | Specification for Cross-linked polyethylene insulated PVC sheathed Cables Part: 2 - For working voltages from 3.3 kV up to and including 33 kV   |                             |        |        |
|            |   | IS 7098 (Part-3)  | Voids and containments tests   |                             |        |        |
|            |   | IS 8130-1984  | Specification for Conductor for insulated electric cables & flexible cords   |                             |        |        |
|            |   | IS 398(Part-IV)-1994  | Aluminum conductors for overhead transmission purposes. Part 4 -Aluminum alloy stranded conductors.  |                             |        |        |
|            |   | IS 10418 – 1982   | Specification for Drums for Electric cables  |                             |        |        |
|            |   | IS 5831-1984  | Specification for PVC insulation and sheath of electric cables   |                             |        |        |
|            |   | IS: 3975 -1999  | Mild steel wires, formed wires and tapes for armoring of cables.   |                             |        |        |
|            |   | IEC-60228: 2004   | Conductor for insulated cables.  |                             |        |        |
|            |   | 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-60811: 1990   | Test methods for insulations and sheaths of electric cables and cords.   |                             |        |        |
|            |   | IEC 60840: 2004   | Power cables with extruded insulation and their accessories. Test methods and requirements.  |                             |        |        |
|            |   | ANSI/ICEA S-94 649:2004   | Standard concentric neutral cables rated through 46kV  |                             |        |        |
|            |   | ASTM D 6097   | Standard test method for relative resistance to vented water tree growth in Solid Dielectric insulating materials.   |                             |        |        |
|            |   | ASTM D 3137   | Standard test method for Rubber property.  |                             |        |        |
|            |   | IS 10810  | Methods of tests for cables  |                             |        |        |
| <b>3.0</b> | <b>SYSTEM PARTICULARS AND CLIMATIC CONDITIONS OF THE INSTALLATION</b> | 1.  | Nominal System Voltage (kV)  | 11kV                        | 22kV   | 33kV   |
|            |   | 2.  | Maximum System Voltage (kV)  | 12.1kV                      | 24.2kV | 36.5kV |
|            |   | 3.  | Frequency (Hz)   | 50                          | 50     | 50     |
|            |   | 4.  | Number of phases   | 3                           | 3      | 3      |
|            |   | 5.  | System   | Effectively grounded system |        |        |

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| RO      | Specification for 11KV and 33kv cables | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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|    |             |  |
|----|-------------|--|
| 6. | Grounding   | Dyn11 with solidly grounded neutral.   |
|    | Fault level | Cables shall be suitable for withstanding without damage, the thermal and mechanical stresses due to a 3 phase symmetrical short circuit of: |

| 33 kV Cable    |             |
|----------------|-------------|
| 3CX400 sq.mm.  | 37.7 kA/sec |
| 1CX630 sq.mm.  | 59.4 kA/sec |
| 11 kV Cable    |             |
| 3CX400 sq.mm.  | 37.7 kA/sec |
| 3CX300 sq.mm.  | 28.3 kA/sec |
| 1CX1000 sq.mm. | 94.3 kA/sec |
| 1CX630 sq.mm.  | 59.4 kA/sec |
| 1CX185 sq.mm.  | 17.5 kA/sec |


**Cable site installation ambient conditions:**

- a) Max. Ambient Temperature : 50 °C
- b) Max. Daily average ambient temp. : 40 °C
- c) Min Ambient Temperature : 0 °C
- d) Maximum Humidity : 100%
- e) Minimum Humidity : 10%
- f) Average No. of thunderstorm per annum : 50
- g) Average Annual Rainfall : 750 mm
- h) Average No. of rainy days per annum : 60
- i) Rainy months : June to Oct.
- j) Altitude above MSL not exceeding : 300meters.
- k) Wind Pressure : 126 kg/sq. m up an elevation of 10 m.

Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g.


|            |                                       |                  |                                   |  |
|------------|---------------------------------------|------------------|-----------------------------------|--|
| <b>4.0</b> | <b>GENERAL TECHNICAL REQUIREMENTS</b> | <b>S.No.</b>     | <b>Description</b>                | <b>Requirement</b>   |
|            |                                       | 1.               | Rated Voltage                     | 12 kV(E) /24 kV (E)/36 kV(E)   |
|            |                                       | 1.1              | Operating Voltage                 | 11 kV(E) /22 kV (E)/33 kV(E)   |
|            |                                       | 2                | Variation in supply voltage       | +/- 10%  |
|            |                                       | 3                | Variation in Supply Frequency     | +/- 5%   |
|            |                                       | 4                | Type of Cable                     | Water tight Aluminum conductor, XLPE Insulated, Extruded PVC Inner sheath, round GI wire armoured and PVC outer sheathed cable |
|            |                                       | 5                | Core                              | Three/ Single  |
|            |                                       | 6                | Material of conductor             | Stranded compacted circular Aluminum conductor as per IS:8130 – 1984   |
|            | 7                                     | Conductor Screen | Extruded Semi-conducting compound |  |

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|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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|---|--|---|
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|     |                             |  |                   |   |
|-----|-----------------------------|--|-------------------|---|
|     |                             | 8  | Insulation        | XLPE insulation as per IS:7098 (Part-II)-1985   |
|     |                             | 9  | Insulation Screen | a) Non-metallic: Extruded semiconducting compound<br>b) Semiconducting compound water swellable tape<br>c) Metallic: Copper tape                          |
|     |                             | 10   | Inner Sheath      | Extruded PVC Compound Type ST2 as per IS:5831-1984  |
|     |                             | 11   | Armour            | a) Galvanized steel wire as per IS: 3975 – 1999 for multi core cable<br>b) Round Al wire for single core cables<br>c) RC tape as a binder over the armour |
|     |                             | 12   | Outer Sheath      | Extruded PVC Compound Type ST2 as per IS: 5831-1984   |
| 5.0 | <b>GENERAL CONSTRUCTION</b> | The cross linked polyethylene insulated (XLPE) cable (Dry cured) shall be manufactured and tested strictly as per IS 7098: Part-II with its latest amendments. 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 | <b>CONDUCTORS</b>           | <p><b>5.1.1.</b><br/><b>Type:</b> All conductors shall be Class 2 stranded, compacted circular, plain Aluminium, Grade H4 as per IS 8130:1984. Conductor shall be of high electrical conductivity Aluminum as specified, conforming to requirement of relevant standards. Before stranding, the conductor shall be circular in cross-section, uniform in quality, solid, smooth and free from scale, sharp edges and other defects.<br/><b>Water inhibition:</b> A conductor filling (strand blocking) shall be provided to inhibit water migration along the conductor. This material shall be water swellable non-conducting tape capable of 90 degree Celsius continuous operation. The filling material shall be compatible with semi conducting and insulating compounds in the cable. In addition, the filling material shall have zero flow and no drip at temperature below 90 degree Celsius and it shall not harm the electrical conductivity of the conductor or joint. The bidder shall describe the method of preparing the filled central conductor for jointing.</p> <p><b>5.1.2.</b><br/><b>Permissible number of joints:</b> Conductors shall conform to the standards for permissible number of joints in any one of the single wires forming every complete length of conductor, for location of joints in same layer of conductors and for method of making such joints. No joint shall be made in any conductor after it is stranded.</p> |                   |   |
| 5.2 | <b>CONDUCTOR SCREENING</b>  | The conductor screening shall consist of a layer of extruded semi-conducting compound as per IS 7098- Part II, 1985 with latest amendments. The semi conducting compound shall be suitable for operating temperature of the cable and compatible with the insulating material. The semi-conducting screens should be effectively cross linked to achieve 90 °C cable rating. The interface between conductor screening and insulation shall be uniform and free from any protrusion/convolution on its surface.  |                   |   |
| 5.3 | <b>INSULATION</b>           | <p>5.3.1 The insulation material shall be Cross linked Polyethylene (XLPE) cured by Dry curing process and applied by extrusion process as per IS 7098:Part II with its latest amendments. 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.</p> <p>5.3.2 The average thickness of insulation shall be as per IS 7098(part II):1985 with latest amendments or as specified in GTP, whichever is greater with tolerance as per IS 7098 (Part-II):1985. It shall fit tightly to the conductor and shall be applied concentrically about the conductor in thickness consistent with voltage classification.</p> <p>5.3.3 The insulation shall be so applied that it shall be possible to remove it without damaging the conductor.</p>  |                   |   |


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|             |                             |   |
|-------------|-----------------------------|---|
|             |                             | 5.3.4 The insulating material shall have excellent electrical properties with regard to resistivity, dielectric constant and loss factor and shall have high tensile strength and resistance to abrasion. This shall not deteriorate at high temperatures or when immersed in water. The insulation shall be preferably resistant to chemicals like acids, alkalies, & oils.  |
| <b>5.4</b>  | <b>INSULATION SCREENING</b> | <p>The insulation screening shall consist of following two parts:</p> <p>a) <b>Non-Metallic Part:</b> This shall be applied directly over the insulation of each core and shall consist of an extruded semi-conducting compound. The semi-conducting compound shall be suitable for the operating temperature of the cable and compatible with the insulating material.<br/><b>For TPCODL:</b> Insulation screen shall be of strippable type with minimum thickness of 0.7mm.</p> <p>b) <b>Water Swellable tape:</b> The water swellable tape shall be applied over the non-metallic screening. This tape shall be of semiconducting compound acting as a moisture barrier for the core. The water swellable tape shall be applied over the semi conducting insulation screen of individual core with minimum <b>25% overlap</b> before the copper screening.</p> <p>c) <b>Metallic Part:</b> This shall consist of a layer of annealed copper tape and shall be applied over the water swellable tape. The copper screen over the water swellable tape shall be helically wound with minimum <b>20% overlap</b>.</p> |
| <b>5.5</b>  | <b>CORE IDENTIFICATION</b>  | For 3 Core Cable – Each of the three core shall be identified by applying the Red, Yellow and Blue coloured strips over them.   |
| <b>5.6</b>  | <b>LAYING UP OF CORES</b>   | In three core cables, the cores shall be laid together with a suitable right hand lay. Where necessary, the interstices shall be filled with non-hygroscopic material.  |
| <b>5.7</b>  | <b>FILLERS</b>              | In three core cables, fillers or bedding used in multi-conductor cables shall be non-wicking and non-moisture absorbing thermoplastic material. Fillers shall be so chosen as to be compatible with the temperature ratings of the cables and shall have no deleterious effect on any other component of the cable.   |
| <b>5.8</b>  | <b>INNER SHEATH</b>         | <p><b>5.8.1</b> The laid up cores shall be provided with normal extruded inner sheath. It shall be ensured that the shape is as circular as possible. The inner sheath shall be of polyvinyl chloride (PVC) Compound conforming to the requirements of type ST-2 of IS: 5831-1984 with latest amendments. The inner sheath shall be black in colour.</p> <p><b>5.8.2</b> It shall be applied to fit closely on to the laid up cores and shall be possible to remove easily without causing any damage to the underlying insulated cores and screens.</p> <p><b>5.8.2</b> The minimum thickness of the inner sheath shall be as per IS: 7098 (Part-II) – 1985.</p>   |
| <b>5.9</b>  | <b>ARMOURING</b>            | <p><b>5.9.1</b> The armoring shall be applied over the inner sheath in cables. The armoring shall be as follows:</p> <p>a) For Multicore cables: Galvanized round steel wires</p> <p>b) For Single Core Cables: H4 Grade aluminium wires</p> <p>It shall comply with the requirements of IS 3975:1999 along with latest amendments. The armor wires shall be applied as closely as possible. The direction of lay of the armor shall be left hand. The armour wires shall be applied as closely as practicable. The dimensions of armour round wires shall be as per IS-7098(Part-II): 1985.</p> <p><b>5.9.2</b> The rubberized cotton tape shall be applied to bind the armor wires such that it shall not affect the electrical properties of the armor wires and the overall cable.</p> <p><b>5.9.3</b> The joints in the armor wires shall be made by brazing or welding and the surface irregularities shall be removed. A joint in any wire shall be at least 300 mm from the nearest joint in any other armour wire in the completed cable.</p>  |
| <b>5.10</b> | <b>OUTER SHEATH</b>         | The outer sheath shall be applied by extrusion process. The outer sheath shall be of polyvinyl chloride (PVC) compound conforming to the requirements of type ST2 of IS 5831:1984 with latest amendments. The minimum and nominal thickness shall be as per IS 7098-(Part-II):1985 subject to tolerances as per   |


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|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |



|   |   |                                       |
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|                                 |                                | <p>standard.<br/>The PVC outer sheath shall be ultraviolet protected for operation in direct sunlight with extruded semi-conducting layer for performing the sheath integrity test.</p> <p>Colour coding of outer sheath shall be as mentioned below:</p> <table border="1"> <thead> <tr> <th>Cable Rating:</th> <th>TPCODL</th> </tr> </thead> <tbody> <tr> <td>11kV</td> <td>Yellow/ As specified by TPCODL</td> </tr> <tr> <td>33kV</td> <td>Black</td> </tr> </tbody> </table>   | Cable Rating:               | TPCODL    | 11kV                            | Yellow/ As specified by TPCODL | 33kV                            | Black |                                 |       |
|---------------------------------|--------------------------------|--|-----------------------------|-----------|---------------------------------|--------------------------------|---------------------------------|-------|---------------------------------|-------|
| Cable Rating:                   | TPCODL                         |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 11kV                            | Yellow/ As specified by TPCODL |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 33kV                            | Black                          |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 6.0                             | <b>MARKING</b>                 | <p>The <b>drum</b> shall carry the following information <b>stenciled</b> on both sides of the drum:</p> <ol style="list-style-type: none"> <li>Reference to the standards</li> <li>Manufacturer's name</li> <li>Type of Cable</li> <li>Voltage Grade</li> <li>Number of cores</li> <li>Nominal Cross sectional Area of the conductor/Cable size</li> <li>Cable Code</li> <li>Length of the cable on the drum</li> <li>Number of lengths on the drum (If more than one)</li> <li>Direction of the rotation of the drum</li> <li>Gross mass</li> <li>Country of manufacture</li> <li>Year and month of manufacture</li> <li>Purchase Order no.</li> </ol> <p>The following details shall be <b>embossed</b> on the <b>outer PVC Jacket</b> of the cable :</p> <ol style="list-style-type: none"> <li>Running meter marking</li> <li>"Property of TPCODL" at every meter – As per requirement of utility.</li> <li>"Name of Supplier" at every meter</li> <li>"Year of Manufacture" at every meter</li> <li>"Voltage grade" at every meter</li> <li>"Size of the cable" shall be embossed on the cable in bold letters.</li> <li>Font size of 12mm shall be used for all markings on single core cables and the embossing shall be done on one side throughout the length of cable for single core cables.</li> <li>Font size shall be as per below table for all markings on three core cables and the embossing shall be done on one side throughout the length of cable for three core cables.</li> </ol> <table border="1"> <thead> <tr> <th>Cable size, rating and code</th> <th>Font size</th> </tr> </thead> <tbody> <tr> <td>3C x 300 sq.mm 11 KV(E) A2XCEWY</td> <td>10 mm</td> </tr> <tr> <td>3C x 400 sq.mm 11 KV(E) A2XCEWY</td> <td>10 mm</td> </tr> <tr> <td>3C x 400 sq.mm 33 KV(E) A2XCEWY</td> <td>12 mm</td> </tr> </tbody> </table> <p>Voltage levels for all the cables shall be embossed legibly on the outer sheath of the cables.</p> | Cable size, rating and code | Font size | 3C x 300 sq.mm 11 KV(E) A2XCEWY | 10 mm                          | 3C x 400 sq.mm 11 KV(E) A2XCEWY | 10 mm | 3C x 400 sq.mm 33 KV(E) A2XCEWY | 12 mm |
| Cable size, rating and code     | Font size                      |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 3C x 300 sq.mm 11 KV(E) A2XCEWY | 10 mm                          |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 3C x 400 sq.mm 11 KV(E) A2XCEWY | 10 mm                          |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 3C x 400 sq.mm 33 KV(E) A2XCEWY | 12 mm                          |  |                             |           |                                 |                                |                                 |       |                                 |       |
| 7.0                             | <b>TESTS</b>                   | <p>All routine, acceptance &amp; type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by TPCODL's authorized representative. All the components should also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the 11/33kV cables in additions to others specified in IS/IEC standards.</p>  |                             |           |                                 |                                |                                 |       |                                 |       |
| 7.1                             | <b>TYPE TEST</b>               | <ol style="list-style-type: none"> <li>Tests on Conductor <ol style="list-style-type: none"> <li>Tensile stress</li> <li>Wrapping test</li> </ol> </li> </ol>  |                             |           |                                 |                                |                                 |       |                                 |       |

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|     |                         |   |
|-----|-------------------------|---|
|     |                         | <ul style="list-style-type: none"> <li>c) Resistance test</li> <li>2) Tests for armoring wires as per IS 3975:1979</li> <li>3) Tests for thickness of insulation and sheath</li> <li>4) Physical test for insulation <ul style="list-style-type: none"> <li>a) Tensile strength and elongation at break as per IS 10810 (part 7)</li> <li>b) Ageing in air oven</li> <li>c) Hot test</li> <li>d) Shrinkage test</li> <li>e) Gravimetric test (Water absorption)</li> </ul> </li> <li>5) Physical test for outer sheath <ul style="list-style-type: none"> <li>a) Tensile strength and elongation at break as per IS 10810 (part 7)</li> <li>b) Ageing in air oven</li> <li>c) Shrinkage test</li> <li>d) Hot deformation</li> <li>e) Loss of mass in air oven</li> <li>f) Heat shock</li> <li>g) Thermal stability</li> </ul> </li> <li>6) Resistance to UV protection on outer sheath as per ASTM-G 154-16&amp;IS 10810 (part 7).</li> <li>7) Partial discharge test</li> <li>8) Bending test</li> <li>9) Dielectric power factor test <ul style="list-style-type: none"> <li>a) As a function of voltage</li> <li>b) As a function of temperature</li> </ul> </li> <li>10) Insulation resistance (volume resistivity) test</li> <li>11) Heating cycle test</li> <li>12) Impulse withstand test</li> <li>13) High voltage test</li> <li>14) Flammability test</li> <li>15) Water tightness test for water swellable tape</li> <li>16) Hydrophobic stability as per ASTM 3137-81</li> </ul> |
| 7.2 | <b>ACCEPTANCE TEST</b>  | <ul style="list-style-type: none"> <li>1) Tensile stress</li> <li>2) Wrapping test</li> <li>3) Conductor resistance test</li> <li>4) Test for thickness of insulation and sheath</li> <li>5) Hot set test for insulation</li> <li>6) Tensile strength and elongation at break test for insulation and sheath.</li> <li>7) Partial discharge test</li> <li>8) High voltage test</li> <li>9) Insulation resistance (volume resistivity) test</li> </ul>   |
| 7.3 | <b>ROUTINE TEST</b>     | <ul style="list-style-type: none"> <li>1) Conductor Resistance test</li> <li>2) Partial Discharge test</li> <li>3) High Voltage test</li> </ul>   |
| 7.4 | <b>ADDITIONAL TESTS</b> | <p>Additional tests for Concentricity, Voids, Contamination tests on insulation parameters as performed according to IS 7098 Part 3 to be performed to ensure that the cable should meet the following characteristics:</p> <ul style="list-style-type: none"> <li>• Core consistency with hot set/creep less than 100%</li> <li>• No voids larger than 75 microns per 16.4 cubic cm</li> <li>• No ambers larger than 250 microns per 16.4 cubic cm</li> <li>• No contaminants larger than 125 microns and less than 5 between 50-125 microns per cubic 16.4 cubic cm tested.</li> <li>• Cable insulation concentricity greater than 90% tested</li> </ul>  |

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|-------------|---|--|
|             |   | <ul style="list-style-type: none"> <li>No protrusions greater than 75 microns at the conductor shield and 125 microns at the insulation shield</li> </ul>  |
| <b>8.0</b>  | <b>TYPE TEST CERTIFICATES</b>             | <p>The Bidder shall furnish the type test certificates of the 11 and 33 kV cable for the tests as mentioned above as per the corresponding standards. All the type tests shall be conducted at certified test laboratories like CPRI / ERDA / KEMA / NABL Accredited Lab as per the relevant standards. <b>Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid.</b> 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. Additional certification should be provided stating that :</p> <p>The cable produced is expected to meet long duration performance criteria based on quality and consistency of manufacturing.</p> <p>In case the type test certificates are dated beyond 5 years and up to 10 years maintaining basic component design same then deviation should be submitted on vendor letter head. TPCODL will have the rights to accept/reject the same.</p>  |
| <b>9.0</b>  | <b>PRE-DESPATCH INSPECTION</b>            | <p>The Material shall be subject to inspection by a duly authorized representative of the TPCODL. Inspection may be made at any stage of manufacture at the discretion of TPCODL 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 representatives at all times when the work is in progress. Inspection by TPCODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. The inspection of cable during manufacturing will be done especially while copper tape screening and forming of laid up cores for new vendors. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL</p> <p>Following documents shall be sent along with material</p> <ol style="list-style-type: none"> <li>Test reports</li> <li>MDCC issued by TPCODL</li> <li>Invoice in duplicate</li> <li>Packing list</li> <li>Drawings &amp; catalogue</li> <li>Guarantee / Warrantee card</li> <li>Delivery Challan</li> <li>Other Documents (as applicable).</li> </ol> |
| <b>10.</b>  | <b>INSPECTION AFTER RECEIPT AT STORES</b> | <p>The material received at TPCODL store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Contracts &amp; Engineering department.</p>   |
| <b>11.0</b> | <b>GUARANTEE</b>                          | <p>Bidder shall stand guarantee towards design, materials, workmanship &amp; quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by TPCODL, up to a period of at least 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 TPCODL, failing</p>   |

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|-------------|--------------------------------------|--|
|             |                                      | <p>which TPCODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPCODL own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be.</p> <p>Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by TPCODL.</p>  |
| <b>12.0</b> | <b>PACKING</b>                       | <p>The cable shall be wound on strong weatherproof and non-returnable steel drums packed in coil lengths as specified below and in line with the requirement of IS 10418:1982 and its latest amendments. The ends of the cable shall be sealed by means of non-hygroscopic sealing material. 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 or projections or unevenness capable of damaging the cable or hands of the operator during rotation of drums. A metal preservation shall be applied to the entire drum. All ferrous types 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</p> <p>The 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.</p> <p>Drum lengths for the 3 core cables should be as follows –<br/> 33 kV 3C x 400sq mm XLPE cable –250 m*<br/> 11 kV 3C x 300sq mm, 3C x 400 sq.mm. XLPE cable –250m*</p> <p><b>*Drums to accommodate cable lengths of min 150 m to max 500m shall be provided on request/as per purchase order.</b></p> <p>Drum lengths for the 1 core cables should be as follows –<br/> 33 kV 1C x 630sq mm XLPE cable –500 m<br/> 11 kV 1C x 185sq mm XLPE cable – 500 m<br/> 11 kV 1C x 630sq mm XLPE cable – 500 m<br/> 11 kV 1C x 1000sq mm XLPE cable – 500 m<br/> Max drum length variation permitted is +/- 5%</p> |
| <b>13.0</b> | <b>TENDER SAMPLE</b>                 | Bidder shall have to submit the sample of material with the offer to TPCODL  |
| <b>14.0</b> | <b>QUALITY CONTROL</b>               | <p>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.</p> <p>TPCODL reserves the sole rights for the type test of random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the bid, the complete Lot shall be rejected.</p> <p>TPCODL's engineer or its nominated representative shall have free access to the bidder's works to carry out inspections.</p>   |
| <b>15.0</b> | <b>MINIMUM TESTING FACILITIES</b>    | Bidder shall have adequate in house testing facilities for carrying out all routine and acceptance tests as per relevant International / Indian standards.   |
| <b>16.0</b> | <b>MANUFACTURING ACTIVITIES</b>      | 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.  |
| <b>17.0</b> | <b>SPARES, ACCESSORIES AND TOOLS</b> | Not Applicable   |

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| <b>18.0</b>  | <b>DRAWINGS AND DOCUMENTS</b>                  | <p>Following documents shall be prepared based on the specifications and statutory requirements with complete BOM and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>Completely filled-in Technical Parameters</li> <li>General description of the equipment and all components including brochures</li> <li>Type test Certificates</li> <li>Experience List.</li> <li>Cross sectional drawing of the cable.</li> </ol> <p>Drawings/Documents to be submitted after the award of the contract:</p>   |   |              |                        |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|--|--|---|---|--------------|------------------------|------------------------|------------------|---|----------------------|---|--|---|---|--|--|---|--|---|---|--|---|---|---|-----------------------------------|---|--|---|---|---------------------------|--|---|---|---|----------------------|--|---|---|---|--------------------------------------|--|---|---|---|--------------|---|---|---|---|--|---|---|---|----|-------------------------|---|---|---|
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|  |  | S. No   | Description   | For Approval | For Review Information | Final Submission       |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 1   | Technical Parameters                                      | √            |                        | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 2   | Manual/Catalogues/drawings for all components.            |              | √                      |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 3   | Technical details and test certificates of XLPE compound. |              | √                      | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 4   | Cross sectional area of the cable                         | √            |                        | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 5   | Installation Instructions                                 |              | √                      | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 6   | Instructions for use                                      |              | √                      | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
|  |  | 7   | Transport/shipping dimension drawing                      |              | √                      | √                      |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
| 8  | QA & QC Plan                                   | √   | √   | √            |                        |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
| 9  | Routine, Acceptance and Type test Certificates | √   | √   | √            |                        |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
| 10   | Fault level calculation                        | √   | √   | √            |                        |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |
| <p>All the Documents and Drawings shall be in English Language.<br/>After receipt of the order, the successful bidder will be required to furnish two copies of all relevant drawings/Documents for TPCODL approval.</p> <p><b>Instruction Manuals:</b> Bidder shall furnish manual (in English Language) covering erection and maintenance instructions and all relevant information pertaining to the cables in case supplying for the first time.</p> |  |   |   |              |                        |                        |                  |   |                      |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                                   |   |  |   |   |                           |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |    |                         |   |   |   |


| <b>19.0</b> | <b>GUARANTEED TECHNICAL PARTICULARS</b> | <table border="1"> <thead> <tr> <th>S. No.</th> <th>Particulars</th> <th>Units</th> <th>As required</th> <th>As furnished by Bidders</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><b>Voltage Grade</b></td> <td>kV</td> <td>11/33 KV(E)</td> <td></td> </tr> <tr> <td>2</td> <td><b>Variation in Supply voltage</b></td> <td>%</td> <td>+/- 10</td> <td></td> </tr> <tr> <td>3</td> <td><b>Variation in Frequency</b></td> <td>%</td> <td>+/- 5</td> <td></td> </tr> <tr> <td>4</td> <td><b>Type of Cable</b></td> <td></td> <td>Stranded Aluminium Conductor, Screened, XLPE insulated, Extruded Semiconducting compound, water swellable tape, Copper tape, extruded PVC Inner Sheathed, GI Wire armoured bind by Rubberized cotton tape and PVC Outer Sheathed</td> <td></td> </tr> <tr> <td>5</td> <td><b>CONDUCTOR</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a)</td> <td>Material</td> <td></td> <td>H4 grade Aluminium Conductor to IS:8130-1984</td> <td></td> </tr> </tbody> </table> | S. No.                                       | Particulars | Units  | As required             | As furnished by Bidders | 1 | <b>Voltage Grade</b> | kV | 11/33 KV(E) |  | 2 | <b>Variation in Supply voltage</b> | % | +/- 10 |  | 3 | <b>Variation in Frequency</b> | % | +/- 5 |  | 4 | <b>Type of Cable</b> |  | Stranded Aluminium Conductor, Screened, XLPE insulated, Extruded Semiconducting compound, water swellable tape, Copper tape, extruded PVC Inner Sheathed, GI Wire armoured bind by Rubberized cotton tape and PVC Outer Sheathed |  | 5 | <b>CONDUCTOR</b> |  |  |  | a) | Material |  | H4 grade Aluminium Conductor to IS:8130-1984 |  |
|-------------|---|--|--|-------------|--|-------------------------|-------------------------|---|----------------------|----|-------------|--|---|------------------------------------|---|--------|--|---|-------------------------------|---|-------|--|---|----------------------|--|--|--|---|------------------|--|--|--|----|----------|--|--|--|
|             |   | S. No.   | Particulars                                  | Units       | As required  | As furnished by Bidders |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
|             |   | 1  | <b>Voltage Grade</b>                         | kV          | 11/33 KV(E)  |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
|             |   | 2  | <b>Variation in Supply voltage</b>           | %           | +/- 10   |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
|             |   | 3  | <b>Variation in Frequency</b>                | %           | +/- 5  |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
|             |   | 4  | <b>Type of Cable</b>                         |             | Stranded Aluminium Conductor, Screened, XLPE insulated, Extruded Semiconducting compound, water swellable tape, Copper tape, extruded PVC Inner Sheathed, GI Wire armoured bind by Rubberized cotton tape and PVC Outer Sheathed |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
|             |   | 5  | <b>CONDUCTOR</b>                             |             |  |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |
| a)          | Material                                |  | H4 grade Aluminium Conductor to IS:8130-1984 |             |  |                         |                         |   |                      |    |             |  |   |                                    |   |        |  |   |                               |   |       |  |   |                      |  |  |  |   |                  |  |  |  |    |          |  |  |  |

| Rev No. | Description                            | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
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| RO      | Specification for 11KV and 33kv cables | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

|   |   |   |
|---|---|---|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <b>TPCODL</b><br><br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | <b>Specification for 11kV,33KV<br/>cables</b> |
| <b>NEG-SPEC-17</b>                                |   | <b>Date of Issue: 05/08/2020</b>              |

|  |    |  |            |   |
|--|----|--|------------|---|
|  | b) | No. of cores & size                    | Sq.mm      | To be provided  |
|  | c) | Min. No. of wires                      | Nos.       | To be furnished by Bidder   |
|  | d) | Shape of Conductor                     |            | Stranded Compacted Circular   |
|  | e) | Minimum Weight of Conductor            | Kg/km/Core | To be furnished by Bidder   |
|  | 6  | <b>CONDUCTOR SCREEN</b>                | mm         | Extruded Semi Conducting Compound<br>min. thickness - 0.3 mm (for three core cables) ; 0.5 mm (for single core cables)  |
|  | 7  | <b>INSULATION</b>                      |            |   |
|  | a) | Material                               |            | XLPE insulation as per IS: 7098 (Part-II) – 1985  |
|  | b) | Nom. Thickness                         | mm         | 11kV:<br>3CX300 sq.mm. – 3.6 mm<br>3CX400 sq.mm.- 3.6mm<br>1CX1000 sq.mm.- 3.6mm<br>1CX630 sq.mm.- 3.6mm<br>1CX185 sq.mm.- 3.6mm<br>33kV:<br>3CX400 sq.mm.- 8.8mm<br>1CX630 sq.mm.- 8.8mm |
|  | 8  | <b>INSULATION SCREENING</b>            |            |   |
|  | a) | Non Metallic Part                      |            | Ext. Semi Conducting Compound Layer (min. thickness 0.7 mm) – Strippable type.  |
|  | b) | Water swellable tape                   |            | Semi conducting compound with 25% overlap   |
|  | b) | Metallic Part                          | mm         | Copper Tape (minimum thickness 0.045mm) with 20% overlap  |
|  | c) | Identification of cores                |            | By using coloured strips as per Cl.13 of IS:7098(II)-1985   |
|  | 9  | <b>INNER SHEATH</b>                    |            |   |
|  | a) | Material                               |            | PVC Compound type ST-2 as per IS 5831-1984  |
|  | b) | Process of applying                    |            | Normal extruded and not pressure extruded   |
|  | c) | Min. Thickness                         | mm         | 0.7mm   |
|  | 10 | <b>ARMOURING</b>                       |            |   |
|  | a) | Material                               |            | For Multi-Core cable - Galvanized Steel Wire as per IS- 3975 : 1979<br>For Single core cable - H4 Grade aluminium wire  |
|  | b) | Nom. Thickness (GI) – For 3 Core cable | mm         | 33 kV ,3C x 400 Sq.mm. - 4 mm<br>11kV ,3C X 400 Sq. mm. – 4 mm<br>11 kV ,3C x 300 Sq. mm.- 3.15 mm  |
|  | c) | Nom. Thickness (Al) – For 1 Core cable | mm         | 33kV, 1C x 630 sq.mm. – 2.5mm<br>11 kV ,1C x 185 Sq.mm. -2.5 mm<br>11 kV ,1C x 630 Sq.mm. -2.0 mm<br>11kV, 1C x 1000 sq.mm. – 2.5mm   |
|  | c) | Rubberized cotton tape                 |            | RC tape to be provided to bind armour wires   |
|  | d) | Armouring Area Coverage                |            | Minimum area of coverage shall be 90%. The gap between any two armour strip/wire shall not be more than the diameter of armour wire.  |

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| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b><br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | <b>Specification for 11kV,33KV<br/>cables</b> |
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|    |  |  |                            |  |             |
|----|--|--|----------------------------|--|-------------|
|    | 11   | <b>OUTER SHEATH</b>                              |                            |  |             |
|    | a)   | Material   |                            | Extruded PVC Compound Type ST2 as per IS: 5831-1984  |             |
|    | b)   | Minimum outer thickness                          | mm                         | 33 kV ,3C x 400 Sq.mm. - 3 mm<br>33 kV ,1C x 630 Sq.mm. - 2.12 mm<br>11 kV ,3C x 400 Sq.mm. - 3 mm<br>11 kV ,3C x 300 Sq.mm. - 2.84 mm<br>11 kV ,1C x 185 Sq.mm. - 1.56 mm<br>11 kV ,1C x 630 Sq.mm. - 1.88 mm<br>11 kV ,1C x 1000 Sq.mm. - 2.2 mm |             |
|    | 12   | App. Calculated overall diameter                 | mm                         | To be furnished by Bidder  |             |
|    | 13   | Tolerance on Diameter                            | mm                         | +/- 3  |             |
|    | 14   | Standard Length with Tolerance                   | m                          | As specified in clause 12.0 of specification   |             |
|    | 15   | Dimensions of the Drum:                          |                            | To be furnished by Bidder  |             |
|    | a)   | With respect to Belly Diameter                   | mm                         | To be furnished by Bidder  |             |
|    | b)   | With respect to Overall Diameter of the cable    | mm                         | To be furnished by Bidder  |             |
|    | 16   | Equivalent effective Impedance of the Cable      | Ohms/ Km                   | To be furnished by Bidder  |             |
|    | 17   | Equivalent effective Capacitance of the cable    | mF/Km                      | To be furnished by Bidder  |             |
|    | 18   | Short circuit capacity of conductor for one sec. | kA/sec                     | 33 kV Cable  |             |
|    |  |  |                            | 3CX400 sq.mm.  | 37.7 kA/sec |
|    |  |  |                            | 1CX630 sq.mm.  | 59.4 kA/sec |
|    |  |  |                            | 11 kV Cable  |             |
|    |  |  |                            | 3CX400 sq.mm.  | 37.7 kA/sec |
|    |  |  |                            | 3CX300 sq.mm.  | 28.3 kA/sec |
|    |  |  |                            | 1CX1000 sq.mm.   | 94.3 kA/sec |
|    |  |  |                            | 1CX630 sq.mm.  | 59.4 kA/sec |
|    |  |  |                            | 1CX185 sq.mm.  | 17.5 kA/sec |
|    | 19   | Short time overload Capacity                     |                            |  |             |
|    | 20   | For 1 hour                                       | Amps.                      | To be furnished by Bidder  |             |
|    | 21   | For 24 Hours                                     | Amps.                      | To be furnished by Bidder  |             |
|    | 22   | For 72 Amps.                                     | Amps.                      | To be furnished by Bidder  |             |
|    | 23   | Continuous current rating of cable when laid     |                            |  |             |
| a) | Direct in ground at 35 Deg.C.                | Amps.  | To be furnished by Bidder  |  |             |
| b) | In Air at 45 Deg.C.                          | Amps.  | To be furnished by Bidder  |  |             |
| c) | In Ducts                                     | Amps.  | To be furnished by Bidder  |  |             |
| d) | In 2 Circuits                                | Amps.  | To be furnished by Bidder. |  |             |
| e) | In 3 circuits                                | Amps.  | To be furnished by Bidder  |  |             |
| 24 | Max. DC Resistance of Conductor at 20 Deg.C. | ohm/km   | To be furnished by Bidder  |  |             |
| 25 | Approx. Weight of the Cable                  | Kg/m   | To be furnished by Bidder  |  |             |

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|         |  | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

| 20.0   | <b>SCHEDULE OF<br/>DEVIATIONS</b> | <b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b>  |            |  |  |
|--|-----------------------------------|--|------------|--|--|
|  |                                   | 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 |  |
| 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  |            |  |  |


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|   |   |   |
|---|---|---|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 11kV,33KV<br/>cables</b> |
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|   |   |  |
|---|---|--|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 11kV ,22kV and<br/>33 kV UG Cable Joints and<br/>Terminations</b> |
| <b>NEG-SPEC-19</b>                                |   | <b>Date of Issue: 05/08/2020</b>   |

**Technical Specification**  
**For**  
**Specification for 11kV ,22kV and 33 kV UG Cable Joints and  
Terminations**

**TP Central Odisha Distribution Limited.**  
**Network Engineering Group**  
**2<sup>nd</sup> Floor, IDCO Tower**  
**Janpath, Bhubaneswar- 751022**

| Rev No. | Description   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|---|--------------------|-------------------|------------------------------|
| RO      | Specification for 11kV ,22kV and 33 kV UG Cable Joints and Terminations | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |


|   |  |   |
|---|--|---|
| TP Central Odisha<br>Distribution Limited | <br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | Specification for 11kV ,22kV and<br>33 kV UG Cable Joints and<br>Terminations |
| NEG-SPEC-19                               |  | Date of Issue: 05/08/2020   |

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|   |  |  |
|---|--|--|
| <b>TP Central Odisha<br/>Distribution Limited</b> |  | <b>Specification for 11kV ,22kV and<br/>33 kV UG Cable Joints and<br/>Terminations</b> |
| <b>NEG-SPEC-19</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b>                                    | <b>Date of Issue: 05/08/2020</b>   |

### # Special Instructions for Bidders

Please read the following instructions carefully before submitting your bid:

- 1) Commercial and Technical bids have to be submitted separately.
- 2) The bidder shall submit the Manufacturing Quality Plan along with the Technical Bid.
- 3) The bidder shall submit all the required Valid Type test reports and filled in Type test verification sheet supplied along with the Technical Bid .All the type test certificates will have to be verified and signed from Tata Power`s Consumer Engineering Department and signed Type test verification sheet will have to be submitted along with the Technical Bid. Technical bid will not be accepted in the absence of verified and signed Type test verification sheet.
- 4) The bidder shall submit the hard and soft (excel) format of the GTP`s during the technical bid submission. Instead of mentioning " refer or as per IS/IEC" exact value/s must be filled in.
- 5) Evaluation will be carried out on the content of technical bid only and no further correspondence will be made.
- 6) Any technical deviations shall be clearly mentioned only in deviation sheet.

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## 1. SCOPE

This specification covers design, manufacture, testing, packing, inspection and delivery of cable terminations and joints employing Heat Shrink Technology suitable for 11 kV (E) ,22 kV (E) and 33 kV (E) Three core and Single core XLPE insulated screened and armoured cables as per IS 7098 part 2 with up to date amendments, having compacted circular stranded aluminium conductors of sizes 25 mm<sup>2</sup> to 1000 mm<sup>2</sup>.


It is not the intent to specify completely herein all details of design and construction of equipment/system .However equipment shall conform in all respects to high standards of Engineering, Design, and Workmanship and be capable of performing in continuous commercial operation up to vendors guarantee in a manner acceptable to the purchaser who will interpret the meaning of the drawings and specification and shall have the power to reject any work or materials, which in his judgement are not in full accordance therewith.

Bidder has to submit all relevant papers, copies of type test reports as required. Failure to do so may amount to the bids being considered non –responsive and outright rejection. The information as asked for is to be mentioned specifically and not be narrated like” as per ISS, relevant standard, reference to other pages of offer bid etc”.Technical data sheet annexed as Annexure –I has to be filled in completely and separately for indoor/outdoor terminations and straight through joints for each voltage class. Copies of the documents wherever asked for are to be enclosed for each requirement.

The offer documents have to be completely filled in and submitted even if there is repetition of information. The offer must have a clause wise affirmation of technical requirements.

Deviations /non-conformances/alternatives/.equivalents must be all separately listed as deviations.

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| TP Central Odisha<br>Distribution Limited | <br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | Specification for 11kV ,22kV and<br>33 kV UG Cable Joints and<br>Terminations |
| NEG-SPEC-19                               |  | Date of Issue: 05/08/2020   |

## 2. APPLICABLE STANDARDS

Applicable standards for testing of Heat Shrink joints and terminations along with material of the components:

|                 |   |
|-----------------|---|
| IS -13573/2011  | Joints & Terminations for polymeric cables for working voltages 6.6 kV up to and including 33 kV –Performance Requirements and Type Tests |
| ESI -09-13      | Electricity Supply Industry Specification-Performance requirements on Heat shrinkable components  |
| IEEE -48        | Standard Test procedures and requirements for high voltage alternating current cable termination  |
| IS -10810 :1984 | Method of tests for cables  |

## 3. CLIMATIC CONDITIONS OF THE INSTALLATION

|   |                                  |                                    |
|---|----------------------------------|------------------------------------|
| a | Average grade of Soil Condition  | Water Logged                       |
| b | Ambient Air Temperature          | Highest 45 deg C ,Average 35 deg C |
| c | Minimum                          | 20 deg C                           |
| d | Relative Humidity                | 100 % Max                          |
| e | Thermal Resistivity of Soil      | 120 Deg C Cm/w                     |
| F | Seismic Zone                     | 3                                  |
| g | Rainfall                         | 3000 mm concentrated in four       |
| h | Maximum altitude above sea level | 1000                               |

## 4. GENERAL TECHNICAL REQUIREMENTS

**4.1. Class of Terminations:** The heat shrinkable terminations (Indoor and Outdoor type) offered shall be Class –I terminations as defined in IEEE standard 48.

**4.2. Class of Straight Through Joints:** The straight through joints must be suitable for direct burial with uncontrolled backfill, water logging, and open trays/trenches.

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| <b>TP Central Odisha<br/>Distribution Limited</b> | <b>TPCODL</b>                                 | <b>Specification for 11kV ,22kV and<br/>33 kV UG Cable Joints and<br/>Terminations</b> |
| <b>NEG-SPEC-19</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b> | <b>Date of Issue: 05/08/2020</b>   |

#### 4.3. Stress Control

|       |  |
|-------|--|
| 4.3.1 | The stress control function at the screen cut back shall be provided by a heat shrinkable tubing having volume resistivity of minimum 10 raise to 7 ohms-meter for both terminations and joints. Also, the relative permittivity shall be minimum 15. The length of stress control tubing should be minimum 130 mm for 11 kV and minimum 260 mm for 33 kV. Bidder shall furnish documentary evidence confirming adherence to these or the dimensions as per the type test report ,whichever is higher. Cross linking using irradiation only. |
| 4.3.2 | The impedance of stress control tubing shall not change over a range of temperature from 0 deg C to 125 deg C. Thermal Endurance test as per IEC 60216   |
| 4.3.3 | For straight through joints prior to the installation of the stress control tubing ,high permittivity mastic must be applied over the connector ,overlapping the insulation by 3 mm .The minimum permittivity of the mastic shall be between 5 and 20  |
| 4.3.4 | At the steps caused by semi conductive screen cut back, high permittivity mastic is to be provided to prevent discharge activity at the step. The minimum permittivity of the mastic should be 15. Semiconducting paints are not acceptable.   |
| 4.3.5 | Silicone grease shall be provided for filling up the nicks and scratches on the surface of XLPE insulation.  |

#### 4.4. Non Tracking, Erosion and Weather Resistant Protection

|       |   |
|-------|---|
| 4.4.1 | The entire surface from the high voltage point to the earthing point of the cable shall be non-tracking, weather and erosion resistant, and hydrophobic in nature.  |
| 4.4.2 | A heat shrinkable flexible polymeric tubing, coloured red, and possessing non tracking erosion and weather resistant properties shall be used as an external covering for the cable cores for both indoor and outdoor terminations. Rain sheds (skirts) wherever required for providing additional creepage shall also be of the same material as the non –tracking tube. |

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|       |   |
|-------|---|
| 4.4.3 | The tubes must be extruded and expanded by irradiation process only   |
| 4.4.4 | The tube material shall confirm to the requirements of ASTM-D-2303 and copies of the test report shall be furnished .Molded tubing are not acceptable.  |
| 4.4.5 | The material used for manufacturing the non tracking tubing's and rain sheds (skirts) material confirm to Thermal Endurance Test as specified by IEC 60216 and shall be submitted in support of this assessment .Load cycling tests alone, shall not be considered sufficient basis for such life assessment. |

#### **4.5 ENVIRONMENTAL SEALING**

|       |  |
|-------|--|
| 4.5.1 | Adhesives and sealants shall be provided in the termination and jointing kits for environmental sealing against ingress of moisture and aggressive gases. The adhesives and sealants will flow due to heating of heat shrinkable components or otherwise during installation and will fill all the voids and adhere to metal components and cable sheaths.   |
| 4.5.2 | For terminations :The sealing of the strands between the lug barrel and cable termination shall be provided by:<br>a)Non tracking, erosion and weather resistant non-tracking sealant coated over the inner side of heat shrinkable tubing<br>b)Non tracking sealant strips<br>The sealant should have unlimited shelf life.   |
| 4.5.3 | For Joints: The outer black coloured heat shrinkable flexible polymeric tubing shall be pre-coated with adhesives to provide sealing of the exposed metallic components/earth connections. Irradiation to be used for cross-linking.   |
| 4.5.4 | Provision of Additional Creepage for Indoor and Outdoor terminations-Single piece, heat shrinkable weather sheds (skirts) having non-tracking, erosion and weather resistant properties shall be supplied with the kits for providing additional creepage.The quantity of sheds to be supplied shall depend on voltage grade and Indoor/Outdoor application and shall be indicated along with the bid. Each shed shall give additional creepage length of at least 100 mm. |

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#### .4.6 Insulation and Screen reinstatement for joints

|       |  |
|-------|--|
| 4.6.1 | To ensure a void free bond between the rebuilt insulation and non metallic screen the bidder shall supply single coextruded dual wall tubing which enables the final insulating layer to be installed complete with a conductive polymeric screen in one step. The dual walled tubing must be a coextruded and shall be offered with joints. Insulating sleeves coated with conductive material are not permitted. Bidders must confirm they are offering co-extruded dual wall tubing for straight through joints as indicated above. |
| 4.6.2 | Insulation Build up –Maximum three layers of insulation tubes shall be used. Total thickness of the insulation being provided in the joints shall not be less than 1.2 times the insulation of the cable being jointed. Physical and Electrical properties shall confirm to ESI 09:13  |

#### 4.7 Earth/Screen Continuity /Termination System

|       |   |
|-------|---|
| 4.7.1 | Metal screen continuity for each core shall be achieved by using tinned copper mesh and earth continuity by means of two tinned copper braided conductor of 25 sq mm for 11 kV and 35 sq mm for 22 and 33 kV. The armour bond shall be achieved by means of a combination of a steel support ring (for 3 core SWA cable) or Aluminium support ring (for 1 – core AWA cable) and two nos. of stainless steel hose clips. Support ring shall be `Zinc sprayed and central bulge/bump`.Width of the support ring shall be 70 mm. |
| 4.7.2 | In terminations, tinned copper braids of appropriate sizes along with copper lugs of appropriate sizes shall be provided for the continuity of screen/armour along with adequate holding arrangements.  |

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#### 4.8 Lugs / Mechanical Connectors

|       |  |
|-------|--|
| 4.8.1 | The requisite number of long barrel Aluminium Lugs for terminations and Mechanical shear bolt type connectors for joints for compact circular stranded conductors shall be provided.   |
| 4.8.2 | Mechanical shear bolt type connectors shall be in accordance with IEC 61238-1 and Class A. Connectors shall be of the water block type and the shear bolt heads shall be hexagonal. Bolts of the shear bolt type shall be suitable of adequate size.<br>Lugs on aluminium cores shall be provided with oxidation |

#### 4.9. Mechanical Protection

By means of a rollable steel mat (with required protective coating against corrosion)

#### 5. Type Tests

All products must be type tested in India at CPRI /ERDA as per the relevant IS (with latest amendments)/IEC .**The type tests certificates should not be more than 5 yrs. old.**

The bidder shall attach the drawing and instruction sheets duly approved by CPRI /ERDA which were used during type testing. All the copies of type certificates should be submitted along with the Technical Bid. The type tests to be carried out on each type of Jointing kit are as per the Type test verification sheet. Duly filled in and signed Type test verification sheet has to be submitted along with the Technical Bid. No follow up will be done for completing any incomplete Type test verification sheet and the bid will be rejected without any further communication.

No deviation to the type tested design shall be accepted. Any non-compliance observed at a later stage will invite blacklisting of the bidder with all the commercial implications.


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## 6. Testing and Inspection

|     |   |
|-----|---|
| 6.1 | All the routine and acceptance tests shall be carried out as per the ESI guidelines/relevant IS /IEEE.  |
| 6.2 | Purchaser reserves the right to witness HV test shall be carried out on a randomly selected and installed Straight-Through Joint, in the presence of Purchaser representative, at manufacturer's works.   |
| 6.3 | The joint shall withstand a test of 4 Uo voltage for 4 hours  |
| 6.4 | Testing on all the moulded and heat shrinkable components, stress grading mastic etc. shall be done at the manufacturers works or third party test laboratories like ERDA/CPRI .This shall be part of Acceptance Test, in the presence of Purchasers representative.  |
| 6.5 | i) Three sets of complete Test certificates (Routine and Acceptance) shall be submitted along with the delivery of Jointing kits.<br>ii) Bought –out Items: Vendor shall submit Test certificates, lot/batch number-wise, from their sub-suppliers/principal.   |
| 6.6 | Further tests mentioned below shall be conducted as acceptance tests at suppliers works or any approved test laboratory at suppliers work, which will be arranged by the supplier at his own cost:<br>a) Visual Inspection-The kits under inspection should be free from any visible defects<br>b) Physical verification of contents-All the contents shall be checked as per the kit contents list enclosed by the supplier<br>c) Electric Strength test for insulation tubing's<br>d) Elongation tests for all types of tubing e) Wall thickness ratio in expanded condition<br>f) Longitudinal change after full recovery<br>g) Tracking and erosion resistance test<br>Test at S.no.(c),(d),(e),(f) and (g) shall be done on sample randomly selected from the lot. |
|     |   |

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|-----|--|
| 6.7 | Supplier shall have a test facility fully equipped for conducting the routine tests, and acceptance test as per IS |
|-----|--|

**7. Tender Sample**

Bidder shall have to submit the sample of material with the offer /as specified by Tata Power.


**8. Guarantee**

**The material shall be guaranteed for satisfactory performance for period of 60 months from the date of commissioning or 65 months from the date of receipt whichever is earlier against defective design, material and manufacturing.** In case of failure of any component of termination and joints, the bidder shall replace such defective terminations and kits free of cost within 3 months of such declaration and shall furnish an undertaking on non-judicial stamp along with the offer to bear the entire expenses which will be incurred by Tata Power towards material and labour in total for rectification/repairs.

**9. Packing of kit**

|     |  |
|-----|--|
| 9.1 | Every component /kit/box shall be properly sealed /packed for protection against damage. Stress grading mastic shall be packed in airtight /air sealed packing. Every kit box shall be wrapped in polythene covers.<br>All components shall be sealed separately and marked clearly for the purpose of identification of each component. |
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|     |   |
|-----|---|
| 9.2 | <p>Following Markings/Labels shall be on both sides of every packed box. 1)Identification number/type designation (as per manufacturer`s standard) 2)Voltage grade, size, description of the kit (including the voltage grade,size,type of cables for which it is to be used)</p> <p>3)Batch no., Lot no.,etc 4)Quantity</p> <p>5) a) Purchase Order no.&amp; date<br/>b) Purchaser`s name<br/>c) Tata Power Company`s SAP code number</p> <p>6)Weight (kg) of each Cable Termination kit and of each box containing kits</p> <p>7)Manufacturer`s name</p> <p>8)Month and Year of Manufacturing 9)Date of packing, shelf life</p> |
| 9.3 | <p>Besides above identification marking on packing, following identification marking shall be made on stress control tubes, dual wall tubes, outer jacketing tubes (in straight through joints),breakouts ,rain sheds, non tracking tubes:</p> <p>a)Batch No.to co-relate with the raw materials used to manufacture the components</p> <p>b)Shrink ratio</p> <p>c)Stress Control or Conductive as the case may be</p> <p>d)Manufacturer`s name</p> <p>“Property of Tata Power Company, Mumbai &amp; Material Code “shall be suitably embossed on these components.</p>   |

## 10. Documents

Documents” refer to documents, Data, Manuals, etc (Scanned copy of signed documents also shall be part of the entire soft file (e-file) or CD)

|      |  |
|------|--|
| 10.1 | <p>Documents to be submitted along with the Bid- Vendor shall submit signed 2 sets (plus 1 set of soft copy) of following documents:</p> <p>a)GTP (duly filled in ) (as per Annexure- )</p> <p>b)Cross sectional drawings for components /Assembly</p> <p><b>c)Type Test Certificates</b></p> <p>d) Complete catalogue and installation instructions. e)Any other document</p> |
|------|--|

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|      |   |
|------|---|
| 10.2 | Documents to be submitted After Award of contract-<br>Vendor shall submit 2 sets (plus 1 set of soft copy) of above mentioned documents within 15 days for Purchasers approval. |
|------|---|

## 11. QUALITY ASSURANCE (QA)

|      |   |
|------|---|
| 11.1 | Vendor`s Quality Plan-To be submitted for Tata Power approval indicating the various stages of inspection ,the tests and checks that will be carried out on the material of construction ,components during manufacture and after finishing bought out items and fully assembled component during manufacture and after finishing ,bought out items and fully assembled component and equipment including drives. As a part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Tata Power representatives shall have free access to the manufacturer /sub supplier`s works to carry out inspections. |
| 11.2 | Inspection Hold Point to be mutually identified agreed and approved in quality plan.  |

The Jointing Kits would qualify only if they have been successful into service trails in the Tata Power Network / Network of reputed power distribution utilities as per the procedure. Documentary evidence to this effect need to be produced by the tender.


## 12. DELIVERY

The delivery of the jointing accessories will be on **Just in Time (JIT)** Model and mutually agreed SLA`s would be defined post award of OLA.

## 13. DEVIATIONS

Deviations from this specification can be acceptable, only where the vendor has listed the same in their bid the requirements that cannot be met and have been agreed to by Tata Power in writing before the OLA is placed. In the absence of any list of deviations from the bidder, it will be assumed by Tata Power that the bidder complies with the specifications fully

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#### 14. GUARANTEED TECHNICAL PARTICULARS (GTP)

The bidder is deemed to have examined all the parts of the enquiry documents and to have been fully informed as to the nature of the work and the conditions related to its performance.

|    |   |  |
|----|---|--|
| 1  | The bidder shall furnish all Technical details as called for in the following format for the specified voltage classes /sizes of heat shrinkable cable terminations/joints /components without which the offer shall be considered as incomplete and technically unresponsive. Specific details shall be furnished avoiding general statements like “as per standards “ etc |  |
| 2  | Name of manufacturer  |  |
| 3  | Trade name of kits ,if any  |  |
| 4  | Enquiry Ref.  |  |
| 5  | Guarantee Period (minimum)  | 60 Months (from the date of commissioning) /<br>65 months (from date of receipt at Tata Power store) whichever is earlier. |
| 6  | Is the production in India supported by any collaboration?  |  |
| 7  | If so ,name and address of the principals   |  |
| 8  | Location and address of the manufacturers work in India, for indigenous components  |  |
| 9  | Applicable IS/IEC standard followed by vendor (incl.type test standard)   |  |
| 10 | Voltage Grade (kV)  |  |
| 11 | Type test reports not older than 5 yrs are enclosed?<br>(Relevant test report no. and date, with type size, other details of each type of kit.)   | Yes/No   |


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|    |  |   |
|----|--|---|
| 12 | Whether all the heat shrinkable and moulded components of the kit meet the requirements of and have been tested in accordance with ESI-09-13 (for HS Joints) | Yes/No<br>(If yes, details of test report no./Date/name of test laboratory to be mentioned) |
| 13 | Whether dimensional drawings indicating the clearance etc and bill of material for each kit is furnished along with the offer                                | Yes/No  |
| 14 | Shelf life of Kits (years)   |   |
| 15 | Continuous operating temperature   | 90 deg C  |
| 16 | a)Volume resistivity of the material of stress control tubing (Min) in ohm-mtr and length in mm<br>b)Documentary evidence enclosed                           |   |
| 17 | a)Relative permittivity (Min) of the material of stress control tubing<br>b)Documentary evidence enclosed  |   |
| 18 | Thermal Endurance of Stress Control Tubings  |   |
| 19 | Minimum permittivity of stress grading mastic  |   |
| 20 | Volume resistivity of stress grading mastic  |   |
| 21 | Shelf life of non-tracking mastic  |   |
| 22 | Shelf life of stress grading mastic  |   |


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|----|--|--|
| 23 | Whether co-extruded dual wall tubing is offered for joints   |  |
| 24 | Method of earth bond a)Size and no. of braids b)Size of armour support c)No. of hose clips   |  |
| 25 | Method of mechanical protection  |  |
| 26 | Method of protection against corrosion(type and coating thickness of corrosion protective layer on steel mat)  |  |
| 27 | Minimum Insulation thickness in joints<br>1)11 kV<br>2)22 kV<br>3)33 kV  | 1)----- mm<br>2)----- mm<br>3)----- mm                             |
| 28 | Number of layers required to achieve insulation build up<br>1)11 kV<br>2)22 kV<br>3)33 kV  | 1)-----<br>2)-----<br>3)-----                                      |
| 29 | Total creepage for<br>1)11 kV Indoor terminations 2)11 kV Outdoor terminations 3)22 kV Indoor terminations 4)22 kV Outdoor terminations 5)33 kV Outdoor terminations | 1)----- mm<br>2)----- mm<br>3)----- mm<br>4)----- mm<br>5)----- mm |
| 30 | Drawing of connector is enclosed   | Yes/No   |
| 31 | Installation procedure enclosed  | Yes/No   |
| 32 | Quality Assurance Programme (QAP for raw materials, in process inspection, factory testing) is enclosed  | Yes/No   |

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|----|--|--|
| 33 | Printing details on each of the Heat Shrinkable and moulded components                   | (Mention the text, presently printed on each of the component) |
| 34 | Description of items in the kit that are imported /sourced from Principal /Sub-suppliers |  |
| 35 | Name of the items in the kit and their respective shelf life (months/years)              |  |
| 36 | Packing of every kit   | 1 No   |
| 37 | Group Packing  | ----- No. of kits per Box<br>----- No. of Boxes                |

#### 15. 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 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:

Date :

Signature

Designation

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|                       | <b>TECHNICAL SPECIFICATION</b>   |                     |                  |
| <b>Document Title</b> | Technical Specification – Heat Shrinkable Straight Through Joint and Termination for 33 kV Power Cable |                     |                  |
| <b>Document No.</b>   | ENG-EHV-1003   | <b>Eff. Date:</b>   |                  |
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21. SCHEDULE OF DEVIATIONS

|     |       |   |
|-----|-------|---|
| 1.0 | Scope | <p>Technical Specification – covering requirements wrt Design, Manufacturing, Material, Testing at manufacturer's work/CPRI/ERDA lab, Packaging, Supply and Delivery, Unloading at site/store of 33 kV Heat Shrink Cable Straight through Joints and Terminations with all accessories for contributing to trouble free and efficient network operation.</p> <p>The equipment shall conform in all respects to high standards of Engineering, Design and Workmanship and be capable of performance in continuous operation.</p> |
|-----|-------|---|

|  |  |                     |                  |
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| 2.0  | Applicable Standards | The equipment covered in the Specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International standards / IEC and shall conform to the regulations of the local authorities. |  |
|  |                      | <b>S. No.</b>   | <b>Standards</b>                       |
|  |                      | 1   | IS-13573(part2): 2011                  |
|  |                      | 2   | IS 7098(part2):2011                    |
|  |                      | 3   | IS 692 : 1994                          |
|  |                      | 4   | IEC 60502 : 2009                       |
|  |                      | 5   | ASTM D-2303                            |
|  |                      | 6   | ASTM D-2671                            |
|  |                      | 7   | ENA TS 09-13:1981                      |
|  |                      | 8   | IEC 61238(part1) : 2003                |
|  |                      | 9   | IS 2633:1986                           |
|  |                      | 10  | IS 4826 : 1979                         |
|  |                      | 11  | IS 12444:1988                          |
|  |                      | 12  | IS 191                                 |
|  |                      | 13  | IS 10810                               |
|  |                      | 3.0   | Climate conditions of the installation |
| 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<br>(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. |                      |   |  |

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Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4.1. General design and sizes of 33 kV XLPE / PILC insulated cables operated in TPCODL network are as mentioned below:

**A. XLPE Insulated Underground Cables as per IS 7098 – 2: 33 kV(E)**

A2XCWY- (Aluminum stranded compacted conductor, XLPE insulation, copper tape screen, wire GI armour, PVC sheath)

A2XCFY- (Aluminum stranded compacted conductor, XLPE insulation, copper tape screen, Flat wire GI armour, PVC sheath)

A2XCWαY (Aluminum conductor, XLPE insulation, copper tape screen, wire Aluminum armour, PVC sheath)

- i) 3CX300 sq.mm. A2XCWY/A2XCFY
- ii) 3CX400 sq.mm. A2XCWY/A2XCFY
- iii) 1CX400 sq.mm. A2XCWαY
- iv) 1CX630 sq.mm. A2XCWαY
- v) 1CX1000 sq.mm. A2XCWαY

**B. PILCA Insulated Cables as per IS 692: 33 kV('E)**

Screened APLST (Al stranded sector shaped, paper insulated, lead sheath, steel tape sheath

3CX300 sq.mm.

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

Tinned coated Mechanical Lugs and mechanical connectors are applicable for all sizes of 33 kV cable terminations and straight through joints respectively.

| Type & size of cable                        | Type of Joint   |
|---|---|
| 3CX300 and 400 sq.mm. XLPE insulated cable  | Indoor termination with tinned coated 300-400mm <sup>2</sup> mechanical lugs  |
|   | Indoor termination joint GIS  |
|   | Outdoor termination with tinned coated 300-400mm <sup>2</sup> mechanical lugs |
| 3CX300 / 400 sq.mm. XLPE insulated cable    | Straight through joint 300-400 sq.mm. with mechanical connector               |
|   | Indoor termination joint GIS  |
| 1CX400 & 1CX630 sq.mm. XLPE insulated cable | Indoor termination screen type (for RMU) with tinned coated mechanical lugs   |
|   | Outdoor termination with tinned coated mechanical lugs                        |
|   | Straight through joint with mechanical connector                              |
| 1CX1000 sq.mm. XLPE insulated cable         | Indoor termination joint GIS  |
|   | Outdoor termination with tinned coated mechanical lugs                        |
|   | Straight through joint with mechanical connector                              |
| PILCA to XLPE transition joints             | Screened Transition joint   |
|   | 3CX300/400 sq.mm. XLPE insulated cable WITH 3CX300/400 sq.mm PILCA cable      |

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(with mechanical connector)

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

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

| S. No. | Parameter   | Units   | Requirement  |
|--------|---|---------|--|
| 1      | Max. Withstand System Voltage   | kV      | 36   |
| 2      | Partial Discharge at 1.73 U <sub>0</sub>  | pC      | <10  |
| 3      | Impulse Peak Withstand  | kV      | 170 kV   |
| 4      | Continuous operation withstand Temperature<br>Short Circuit withstand temperature | °C      | 90   |
|        |   | °C      | 250  |
| 5      | Withstand short circuit current   | kA/1Sec | a) 3CX300 Sq.mm Cable : 28.2 kA<br>b) 3CX400 sq.mm Cable : 37.7 kA<br>c) 1CX1000 Sq.mm Cable : 94.0 kA<br>d) 1CX630 Sq.mm Cable : 59.4 kA<br>e) 1CX400 Sq.mm Cable : 37.6 kA |
| 6      | Storage Temperature Range   | °C      | -10°C to + 45°C  |
| 7      | Shelf life of kit components excluding mastic and solution                        | Years   | Min. 5   |
| 8      | Shelf life of mastic and solution   | Years   | Min. 2   |

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

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

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|----|---|--|
| 10 | Tracking resistance   | No tracking, erosion to top surface or flame failure after<br>1hr @ 2.5KV<br>1hr @2.7KV<br>1Hr@ 3.0 KV<br>20 min@ 3.25KV |
| 11 | Volume Resistivity  | 1x 1010 Ohm- meter (Minimum)<br>(For stress control tube VR: 1x 107 Ohm- meter Min.)                                     |
| 12 | Flame Retardant<br>(Applicable only for Anti tracking Tubes/ sleeves) | After 1 minute burn: Burnt or charred length 250mm Max.  |

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

| S.No. | Parameter  | Specified limit  |
|-------|--|--|
| 1     | Visual Examination                                     | Free from protrusions, pin holes, cracks, nicks and other visible defects. |
| 2     | Wall thickness Ratio                                   | 0.6 or 60% (Minimum at any two points of measurements)                     |
| 3     | Internal dia of tube after full recovery               | Shall not be higher than as specified in approved BOM / GTP.               |
| 4     | Longitudinal change                                    | 25% Max.   |
| 5     | Electric Strength                                      | 10 KV /mm (Minimum)  |
| 6     | Tensile Strength                                       | 8 N/mm2 (Minimum)  |
| 7     | Ultimate Elongation                                    | 200% (Minimum)   |
| 8     | Heat Shock   | No splitting, cracking, dripping or flowing after 30 minutes at 250°C Min. |
| 9     | Low Temperature Flexibility                            | No cracking after 4 Hrs at minus -20°C 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.

|            |                             |  |
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| <b>5.0</b> | <b>General Construction</b> | <b>5.1. Termination Joints:</b>  |
|            |                             | <p>a) Termination kit shall be designed based on heat shrink technology and shall be suitable for installation for 33 kV, three core and single core aluminum conductor, XLPE insulated (in line with TPCODL Specification for underground IS 7098-part 2, IS 13573 Part 2 &amp;3).</p> <p>a.1 Length of 33 KV terminations (from bottom of breakout to center of lug hole) shall be:</p> <p>i) 1core cable I/D &amp; O/D and 3 core cable (I/D)Indoor terminations - 1500 mm</p> <p>ii) 3 core cable O/D (Outdoor terminations) - 3000 mm</p> |

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| S. No. | Components   | Requirement   |
|--------|--|---|
| 1      | Tinned coated Mechanical Lugs                                    | Mechanical Lugs: <ul style="list-style-type: none"> <li>- Tinned coated Aluminium 300-400 mm<sup>2</sup>/630mm<sup>2</sup>/1000mm<sup>2</sup></li> <li>- As per IEC 61238(part1): 2003.</li> <li>- Dimensions shall be as annexure-I of this specification.</li> </ul>  |
| 2      | Lug Seal, Anti-tracking tube, weather sheds, Stress control tube | <ul style="list-style-type: none"> <li>- Heat Shrinkable</li> <li>- Fire resistant and weather resistant as per ENA TS 09-13 – for lug seals, weather sheds and Anti-tracking tubes</li> </ul>  |
| 3      | Mastic tape  | <ul style="list-style-type: none"> <li>- Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant.</li> <li>- Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENA TS 09-13.</li> </ul>   |
| 4      | Heat Shrink Breakout   | <ul style="list-style-type: none"> <li>- Fire resistant and weather resistant as per ENA TS 09-13.</li> <li>- Adhesive coated Breakouts shall be provided on outer sheath of the cable to prevent water ingress.</li> </ul>   |
| 5      | Tinned coated copper braid                                       | <ul style="list-style-type: none"> <li>- Shall be completely insulated by adhesive coated fire retardant and weather resistant HS tube/sleeve up to copper lug.</li> <li>- Fire resistant and weather resistant as per ENA TS 09-13.</li> <li>- Size and length is as follows:<br/>For 3C cables: 70 mm<sup>2</sup> X 750 mm X 1 Run for 300/ 400 mm<sup>2</sup> cables.<br/>For 1C cables: 50 mm<sup>2</sup> X 750 mm X 1 Run for 400 mm<sup>2</sup>, 630 mm<sup>2</sup> &amp; 1000 mm<sup>2</sup> cables. Additionally 3 nos. X 150 mm<sup>2</sup> Al lugs with sealing sleeves/ mastic for armor back fold for earth bonding.</li> </ul> |
| 6      | Tinned coated copper braid as a Leakage Current Collector        | <ul style="list-style-type: none"> <li>- Leakage current collector tinned copper braid</li> <li>- 1R X 7 mm<sup>2</sup> X 150 mm per core shall be provided for terminations.</li> </ul>  |
| 7      | Tinned copper wire mesh  | <ul style="list-style-type: none"> <li>- Minimum 2.5mm<sup>2</sup> tinned copper mesh shall be provided on armour circumference beneath the copper braid.</li> <li>- Length of copper wire mesh shall be provided in BOM submission.</li> </ul>   |
| 8      | Sub-kit components   | <ul style="list-style-type: none"> <li>- Tapes, Mastic, GI back-up rings, Worm Drive clip/ Jubilee clip of stainless steel, adhesive cloth, cleaning solvents and other necessary items.</li> <li>- Compatible Supporting ring with SS jubilee clips shall be provided to connect tinned copper braids.</li> <li>- Soldering on copper screen is not acceptable.</li> <li>- Roll spring shall be provided for screen connections.</li> <li>- Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring should be used for same.</li> </ul>  |
| 9      | Submission of BOM and instruction sheet                          | <ul style="list-style-type: none"> <li>- Participating bidder shall submit BOM (during pre-bid) with dimensions of each size and quantity of HS joint and termination. Also instruction sheet shall be provided in each kit.</li> <li>- *Note: BOM shall be approved by TPCODL authorized official at the time of pre-bid.</li> </ul>   |

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**5.2. Components of Straight Through jointing kit:**

| S. No. | Components   | Requirement  |
|--------|--|--|
| 1      | Heat Shrinkable insulating tube/ Sleeve  | <ul style="list-style-type: none"> <li>- Surface of material: shall be smooth and free from protrusion, voids and nicks.</li> <li>- Recovered thickness: Recovered thickness of insulation tubes over ferrule or connector circumference shall not be less than 10.56 mm at any point of measurement.</li> <li>- Wall thickness ratio (before recovery) of all sleeves/ tubes shall not be less than 60% at any two points of measurement.</li> </ul>  |
| 2      | Mechanical Connectors  | <ul style="list-style-type: none"> <li>- Aluminum Mechanical connectors 300-400 m<sup>2</sup>/630mm<sup>2</sup>/1000mm<sup>2</sup> as per IEC 61238.</li> <li>- Dimensions as per <b>Annexure-I</b> of this Specification</li> <li>- Conductivity of ferrules/mechanical connectors shall be as per IEC 61238(part1).</li> </ul>   |
| 3      | Mastic Tape  | <ul style="list-style-type: none"> <li>- Mastic tape shall be electrically insulating, non-tracking and water/humidity resistant.</li> <li>- Volume resistivity of mastic shall not be less than volume resistivity of insulating tube as specified in ENA TS 09-13.</li> </ul>  |
| 4      | Tinned coated copper braid for GI armour continuity / Ferrules for Aluminium armour continuity | <p><b>Tinned coated copper braid for GI armour continuity:</b></p> <p>Uniformly tinned coated copper braid shall be provided for armour continuity.</p> <ul style="list-style-type: none"> <li>- Wrap tinned copper wire mesh with 50% overlap around the joint area and continue 25 mm over the copper screen on both sides. Bind the copper wire mesh on copper screen.</li> <li>- Uniformly tinned coated copper braid shall be provided for armor continuity.</li> <li>- Tinned copper braid shall be provided for wrapping over armour circumference beneath the copper braid and size shall be:<br/>For 3C Cables: 70 mm<sup>2</sup> X1 Run for 300/ 400mm<sup>2</sup> cables. Length of copper braid shall be submitted in the BOM.<br/>For 1C Cables: In single core cables, 1CX400,1CX630 and 1CX1000 sq.mm. cables,<br/>Aluminium armor continuity shall be done using 2 nos. each size of 150 sq.mm. and 185 sq.mm. ferrules respectively.</li> </ul> |
| 5      | Tinned copper wire mesh  | <ul style="list-style-type: none"> <li>- Uniformly tinned coated copper mesh shall be provided for screen continuity.</li> <li>- Minimum 2.5mm<sup>2</sup> tinned copper mesh shall be provided on both sides of armour circumference beneath the copper braid.</li> <li>- Length of copper wire mesh shall be provided in BOM submission.</li> </ul>  |
| 6      | GI wire mesh/ Copper wire mesh   | <ul style="list-style-type: none"> <li>- Mechanical protection shall be provided in GI armored cables by means of heavily zinc coated GI mesh as per IS 4826.</li> <li>- In 1C Aluminium armored cables, for mechanical protection, copper wire mesh shall be provided.</li> </ul>   |
| 7      | Breakouts  | <ul style="list-style-type: none"> <li>- Adhesive coated Breakouts shall be provided on outer sheath at both sides on the cable to prevent water ingress.</li> </ul>   |

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|  |  | 8  | Wrap around insulating tube/Sleeve as outer most tube | <ul style="list-style-type: none"> <li>- Material: cross-linked polyolefin (Heat Shrinkable) as a waterproof seal.</li> <li>- Shape: Wrap around form with hot-melt adhesive liner on the inner surface of the sleeve (Upon heating, the sleeve shrinks and the adhesive melts, creating a water-tight bond between the sleeve and the cable).</li> <li>- Stainless steel channel shall be provided along the wrap around to close the sleeve during installation.</li> <li>- Excellent mechanical and corrosion protection, and atmospheric sealing.</li> <li>- High split resistance.</li> <li>- *Note: Overlapping of wrap around sleeve is not acceptable.</li> <li>- Additionally, adhesive coated sleeve approx. 300 mm length shall be provided at ferrule joint area beneath the wrap around sleeve.</li> </ul> |
|  |  | 9  | Sub-kit Components                                    | <ul style="list-style-type: none"> <li>- Tapes, Mastic, GI back-up rings, Worm Drive clip/ Jubilee clip of stainless steel, adhesive cloth, cleaning solvents and other necessary items.</li> <li>- Compatible support rings (Aluminium for single core and GI for three core cables) with four nos. SS jubli clips shall be provided to connect tinned copper braid.</li> <li>- For copper screen bonding, roll spring shall be provided.</li> <li>- Plumb earthing on PILCA side is unacceptable. Constant pressure roll spring shall be provided for earthing continuity.</li> </ul>   |
|  |  | 10 | Submission of BOM and instruction sheet               | <ul style="list-style-type: none"> <li>- Participating bidder shall submit BOM (during pre-bid) with dimensions of each size and quantity of HS joint and termination. Also instruction sheet shall be provided in each kit.</li> </ul> <p>*Note: BOM shall be approved by TPCODL authorized official at the time of pre-bid.</p>   |

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| <b>6.0</b> | <b>Name plate and Marking</b> | <p>Following details shall be printed on the box:</p> <ol style="list-style-type: none"> <li>a) Manufacturer's name</li> <li>b) Month &amp; Year of manufacturing</li> <li>c) Voltage Grade</li> <li>d) Property of TPCODL</li> <li>e) Material code</li> <li>f) PO No.</li> </ol> <p>HS Sleeves/ tubes and breakout components shall be embossed with:</p> <ol style="list-style-type: none"> <li>a) Month and year of manufacturing</li> <li>b) Manufacturer name</li> <li>c) Batch no. / Lot no.</li> <li>d) Shrink ratio</li> <li>e) Size</li> <li>f) Type</li> </ol> |
|------------|-------------------------------|---|

|            |              |   |
|------------|--------------|---|
| <b>7.0</b> | <b>Tests</b> | <p>All Routine, Acceptance &amp; Type tests shall be carried out in accordance with the Relevant IS/IEC/ ENA TS 09-13.</p> <p>Acceptance tests shall be witnessed by TPCODL authorized representative.</p> <p>All the components shall also be type tested as per the relevant standards mentioned below.</p> <p>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:-</p> <p><b>A. Type Tests:</b></p> <p><b>(I) Terminations &amp; Straight Through joints</b></p> |
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| 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 Mechanical lugs and connectors**

| Test              | Clause No. | Reference Standard         |
|-------------------|------------|----------------------------|
| Conductivity test |            | as per IEC 61238, part - 1 |

**B. Routine Tests:**

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

**TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR**

**TECHNICAL SPECIFICATION**

|                       |  |                      |                  |
|-----------------------|--|----------------------|------------------|
| <b>Document Title</b> | Technical Specification – Heat Shrinkable Straight Through Joint and Termination for 33 kV Power Cable |                      |                  |
| <b>Document No.</b>   | ENG-EHV-1003   | <b>Eff. Date:</b>    |                  |
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|   |      |               |
|---|------|---------------|
| 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 |

**C. Acceptance tests:**

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

|            |                              |  |
|------------|------------------------------|--|
| <b>8.0</b> | <b>Type Test Certificate</b> | <p>The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards.</p> <p>All the tests shall be conducted at CPRI/ERDA as per the relevant standards not exceeding 5 years from the date of opening of bid.</p> <p>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.</p> <p>TPCODL has rights for Surveillance test of random selected samples from third party lab for quality checks of item.</p> <p>TPCODL shall be intimated in case revision is done by manufacturer in product design/ dimension/ material during execution of contract. Subsequently Type test certificate shall be produced.</p> |
|------------|------------------------------|--|

|            |                                |   |
|------------|--------------------------------|---|
| <b>9.0</b> | <b>Pre-dispatch inspection</b> | <p>Equipment shall be subject to inspection by a duly authorized representative of TPCODL. Inspection may be made at any stage of manufacturing at the option of TPCODL and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection.</p> <p>Bidder shall grant free access to the places of manufacture TPCODL's representatives at all times when the work is in progress. Inspection by TPCODL'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. The pre-dispatch inspection shall be carried out as per annexure-II. Following documents shall be sent along with material:</p> <ul style="list-style-type: none"> <li>a) Test reports</li> <li>b) MDCC issued by TPCODL</li> <li>c) Invoice in duplicate</li> </ul> |
|------------|--------------------------------|---|

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|-----------|------------------------|
| Initiator | HoG(Plant Engineering) |
|-----------|------------------------|

**TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR**

**TECHNICAL SPECIFICATION**

|                       |  |                      |                  |
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|             |   | <ul style="list-style-type: none"> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warrantee card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable)</li> </ul>   |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
|-------------|---|--|------------------------|------------------|--------------|------------------------|------------------|---|----------------------|---|--|---|---|-------------------------------|---|--|--|---|--------------------------------|---|--|---|
| <b>10.0</b> | <b>Inspection after receipt at Stores</b> | Material received at TPCODL's, Odisha store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department.  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>11.0</b> | <b>Guarantee</b>                          | <p>Bidder shall stand guarantee towards design, materials, workmanship &amp; quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by TPCODL up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is later.</p> <p>Further Bidder shall also stand guarantee towards poor workmanship in installation of straight through joint and terminations installed by bidder's jointer up to 60 months from the date of installation. Bidder shall be liable to undertake to replace/rectify such defects at own costs, within mutually agreed time frame, and to the entire satisfaction of TPCODL, failing which TPCODL shall be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for free replacement for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by TPCODL.</p> |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>12.0</b> | <b>Packaging</b>                          | <p>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. The material used for packing shall be environmentally friendly.</p> <p>Each components shall be supplied in a single package as a complete kit for one termination/joint.</p>   |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>13.0</b> | <b>Tender Sample</b>                      | Bidder shall be submit the sample of material during tender evaluation process with the offer (in case of first supply to TPCODL).   |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>14.0</b> | <b>Training</b>                           | <p>Detailed Installation instruction with drawings for all joints and termination shall be provided by Bidder with tender documents in English and Hindi &amp; Odia Language.</p> <p>Updated installation manual shall be provided in the kit.</p> <p>Hands-on-training shall be conducted annually at our site location for BA and TPCODL jointers.</p> <p>Bidder shall provide installation/operational services at site.</p>  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>15.0</b> | <b>Quality Control</b>                    | <p>The bidder shall submit with the offer, 'Quality Assurance Plan' indicating the various stages of inspection, the tests and checks which shall be carried out on the material of construction, components and bought out items.</p> <p>TPCODL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.</p>  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>16.0</b> | <b>Minimum Testing facilities</b>         | Bidder shall have adequate in house testing facilities for carrying out all routine tests, acceptance tests as per Indian /International standards.  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>17.0</b> | <b>Manufacturing activities</b>           | The successful bidder shall submit 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 shall be submitted within 15 days from the release of the order.  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>18.0</b> | <b>Spares, Accessories and Tools</b>      | Not applicable.  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| <b>19.0</b> | <b>Drawings and Documents</b>             | <p>After the award of the contract four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>S. No.</th> <th>Description</th> <th>For Approval</th> <th>For Review Information</th> <th>Final Submission</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Technical Parameters</td> <td align="center">√</td> <td></td> <td align="center">√</td> </tr> <tr> <td>2</td> <td>BOM ( at the time of pre-bid)</td> <td align="center">√</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Drawing showing Joints Details</td> <td align="center">√</td> <td></td> <td align="center">√</td> </tr> </tbody> </table>   | S. No.                 | Description      | For Approval | For Review Information | Final Submission | 1 | Technical Parameters | √ |  | √ | 2 | BOM ( at the time of pre-bid) | √ |  |  | 3 | Drawing showing Joints Details | √ |  | √ |
| S. No.      | Description                               | For Approval   | For Review Information | Final Submission |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| 1           | Technical Parameters                      | √  |                        | √                |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| 2           | BOM ( at the time of pre-bid)             | √  |                        |                  |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |
| 3           | Drawing showing Joints Details            | √  |                        | √                |              |                        |                  |   |                      |   |  |   |   |                               |   |  |  |   |                                |   |  |   |

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| Initiator | HoG(Plant Engineering) |
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|                       | <b>TECHNICAL SPECIFICATION</b>   |                      |                  |
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|  |  |   |  |   |   |   |
|--|--|---|--|---|---|---|
|  |  | 5 | Termination drawings                           | √ |   |   |
|  |  | 6 | Manual/Catalogues                              |   | √ | √ |
|  |  | 7 | Transport/ Shipping dimension drawing          |   | √ | √ |
|  |  | 8 | QA &QC Plan                                    | √ | √ | √ |
|  |  | 9 | Routine, Acceptance and Type Test Certificates | √ | √ | √ |

All the documents & drawings shall be in English language.

|             |   |  |
|-------------|---|--|
| <b>20.0</b> | <b>Guaranteed Technical Particulars</b> | Bidder to comply all above clauses as per specification. |
|-------------|---|--|

| <b>21.0</b> | <b>Schedule of Deviations</b> | <p>The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.</p> <p style="text-align: center;">(TO BE ENCLOSED WITH THE BID)</p> <p>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:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>S.No.</th> <th>Clause No.</th> <th>Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above.</p> <p>Seal of the Company: _____</p> <p style="text-align: right;">Signature: _____</p> <p style="text-align: right;">Designation: _____</p> | S.No. | Clause No. | Details of deviation with justifications |  |  |  |
|-------------|-------------------------------|---|-------|------------|--|--|--|--|
| S.No.       | Clause No.                    | Details of deviation with justifications  |       |            |  |  |  |  |
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### Annexure-I

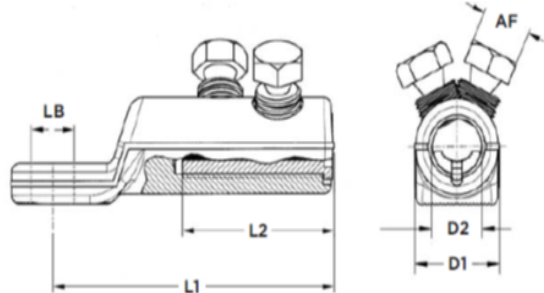
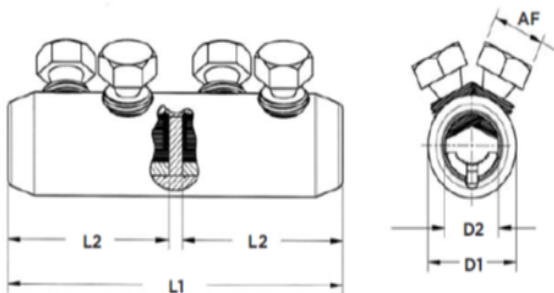
#### Annexure- Dimensions Mechanical connectors & Mechanical Lugs

Aluminium Mechanical connectors

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

Tinned Aluminium Mechanical Lugs

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



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### Annexure- II

Inspection Test Plan for HS Jointing kit components

| S. No. | Name of test   | Specified value(Range)  | Reference documents                                 | Test Result | Pass/Fail |
|--------|--|---|---|-------------|-----------|
| 1      | Visual inspection  | Free from pin holes, cracks, nicks, protrusion and other visible defects.                         | ENA-TS-09-13 Clause No. 3.15 & TPCODL specification |             |           |
| 2      | Physical verification of kit contents and dimensions                     | Dimensions as per TPCODL approved BOM   |   |             |           |
| 3      | Electric Strength test   | 10 KV /mm (Minimum)   | ENA-TS-09-13 Clause No. 3.4                         |             |           |
| 4      | Ultimate Elongation tests  | 200% (Minimum)  | ENA-TS-09-13 Clause No. 3.12                        |             |           |
| 5      | Tensile Strength   | 10 N/mm <sup>2</sup> (Minimum)<br>For anti-track tube-8 N/mm <sup>2</sup>                         | ENA-TS-09-13 Clause No. 3.12                        |             |           |
| 6      | Tracking resistance test(Anti-tracking Tube)                             | NO Tracing erosion to top surface /flash failure after 1 hr 2.5 KV<br>1hr 2.75KV<br>20 min 3.5 KV | ENA-TS-09-13 Clause No. 3.14                        |             |           |
| 7      | Volume Resistivity   | 1x10 <sup>10</sup> Ohm- meter (Minimum)   | ENA-TS-09-13 Clause No. 3.16                        |             |           |
| 8      | Wall thickness ratio   | 0.6 or 60% (Minimum at any two points of measurements)  | ENA-TS-09-13 Clause No. 3.3                         |             |           |
| 9      | Expanded and recovered diameters   | As per TPCODL approved BOM  | ENA-TS-09-13 Clause No. 3.3(i)                      |             |           |
| 10     | Longitudinal change after recovery                                       | 10% max   | ENA-TS-09-13 Clause No. 3.3(ii)                     |             |           |
| 11     | Heat shock test  | No splitting, cracking, dripping or flowing after 30 min @200°C min                               | ENA-TS-09-13 Clause No. 3.7.1/ 3.7.2                |             |           |
| 12     | Low temperature flexibility  | No cracking after 4 Hrs @ Minus 20°C max  | ENA-TS-09-13 Clause No. 4.5                         |             |           |
| 13     | Insulation build up thickness after shrink on Ferrule as per IS 10810 -6 | Not less than as specified in specification   | as per IS 10810 -6 Clause No. 8.1                   |             |           |

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|    |  |   |   |  |  |
|----|--|---|---|--|--|
| 14 | Flame retardant test   | After one min burn: burnt or charred length 250 mm max.       | ENA-TS-09-13 Clause No. 3.5.1/ 3.5.2    |  |  |
| 15 | Area measurement of tinned copper braids (Area of one wire x no. of wires x no. of carriers) | As per TPCODL specification/ approved BOM                     |   |  |  |
| 16 | Ferrules/ connectors/ lugs dimension and conductivity test                                   | As per annexure-I in this specification                       | as per IS 8309 Clause 8.3 and IEC 61238 |  |  |
| 17 | Uniformity of zinc coating on GI mesh as per IS 2633   | No reddish color after one dip for ½ minute in CuSO4 solution | as per IS 2633 Clause 4.1               |  |  |

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|                | <b>TECHNICAL SPECIFICATION</b>                             |                       |            |
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### + Annexure: Inspection Test Plan

|     |       |  |
|-----|-------|--|
| 1.0 | SCOPE | <p>This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store, performance of 33 kV cable for trouble free and efficient operations.</p> <p><b>Inclusive sizes:</b></p> |
|-----|-------|--|

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| <b>Prepared by:</b>  | <b>Reviewed By:</b>                          | <b>Approved By:</b>          | <b>Issued By:</b> |

|            |   | <b>3 CORE CABLE</b>  | <b>1 CORE CABLE</b>  |
|------------|---|--|--|
|            |   | 3C X 300 sq.mm.  | 1C X 400 sq.mm. , 1C X 630 sq.mm.  |
|            |   | 3C X 400 sq.mm.  | 1C X 1000 sq.mm.   |
| <b>2.0</b> | <b>APPLICABLE STANDARDS</b>   | 33 kV Cable covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest revisions of relevant Indian Standards /IEC/ International Standards and shall conform to the regulations of local statutory authorities.  |  |
|            |   | IS 7098 (Part-2)   | Specification for Cross-linked polyethylene insulated PVC sheathed Cables Part: 2 - For working voltages from 3.3 kV up to and including 33 kV   |
|            |   | IS 8130  | Specification for Conductor for insulated electric cables & flexible cords   |
|            |   | IS 3975  | Low carbon galvanized steel wires, formed wires and tapes for Armouring of cables  |
|            |   | IS 10418   | Specification for Drums for Electric cables  |
|            |   | IS 5831  | Specification for PVC insulation and sheath of electric cables   |
|            |   | IS: 3975   | Low carbon galvanized steel wires, formed wires and tapes for armoring of cables   |
|            |   | IEC-60228  | Conductor for insulated cables   |
|            |   | 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-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  |
|            |   | IEC 332  | Test on electric cables on the fire conditions   |
|            |   | IS 5:2007  | Colours for ready mixed paints and enamels   |
|            |   | ASTM 2863  | Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)   |
| IEC 60754  | Apparatus and procedure for the measurement of the amount of halogens evolved during the combustion of materials taken from electric or optical fiber cable constructions |  |  |
| ASTM 2843  | Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics   |  |  |
|            |   | <i>*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.</i>  |  |
| <b>3.0</b> | <b>CLIMATIC CONDITIONS OF THE INSTALLATION</b>  | The service conditions shall be as follows:<br>1. Maximum altitude above sea level 1,000m<br>2. Maximum ambient air temperature 50°C<br>3. Maximum daily average ambient air temperature 35°C<br>4. Minimum ambient air temperature 0°C<br>5. Maximum relative humidity 95%<br>6. Average number of thunderstorm days per annum (isokeraunic level) 70 |  |

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| TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR |                                       |                       |            |
|---|---------------------------------------|-----------------------|------------|
| TECHNICAL SPECIFICATION                             |                                       |                       |            |
| Document Title                                      | Technical Specification – 33 kV Cable |                       |            |
| Document No.  | ENG-EHV-1012                          | Eff. Date: 01.06.2020 |            |
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|                           |   | <p>7. Average number of rainy days per annum 120<br/> 8. Average annual rainfall 150cm<br/> 9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g<br/> 10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g<br/> (g being acceleration due to gravity)<br/> 11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.<br/> 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.</p>  |   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|---------------------------|---|--|---|---|--------------|--|----|---------------|------------------------|--|---|--------------------|-------|--|---|-----------|-------|--|---|------------------------|--------|--|---|------------------|--------------|--------------|-----------|---|--|------------------|---------------------------------|--|------------|------|--|-------------------|---|---|---------------------------|-----------------------|----|--------------|---|-------------------|--------|--|--|--------------|---|--|--|
| 4.0                       | GENERAL TECHNICAL REQUIREMENTS  | <table border="1"> <thead> <tr> <th>S.No.</th> <th>Description</th> <th colspan="2">Requirement</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Voltage grade</td> <td colspan="2">33 kV (Earthed system)</td> </tr> <tr> <td>2</td> <td>Max System voltage</td> <td colspan="2">36 kV</td> </tr> <tr> <td>3</td> <td>Frequency</td> <td colspan="2">50 Hz</td> </tr> <tr> <td>4</td> <td>Variation in frequency</td> <td colspan="2">+/- 5%</td> </tr> <tr> <td rowspan="8">5</td> <td>Cable components</td> <td>3 CORE CABLE</td> <td>1 CORE CABLE</td> </tr> <tr> <td>Conductor</td> <td colspan="2">Watertight Stranded Aluminum (compacted circular)</td> </tr> <tr> <td>Conductor screen</td> <td colspan="2">Semi conducting tape and screen</td> </tr> <tr> <td>Insulation</td> <td colspan="2">XLPE</td> </tr> <tr> <td>Insulation screen</td> <td>Shall have three layers:<br/>a) Bonded Semiconducting,<br/>b) Semiconducting water swellable tape,<br/>c) Metallic copper tape</td> <td>Shall have three layers:<br/>a) Bonded Semiconducting,<br/>b) Semiconducting water swellable tape,<br/>c) Metallic copper tape<br/>d) Polyester transparent tape over copper screen</td> </tr> <tr> <td>Core identification strip</td> <td>Beneath copper screen</td> <td>NA</td> </tr> <tr> <td>Inner sheath</td> <td>Pressure Extruded PVC ST- 2 with PP fillers</td> <td>Extruded PVC ST-2</td> </tr> <tr> <td>Armour</td> <td>GI wire round binded with rubberized cotton binding tape</td> <td>Aluminum wire binded by rubberized cotton tape</td> </tr> <tr> <td>Outer sheath</td> <td colspan="2">PVC ST-2 FRLSH type of colour 'yellow lemon shade' code: 355 as per IS 5:2007</td> </tr> </tbody> </table> | S.No.   | Description                                       | Requirement  |  | 1. | Voltage grade | 33 kV (Earthed system) |  | 2 | Max System voltage | 36 kV |  | 3 | Frequency | 50 Hz |  | 4 | Variation in frequency | +/- 5% |  | 5 | Cable components | 3 CORE CABLE | 1 CORE CABLE | Conductor | Watertight Stranded Aluminum (compacted circular) |  | Conductor screen | Semi conducting tape and screen |  | Insulation | XLPE |  | Insulation screen | Shall have three layers:<br>a) Bonded Semiconducting,<br>b) Semiconducting water swellable tape,<br>c) Metallic copper tape | Shall have three layers:<br>a) Bonded Semiconducting,<br>b) Semiconducting water swellable tape,<br>c) Metallic copper tape<br>d) Polyester transparent tape over copper screen | Core identification strip | Beneath copper screen | NA | Inner sheath | Pressure Extruded PVC ST- 2 with PP fillers | Extruded PVC ST-2 | Armour | GI wire round binded with rubberized cotton binding tape | Aluminum wire binded by rubberized cotton tape | Outer sheath | PVC ST-2 FRLSH type of colour 'yellow lemon shade' code: 355 as per IS 5:2007 |  |  |
|                           |   | S.No.  | Description   | Requirement                                       |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | 1.   | Voltage grade   | 33 kV (Earthed system)                            |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | 2  | Max System voltage  | 36 kV   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | 3  | Frequency   | 50 Hz   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | 4  | Variation in frequency  | +/- 5%  |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | 5  | Cable components  | 3 CORE CABLE                                      | 1 CORE CABLE |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   |  | Conductor   | Watertight Stranded Aluminum (compacted circular) |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   |  | Conductor screen  | Semi conducting tape and screen                   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   |  | Insulation  | XLPE  |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| Insulation screen         | Shall have three layers:<br>a) Bonded Semiconducting,<br>b) Semiconducting water swellable tape,<br>c) Metallic copper tape |  | Shall have three layers:<br>a) Bonded Semiconducting,<br>b) Semiconducting water swellable tape,<br>c) Metallic copper tape<br>d) Polyester transparent tape over copper screen |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| Core identification strip | Beneath copper screen   |  | NA  |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| Inner sheath              | Pressure Extruded PVC ST- 2 with PP fillers   |  | Extruded PVC ST-2   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| Armour                    | GI wire round binded with rubberized cotton binding tape  |  | Aluminum wire binded by rubberized cotton tape  |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| Outer sheath              | PVC ST-2 FRLSH type of colour 'yellow lemon shade' code: 355 as per IS 5:2007   |  |   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
| 5.0                       | GENERAL CONSTRUCTION  | <p>The cross linked polyethylene insulated (XLPE) 33 kV Cable Dry cured &amp; 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.</p>  |   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | <p>All material used in the manufacturing of cables shall be new and shall be selected as the best available for the intended use.</p>   |   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |
|                           |   | <p>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.</p>  |   |   |              |  |    |               |                        |  |   |                    |       |  |   |           |       |  |   |                        |        |  |   |                  |              |              |           |   |  |                  |                                 |  |            |      |  |                   |   |   |                           |                       |    |              |   |                   |        |  |  |              |   |  |  |

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| TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR |                                       |                       |            |
|---|---------------------------------------|-----------------------|------------|
| TECHNICAL SPECIFICATION                             |                                       |                       |            |
| Document Title                                      | Technical Specification – 33 kV Cable |                       |            |
| Document No.  | ENG-EHV-1012                          | Eff. Date: 01.06.2020 |            |
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| (A) 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              | No. of strands & electrical parameters | Nominal size of conductor mm <sup>2</sup>   | Min. number of strands                | Max. DC resistance @ 20 deg C (Ohm/km)   | Conductor Short circuit current rating for 1 second |  |
|                |  | 300   | 30                                    | 0.10   | 28.3 kA   |  |
|                |  | 400   | 53                                    | 0.0778   | 37.7 kA   |  |
|                |  | 630   | 53                                    | 0.0469   | 59.4 kA   |  |
| 5              | No. of strands & electrical parameters | 1000  | 53                                    | 0.0291   | 94.3 kA   |  |
|                |  | 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.  |                                       |  |   |  |
| 7              | Cleanliness and uniformity             | a) Before stranding, the cross-section of the Aluminium conductor shall be circular, and shall have uniform smooth surface, free from sharp edges and free from any defects.<br>b) Stranded Conductor shall be free from oil traces & aluminum dust. Conductor (after stranding) shall be super cleaned<br>c) Traces of aluminum dust on conductor or conductor screen shall not be acceptable. |                                       |  |   |  |
| 8              | Conductor jointing                     | Not acceptable in any strand or in any conductor after it is stranded.  |                                       |  |   |  |
| 9              | Raw material supplier                  | Conductor raw material shall be procured from reputed suppliers viz., BALCO/ HINDALCO/ NALCO/ Vedanta only.   |                                       |  |   |  |
| 10             | Diameter of conductor                  | To be specified by bidder   |                                       |  |   |  |
| 11             | Min. weight of conductor (kg/km/core)  | Nominal size of conductor mm <sup>2</sup>   | Min. weight of conductor (kg/km/core) |  |   |  |
|                |  | 300   | 780                                   |  |   |  |
|                |  | 400   | 1080                                  |  |   |  |
|                |  | 630   | 1650                                  |  |   |  |
| 11             | Min. weight of conductor (kg/km/core)  | 1000  | 2600                                  |  |   |  |
|                |  | (B) Conductor Screen  |                                       |  |   |  |
|                |  | S.No.   | Parameter                             | Requirement  |   |  |
|                |  | 1   | Material                              | 1 <sup>st</sup> layer: Semi-conducting tape<br>2 <sup>nd</sup> layer: Semi-conducting compound |   |  |
| 2              | Configuration                          | 1 <sup>st</sup> layer: Semi-conducting tape shall be applied over conductor with nominal thickness of 0.2 mm.<br>2 <sup>nd</sup> layer: Semi-conducting compound screen shall be applied through triple extrusion process.  |                                       |  |   |  |
| 3              | Min. thickness                         | Minimum thickness of semi-conducting compound screen  |                                       |  |   |  |

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|   |                                  |   |
|---|----------------------------------|---|
|   |                                  | 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 only  |

**(C) Insulation**

| S.No. | Parameter                      | Requirement   |
|-------|--------------------------------|---|
| 1     | Material and extrusion process | XLPE insulation shall be applied through CCV/VCV line by triple extrusion process with 'Dry Curing' and 'Water Cooling'.  |
| 2     | Raw material supplier          | a) <b>XLPE compound shall be super cleaned and procured from reputed raw material suppliers viz.,</b> Dow/Borealis/Hanwa only.<br>b) Both XLPE and semi conductive compounds shall be used from same raw material supplier. |
| 3     | Thickness and Eccentricity     | a) Nominal thickness shall be 8.8 mm.<br>b) Minimum thickness shall be 7.82 mm at any point of measurement.<br>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.                                     |

**(D) Insulation Screen & Core identification strip**

| S.No.               | Parameter           | Requirement  |                     |                     |
|---------------------|---------------------|--|---------------------|---------------------|
| 1                   | Material            | a) <b>1<sup>st</sup> layer</b> : Semi-conducting compound<br>b) <b>2<sup>nd</sup> layer</b> : Semi-conducting water swellable tape<br>c) <b>3<sup>rd</sup> layer</b> : Annealed copper tape  |                     |                     |
| 2                   | Configuration       | a) <b>1<sup>st</sup> layer: Non-Metallic Part:</b><br>Extruded Insulation semiconducting screen shall be bonded type.<br>Resistivity shall not exceed 500 Ω-meter.<br>Surface of insulation screen shall be smooth, free from cavity/ nicks/scratches/ other visible defects.<br>Min. thickness shall be 0.5 mm at any point of measurement.<br><br>b) <b>2<sup>nd</sup> layer: Water Swellable tape:</b><br>Semi-conducting water swellable tapes shall be applied over non-metallic screen.<br>Minimum thickness of water swellable shall be 0.3 mm and minimum overlapping shall be 15%.<br><br><b>Core identification strip:</b> |                     |                     |
|                     |                     | <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;"><b>3 CORE CABLE</b></td> <td style="width: 50%; text-align: center;"><b>1 CORE CABLE</b></td> </tr> </table>  | <b>3 CORE CABLE</b> | <b>1 CORE CABLE</b> |
| <b>3 CORE CABLE</b> | <b>1 CORE CABLE</b> |  |                     |                     |

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| TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR |                                       |                       |            |
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| TECHNICAL SPECIFICATION                             |                                       |                       |            |
| Document Title                                      | Technical Specification – 33 kV Cable |                       |            |
| Document No.  | ENG-EHV-1012                          | Eff. Date: 01.06.2020 |            |
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|                  |  |   |  |  |                            |  |           |                     |  |
|------------------|--|---|--|--|----------------------------|--|-----------|---------------------|--|
|                  |  | 4   | Min. thickness<br>At any point of<br>measurement | <b>3 CORE CABLE</b>  |                            | <b>1 CORE CABLE</b>  |           |                     |  |
|                  |  |   |  | 3CX300<br>sq.mm.   | 0.7 mm                     | 1CX400<br>sq.mm.   | 0.5<br>mm |                     |  |
|                  |  |   |  | 3CX400<br>sq.mm.   | 0.7 mm                     | 1CX630<br>sq.mm.   | 0.6<br>mm |                     |  |
|                  |  |   |  |  |                            | 1CX1000<br>sq.mm.  | 0.7<br>mm |                     |  |
|                  |  | <b>(G) Armour:</b>  |  |  |                            |  |           |                     |  |
|                  |  | <b>S.No.</b>  |  | <b>Parameter</b>   |                            | <b>Requirement</b>   |           |                     |  |
|                  |  |   |  |  |                            | <b>3 CORE CABLE</b>  |           | <b>1 CORE CABLE</b> |  |
|                  |  | 1   | Material   | Low carbon annealed hot dipped galvanized round steel wires  |                            | H4 Grade Aluminium wires   |           |                     |  |
|                  |  | 2   | Compliance to Standard                           | It shall comply with the requirements of IS 3975 along with latest amendments. Hot dipped galvanizing layer shall be uniform on low carbon annealed steel wires. Zinc coating shall be 290 g/m <sup>2</sup> as per IS 4826:1979. |                            | It shall comply with the requirements of IS 8130 along with latest amendments. |           |                     |  |
|                  |  | 3   | Nominal Dimensions                               | <b>3 CORE CABLE</b>  |                            | <b>1 CORE CABLE</b>  |           |                     |  |
| 3CX300<br>sq.mm. | 4.0 mm<br>(GI Wire)                                |   |  | 1CX400   | 2 mm<br>(Aluminum wire)    |  |           |                     |  |
| 3CX400<br>sq.mm. | 4.00 mm<br>(GI wire)                               |   |  | 1CX630<br>sq.mm.   | 2.5 mm<br>(Aluminum wire)  |  |           |                     |  |
|                  |  |   |  | 1CX1000<br>sq.mm.  | 3.15 mm<br>(Aluminum wire) |  |           |                     |  |
| 4                | Approx. Armor Short circuit rating in kA for 1 sec | <b>3 CORE CABLE</b>   |  | <b>1 CORE CABLE</b>  |                            |  |           |                     |  |
|                  |  | 3CX300<br>sq.mm.  | 40   | 1CX400<br>sq.mm.   | 20                         |  |           |                     |  |
|                  |  | 3CX400<br>sq.mm.  | 42   | 1CX630<br>sq.mm.   | 28                         |  |           |                     |  |
|                  |  |   |  | 1CX1000<br>sq.mm.  | 42                         |  |           |                     |  |
| 5                | Joining 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 such that 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                              | Armour shall be procured from reputed raw material suppliers viz., TATA Steel, Jindal Steel, SAIL only.   |  |  |                            |  |           |                     |  |

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**(H) Outer Sheath**

| S.No. | Parameter                                  | Requirement  |
|-------|--|--|
| 1     | Material                                   | Polyvinyl chloride (PVC) ST-2 <b>FRLSH</b> type compound with ' <b>lead naphthenate</b> ' additive   |
| 2     | Configuration                              | Polyvinyl chloride (PVC) ST-2 FRLSH type compound with ' <b>lead naphthenate</b> ' additive as 'termite & rodent repellent' applied by extrusion process.  |
| 3     | Min. Thickness at any point of measurement | <b>3 CORE CABLE</b>  |
|       |  | 3CX300 sq.mm.      3.0 mm  |
|       |  | 3CX400 sq.mm.      3.0 mm  |
|       |  | <b>1 CORE CABLE</b>  |
|       |  | 1CX400 sq.mm.      2.04 mm   |
|       |  | 1CX630 sq.mm.      2.36 mm   |
|       |  | 1CX1000 sq.mm.      2.52 mm  |
| 4     | Colour                                     | Yellow Lemon color, colour code: 355 as per IS 5:2007.   |
| 5     | Surface uniformity                         | Surface of outer sheath shall be free from cavity/ nicks/ other visible defects.   |
| 6     | Raw material supplier                      | <b>PVC compound shall be procured from reputed raw material suppliers viz.,</b> Shakun, Kalpana, KLJ, DCM ShriRam.<br>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   |

**(I) 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.       |

**(J) Other requirements**

| S.No. | Parameter                 | Requirement              |
|-------|---------------------------|--------------------------|
| 1     | Overall diameter of cable | To be provided by bidder |
| 2     | Weight of Overall cable   | To be provided by bidder |

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| <b>6.0</b> | <b>NAME PLATE AND MARKING ON DRUM AND CABLE OUTER SHEATH</b> | <p><b>Steel drums</b> shall be provided. Drum shall be free from sharp edges and visual defect.</p> <p><b>Stencil plate</b> on one flange side of the drum and <b>laminated paper sheet</b> on other side flange of drum.</p> <p>Cable length on one drum shall be 250 meters max. +/- 5%.</p> <p>i. Following details shall be provided on flanges of <b>drum</b>:</p> <ul style="list-style-type: none"> <li>a) Manufacturer's name</li> <li>b) Type of Cable</li> <li>c) Size of Cable</li> <li>d) Voltage Grade</li> <li>e) Length of the cable on the drum</li> <li>f) Direction of the rotation of the drum</li> <li>g) Gross mass</li> <li>h) Country of manufacture</li> <li>i) Year and month of manufacture</li> <li>j) Purchase Order no.</li> <li>k) Drum No.</li> </ul> <p>ii. Following details shall be <b>embossed</b> on the <b>outer sheath</b>:</p> <ul style="list-style-type: none"> <li>a) Sequential meter marking shall be printed.</li> </ul> <p>All other details mentioned below shall be embossed.<br/>Embossing shall be clearly visible.</p> <p><b>At interval of every 1 meter, following details to be embossed:</b></p> <ul style="list-style-type: none"> <li>b) Property of TPCODL</li> <li>c) Manufacturer name</li> <li>d) Month &amp; Year of Manufacture</li> <li>e) Voltage grade</li> <li>f) Size of the cable</li> <li>g) Purchase Order no.</li> <li>h) Cable code</li> </ul> |
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| <b>7.0</b> | <b>TESTS</b> | <p>Routine, Acceptance &amp; Type tests shall be carried out in accordance with the relevant IS/IEC/ International standard.</p> <p>Acceptance tests shall be witnessed by TPCODL's authorized representative.</p> <p>Following tests shall be necessarily conducted on the <b>33 kV</b> underground cable in additions to others specified in IS/IEC/ANSI standards. Type tests shall be conducted from CPRI/ERDA only.</p> <p><i>*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.</i></p> |  |                          |                           |                    |                           |
|            |              | <b>(A) Type Tests</b>   |  |                          |                           |                    |                           |
|            |              |   |  | <b>Specific value</b>    |                           | <b>Test method</b> |                           |
|            |              | <b>S.No.</b>  | <b>Test</b>  | <b>Clause No.</b>        | <b>Reference Standard</b> | <b>Clause No.</b>  | <b>Reference Standard</b> |
|            |              | <b>Tests on Conductor</b>   |  |                          |                           |                    |                           |
|            |              | 1   | Conductor resistance test                              | Table 2                  | IS 8130                   | 10                 | IS 10810 part 5           |
|            |              | 2   | Conductor water penetration test                       | IEC 60502/ ICEA T-31-610 | IEC 60502/ ICEA T-31-610  | Annexure F         | IEC 60502/ ICEA T-31-610  |
|            |              | <b>Tests on Insulation</b>  |  |                          |                           |                    |                           |
|            |              | 3   | Tensile strength & Elongation at break (before ageing) | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 7           |
|            |              | 4   | Ageing in air oven                                     | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 11          |
|            |              | 5   | Tensile strength & Elongation at break                 | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 7           |
|            |              | 6   | Tests for thickness of insulation                      | Table 4                  | IS 7098 part 2            | 8                  | IS 10810 part 6           |
|            |              | 7   | Eccentricity and Ovality of insulation                 | 12.4                     | IS 7098 part 2            | Annexure A         | IS 7098 part 2            |
|            |              | 8   | Hot set test   | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 30          |
|            |              | 9   | Shrinkage test   | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 12          |
|            |              | 10  | Gravimetric test (Water absorption)                    | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 33          |
|            |              | 11  | Volume resistivity/ Insulation Resistance              | Table 1 of Clause No.5   | IS 7098 part 2            | 8                  | IS 10810 part 43          |
|            |              | <b>Tests on Inner Sheath</b>  |  |                          |                           |                    |                           |
|            |              | 12  | PVC thickness  | Table 5                  | IS 7098 part 2            | 8                  | IS 10810 part 6           |
|            |              | <b>Tests on Extruded semi-conducting screen</b>   |  |                          |                           |                    |                           |

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|  | 13                                      | Volume resistivity test of conductor screen              | Table 2               | IS 7098 part 2 | Annexure E | IS 7098 part 2   |
|  | 14                                      | Volume resistivity test of core screen                   | Table 2               | IS 7098 part 2 | Annexure E | IS 7098 part 2   |
|  | <b>Tests on Outer Sheath (PVC)</b>      |  |                       |                |            |                  |
|  | 15                                      | Flammability test for outer sheath                       | Clause no. 20.8       | IS 7098 part 2 | 8          | IS 10810 part 53 |
|  | 16                                      | Thickness  | Table 7               | IS 7098 part 2 |            |                  |
|  | 17                                      | Tensile strength and Elongation at break (before ageing) | Table 2               | IS 5831        | 8          | IS 10810 part 7  |
|  | 18                                      | Tensile strength and Elongation at break (after ageing)  | Table 2               | IS 5831        | 8          | IS 10810 part 7  |
|  | 19                                      | Variation due to ageing                                  | Table 2               | IS 5831        | 8          | IS 10810 part 7  |
|  | 20                                      | Loss of mass test  | Table 2               | IS 5831        | 8          | IS 10810 part 10 |
|  | 21                                      | Shrinkage test   | Table 2               | IS 5831        | 8          | IS 10810 part 12 |
|  | 22                                      | Hot deformation test                                     | Table 2               | IS 5831        | 8          | IS 10810 part 15 |
|  | 23                                      | Heat shock test  | Table 2               | IS 5831        | 8          | IS 10810 part 14 |
|  | 24                                      | Thermal stability test                                   | Table 2               | IS 5831        | Appendix B | IS 5831:1984     |
|  | 25                                      | Flammability test  | As per IEC 332 part 1 |                |            |                  |
|  | 26                                      | Oxygen index   | As per ASTM 2863      |                |            |                  |
|  | 27                                      | Temperature index  | ASTM 2863             |                |            |                  |
|  | 28                                      | Acid gas generation                                      | IEC 60754             |                |            |                  |
|  | 29                                      | Smoke density  | ASTM 2843             |                |            |                  |
|  | <b>Tests on Armour for 3 Core Cable</b> |  |                       |                |            |                  |
|  | 30                                      | Tensile test   | 8                     | IS 3975        | 6          | IS 1608          |
|  | 31                                      | Torsion test   | 8                     | IS 3975        | 7          | IS 1717          |
|  | 32                                      | Wrapping test  | 8                     | IS 3975        | 5          | IS 1755          |
|  | 33                                      | Resistance test  | 8                     | IS 3975        | 8          | IS 10810 Part 42 |
|  | 34                                      | Mass of zinc coating                                     | 9                     | IS 4826        | 6          | IS 6745          |
|  | 35                                      | Uniformity of zinc coating                               | 9                     | IS 3975        | 4          | IS 2633          |
|  | 36                                      | Adhesion test  | 9                     | IS 3975        | 9.3        | IS 3975          |
|  | <b>Tests on Armour for 1 Core Cable</b> |  |                       |                |            |                  |
|  | 37                                      | Tensile test   | 8                     | IS 8130        | 6          | IS 1608          |
|  | 38                                      | Torsion test   | 8                     | IS 8130        | 7          | IS 1717          |
|  | 39                                      | Wrapping test  | 8                     | IS 8130        | 5          | IS 1755          |
|  | 40                                      | Resistance test  | 8                     | IS 8130        | 8          | IS 10810 Part 42 |
|  | <b>Tests on complete cable</b>          |  |                       |                |            |                  |
|  | 41                                      | Partial discharge test                                   | 20.2                  | IS 7098 part 2 | 8          | IS 10810 Part 46 |

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| 42 | Thermal ageing test          | 20.9  | IS 7098 part 2 | 20.9 | IS 7098 part 2 |
| 43 | Bending test                 | 20.3  | IS 7098 part 2 | 20.3 | IS 7098 part 2 |
| 44 | Dielectric power factor test | 20.4  | IS 7098 part 2 | 20.4 | IS 7098 part 2 |
| 45 | High voltage test            | 63 kV for 5 minutes<br>As per Clause no. 20.7.2 | IS 7098 part 2 | 20.7 | IS 7098 part 2 |
| 46 | Heat cycle test              | 20.5  | IS 7098 part 2 | 20.5 | IS 7098 part 2 |
| 47 | Impulse withstand test       | 20.6  | IS 7098 part 2 | 20.6 | IS 7098 part 2 |

**(B) Routine Tests**

| Test                                   | Clause No. | Reference Standard |
|--|------------|--------------------|
| Conductor resistance test              | 19.3       | IS 7098 part 2     |
| Partial discharge                      | 19.3       | IS 7098 part 2     |
| High voltage test with power frequency | 19.3       | IS 7098 part 2     |
| Resistance test for Aluminium armour   | 19.3       | IS 7098 part 2     |

**(C) Acceptance Tests:**

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

| S.No.                                | Test name   | Specific value    |                    | Test method                              |                    |
|--------------------------------------|---|-------------------|--------------------|--|--------------------|
|                                      |   | Clause No.        | Reference Standard | Clause No.                               | Reference Standard |
| <b>(I) Test on Conductor</b>         |   |                   |                    |  |                    |
| 1                                    | Conductor resistance test   | Clause No. 5(A.5) | ENG-EHV-1012       | 10                                       | IS 10810 part 5    |
| 2                                    | Test for non-conductivity of water swellable tape/yarn of conductor | Clause No. 5(A.6) | ENG-EHV-1012       | Through multimeter                       |                    |
| 3                                    | Visual inspection for conductor cleanliness                         | Clause No. 5(A.7) | ENG-EHV-1012       | Check for presence of any Aluminium dust |                    |
| 4                                    | Conductor water penetration test                                    | ICEA T-31-610     |                    |  |                    |
| <b>(II) Test on Conductor Screen</b> |   |                   |                    |  |                    |
| 5                                    | Thickness of semi-conducting tape over conductor                    | Clause No. 5(B.2) | ENG-EHV-1012       | Value to be noted by inspector           |                    |

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|  |  | 6                                     | Test for conductivity of semi-conducting tape over conductor  | Clause No. 5(B.2)      | ENG-EHV-1012   | Through multimeter             |                  |  |  |
|  |  | 7                                     | Resistivity of extruded semi-conducting conductor screen  | Clause No. 5(B.4)      | ENG-EHV-1012   | Annexure E                     | IS 7098 part 2   |  |  |
|  |  | 8                                     | Thickness of extruded semi-conducting conductor screen  | Clause No. 5(B.3)      | ENG-EHV-1012   | Value to be noted by inspector |                  |  |  |
|  |  | <b>(III) Test on Insulation</b>       |   |                        |                |                                |                  |  |  |
|  |  | 9                                     | Tensile strength & Elongation at break (before ageing)  | Table 1 of Clause No.5 | IS 7098 part 2 | 8                              | IS 10810 part 7  |  |  |
|  |  | 10                                    | Insulation thickness  | Clause No. 5(C.3)      | ENG-EHV-1012   | 8                              | IS 10810 part 6  |  |  |
|  |  | 11                                    | Eccentricity and Ovality of insulation  | Clause No. 5(C.3)      | ENG-EHV-1012   | Annexure A                     | IS 7098 part 2   |  |  |
|  |  | 12                                    | Hot set test  | Table 1 of Clause No.5 | IS 7098 part 2 | 8                              | IS 10810 part 30 |  |  |
|  |  | 13                                    | Volume resistivity  | Table 1 of Clause No.5 | IS 7098 part 2 | 8                              | IS 10810 part 43 |  |  |
|  |  | 14                                    | Void & contamination test on core (by silicon oil dip method)   | Clause No. 5(C.5)      | ENG-EHV-1012   | 20.1                           | IS 7098 part 3   |  |  |
|  |  | 15                                    | Surface smoothness of insulation  | Clause No. 5(C.5)      | ENG-EHV-1012   | To be checked by inspector     |                  |  |  |
|  |  | <b>(IV) Test on Insulation Screen</b> |   |                        |                |                                |                  |  |  |
|  |  | 16                                    | Resistivity of insulation screen  | Clause No. 5(D.2.a)    | ENG-EHV-1012   | Annexure E                     | IS 7098 part 2   |  |  |
|  |  | 17                                    | Thickness of insulation screen  | Clause No. 5(D.2)      | ENG-EHV-1012   | Value to be noted by inspector |                  |  |  |
|  |  | 18                                    | Visual inspection for any convolution/ protrusion between conductor screen and XLPE insulation, XLPE insulation and insulation screen | Clause no. 5(C.5)      | ENG-EHV-1012   | To be checked by inspector     |                  |  |  |
|  |  | 19                                    | Thickness & % Overlapping of semi-conducting water swellable tape   | Clause no. 5(D.2.b)    | ENG-EHV-1012   | Value to be noted by inspector |                  |  |  |
|  |  | 20                                    | Thickness & % Overlapping of copper tape  | Clause No. 5(D.2.c)    | ENG-EHV-1012   | Value to be noted by inspector |                  |  |  |
|  |  | <b>(V) Test on Inner sheath</b>       |   |                        |                |                                |                  |  |  |

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| 21                                | PVC thickness   | Clause No. 5(F.4)               | ENG-EHV-1012 | 8   | IS 10810 part 6  |
| 22                                | Colour of inner sheath  | Clause No. 5(F.1)               | ENG-EHV-1012 | To be checked by inspector                              |                  |
| <b>(VI) Test on Armour</b>        |   |                                 |              |   |                  |
| <b>For 3 core cable</b>           |   |                                 |              |   |                  |
| 23                                | Tensile test  | 8                               | IS 3975      | IS 1608   |                  |
| 24                                | Mass of zinc coating  | Table 1                         | IS 4826      | IS 6745   |                  |
| 25                                | Uniformity of zinc coating  | 9                               | IS 3975      | IS 2633   |                  |
| 26                                | Adhesion test   | 9                               | IS 3975      | IS 3975   |                  |
| 27                                | Diameter and no. of wires   | Clause No. 5(G.3)               | ENG-EHV-1012 | Value to be noted by inspector                          |                  |
| 28                                | Coverage %  | Clause No. 5(G.6)               | ENG-EHV-1012 | Value to be noted by inspector                          |                  |
| <b>For 1 core cable</b>           |   |                                 |              |   |                  |
| 29                                | Tensile test  | 8                               | IS 8130      | 6   | IS 1608          |
| 30                                | Wrapping test   | 8                               | IS 8130      | 5   | IS 1755          |
| 31                                | Resistance test   | 8                               | IS 8130      | 8   | IS 10810 Part 42 |
| 32                                | Diameter and no. of wires   | Clause No. 5(G.3)               | ENG-EHV-1012 | Value to be noted by inspector                          |                  |
| 33                                | Coverage %  | Clause No. 5(G.6)               | ENG-EHV-1012 | Value to be noted by inspector                          |                  |
| <b>(VII) Test on Outer Sheath</b> |   |                                 |              |   |                  |
| 34                                | Thickness   | Clause No. 5(H.3)               | ENG-EHV-1012 | Value to be noted by inspector                          |                  |
| 35                                | Tensile strength and Elongation at break (before ageing)  | Table 2                         | IS 5831      | 8   | IS 10810 part 7  |
| 36                                | Colour of outer sheath  | Clause No. 5(H.4)               | ENG-EHV-1012 | To be checked by inspector                              |                  |
| 37                                | Surface uniformity of outer sheath (on full drum)/ shall be free from any damage- void, nick, cavity. | Clause No. 5(H.5)               | ENG-EHV-1012 | Through rewinding of drum (As per TPCODL specification) |                  |
| 38                                | Presence of lead naphthenate in PVC outer sheath  | Chemical test Clause no. 5(H.1) | ENG-EHV-1012 | To be checked by inspector                              |                  |
| 39                                | Flammability test   | As per IEC 332 part 1           |              |   |                  |
| 40                                | Oxygen index  | As per ASTM 2863                |              |   |                  |
| 41                                | Temperature index   | ASTM 2863                       |              |   |                  |

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|           | <b>42</b>                              | Acid gas generation  | IEC 60754   |                                |                                |                  |
|           | <b>43</b>                              | Smoke density  | ASTM 2843   |                                |                                |                  |
|           | <b>(VIII) Tests for complete cable</b> |  |   |                                |                                |                  |
|           | <b>44</b>                              | Partial discharge test   | 5 pC  | As per type test               | 8                              | IS 10810 part 46 |
|           | <b>45</b>                              | High voltage test  | 63 kV for 5 minutes<br>As per Clause no. 20.7.2     | IS 7098 part 2                 | 8                              | IS 10810 part 45 |
|           | <b>46</b>                              | Raw material consumption verification  | Document verification as proof to be submitted      |                                |                                |                  |
|           |  |  | Invoice to be shown from procurement to consumption |                                |                                |                  |
|           | <b>(IX) Additional tests</b>           |  |   |                                |                                |                  |
|           | <b>47</b>                              | Colour coding identification over copper screen (for 3C cable)                       | Clause no. 5(D.2)                                   | ENG-EHV-1012                   | To be checked by inspector     |                  |
|           | <b>48</b>                              | Sequential marking check   | Clause no. 6.ii                                     | ENG-EHV-1012                   | To be checked by inspector     |                  |
|           | <b>49</b>                              | Cable drum length verification   | Clause no. 6  | ENG-EHV-1012                   | To be checked by inspector     |                  |
|           | <b>50</b>                              | Packaging of cable on cable drum   | By recyclable PVC sheet- As per Clause no.12        | ENG-EHV-1012                   | To be checked by inspector     |                  |
|           | <b>51</b>                              | Weight of conductor/km   | Clause No. 5(A.11)                                  | ENG-EHV-1012                   | Value to be noted by inspector |                  |
|           | <b>52</b>                              | Diameter of conductor  | Clause No. 5(A.10)                                  | ENG-EHV-1012                   | Value to be noted by inspector |                  |
|           | <b>53</b>                              | Weight of XLPE insulation plus semiconducting screen (of conductor & insulation)/ km | Value to be noted by inspector                      |                                |                                |                  |
| <b>54</b> | Diameter over core                     | Clause no. 5(D.4)  | ENG-EHV-1012  | Value to be noted by inspector |                                |                  |
| <b>55</b> | Weight of core                         | Clause no. 5(D.5)  | ENG-EHV-1012  | Value to be noted by inspector |                                |                  |

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|     |                                | 56  | Weight of copper tape/km   | Clause No. 5(D.6)              | ENG-EHV-1012 | Value to be noted by inspector       |
|     |                                | 57  | Diameter over inner sheath | Value to be noted by inspector |              |                                      |
|     |                                | 58  | Weight of armour/ km       | Clause No. 5(G.6)              | ENG-EHV-1012 | Value to be noted by inspector       |
|     |                                | 59  | Cable sealing end caps     | Clause No. I                   | ENG-EHV-1012 | Provision to be checked by inspector |
|     |                                | 60  | Weight of outer sheath/ km | Clause No. 5(H.7)              | ENG-EHV-1012 | Value to be noted by inspector       |
|     |                                | 61  | Diameter of complete cable | Clause No. 5(J.1)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 8.0 | <b>TYPE TEST CERTIFICATES</b>  | <p><b>Requirement:</b> Bidder shall furnish the type test report of <b>33 kV</b> cable for the tests as mentioned in Clause no. 7 of this specification and as per reference standards.</p> <p><b>Test Laboratories:</b> Complete set of Type Tests shall be conducted at certified test laboratories, which are CPRI / ERDA only.</p> <p>Type test report shall be submitted for the type, size and rating of the cable mentioned in the bid/ OR for any size higher (than required) of similar type and similar voltage grade.</p> <p><b>Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from the date of opening the bid.</b></p> <p>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.</p> <p>In case the type test certificates are dated beyond 5 years and up to 10 years maintaining basic component design same then deviation should be submitted on vendor letter head. TPCODL will have the rights to accept/reject the same.</p> |                            |                                |              |                                      |
| 9.0 | <b>PRE-DISPATCH INSPECTION</b> | <p>Inspection shall be carried out by duly authorized representative of TPCODL. Bidder shall grant free access to the places of manufacture to TPCODL's representatives at all times when the work is in progress.</p> <p>Inspection may be made at any stage of manufacturing at the discretion of TPCODL and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Inspection by TPCODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications.</p> <p><b>Dispatch of material:</b> Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL.</p> <p>Following documents shall be sent along with the supplied material:</p> <ol style="list-style-type: none"> <li>Test reports</li> <li>MDCC issued by TPCODL</li> <li>Invoice in duplicate</li> <li>Packing list</li> <li>Delivery Challan</li> </ol>   |                            |                                |              |                                      |

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| <b>10.</b>  | <b>INSPECTION<br/>AFTER RECEIPT<br/>AT STORES</b> | The material received at TPCODL, Odisha store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Contracts & Engineering department.   |
| <b>11.0</b> | <b>GUARANTEE</b>                                  | <p><b>Requirement:</b> Bidder shall confirm for guarantee towards design, material, workmanship &amp; quality of process / manufacturing for integrated product delivered under the contract. In the event any defect is found by TPCODL, up to a period of at least 60 months from the date of commissioning or 72 months from the date of last supplies made under the contract whichever is later, bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of TPCODL, failing which TPCODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPCODL's own charges (@ 20% of expenses incurred), from the Bidder or from 'Security cum Performance Deposit' as the case may be.</p> <p><b>Free replacement:</b> Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by TPCODL.</p>  |
| <b>12.0</b> | <b>PACKAGING</b>                                  | <p>a) <b>Standard length of Cable:</b> The cable shall be supplied in continuous <b>standard length</b> of 250 (3 cores) &amp; 500 (Single core) running meters with +/- 5% tolerance.</p> <p>b) <b>Filling condition:</b> Drum shall not be overfilled.</p> <p>c) <b>Cable drum:</b> The cable shall be wound on non-returnable steel drums without any extra cost to TPCODL as per IS 10418 and its latest amendments.</p> <p>d) <b>Sealing of cable ends:</b> 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.</p> <p>e) <b>Requirements for Cable drums:</b> 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.</p> <p>f) Bottom end of cable should be clamped on drum by jute or nylon rope.</p> <p>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.</p> <p>h) <b>Rail/ Road transportation:</b> 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.</p> <p><b>i) Packaging shall be as per climate change perspective. Cable wound on cable drum shall be covered by recyclable PVC sheet for dust proof. TPCODL encourages to use environment friendly packaging.</b></p> |
| <b>13.0</b> | <b>TENDER SAMPLE</b>                              | NA  |
| <b>14.0</b> | <b>QUALITY CONTROL</b>                            | <p>The bidder shall submit '<b>Quality Assurance Plan</b>' followed by him in respect of:<br/> Bought out items<br/> Items manufactured by him<br/> Raw materials in process<br/> Final inspection<br/> Packaging &amp; Marking.</p> <p>As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPCODL reserves the sole rights for the type test of random sample from the lot and in case of any discrepancy or deviation from the Type test certificates submitted along with the bid, the complete Lot shall be rejected.<br/> TPCODL's nominated representative shall have free access to the bidder's works to carry out inspections.</p>   |
| <b>15.0</b> | <b>MINIMUM</b>                                    | Bidder shall have adequate in house testing facilities for carrying out all routine and acceptance  |
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|             | <b>TESTING FACILITIES</b>               | tests as per relevant International / Indian standards.   |
| <b>16.0</b> | <b>MANUFACTURING ACTIVITIES</b>         | The successful bidder will have to submit (after placement of RC) technical compliance document and drawing of cable as per RC line items for getting approval before mass manufacturing.<br>Manufacturing mass quantity to start only after getting CAT-A approved drawings or as per intimation from TPCODL.  |
| <b>17.0</b> | <b>SPARES, ACCESSORIES AND TOOLS</b>    | Not Applicable  |
| <b>18.0</b> | <b>DRAWINGS AND DOCUMENTS</b>           | <p>Following documents shall be submitted along with the bid for approval after award of RC/PO:</p> <ul style="list-style-type: none"> <li>a) Completely filled–in clause wise compliance of the specification.</li> <li>b) General description of the equipment and all components including brochures</li> <li>c) Type test Certificates for each specified test</li> <li>d) Experience List.</li> <li>e) Cross sectional drawing of the cable.</li> <li>f) Rating factors for variation in ground and air temperature, depth of laying, thermal resistivity of soil and different laying configuration of cables.</li> <li>g) A detailed list of bought out items which got into the manufacture of cables should be furnished indicating the name of the firms from whom these items are procured.</li> </ul> <p>All the Documents and Drawings shall be in English Language.</p> |
| <b>19.0</b> | <b>GUARANTEED TECHNICAL PARTICULARS</b> | Bidder to submit clause wise compliance.  |

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**(TO BE ENCLOSED WITH TECHNICAL BID)**

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

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

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

Seal of the Company

Signature :

Designation

20.0

**SCHEDULE OF DEVIATIONS**

**ANNEXURE – 1**

|           |  |                         |  |
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### INSPECTION TEST PLAN

| S.No.                                | Test name   | Specific value         |                    | Test method                              |                    |
|--------------------------------------|---|------------------------|--------------------|--|--------------------|
|                                      |   | Clause No.             | Reference Standard | Clause No.                               | Reference Standard |
| <b>(I) Test on Conductor</b>         |   |                        |                    |  |                    |
| 1                                    | Conductor resistance test   | Clause No. 5(A.5)      | ENG-EHV-1012       | 10                                       | IS 10810 part 5    |
| 2                                    | Test for non-conductivity of water swellable tape/yarn of conductor | Clause No. 5(A.6)      | ENG-EHV-1012       | Through multimeter                       |                    |
| 3                                    | Visual inspection for conductor cleanliness                         | Clause No. 5(A.7)      | ENG-EHV-1012       | Check for presence of any Aluminium dust |                    |
| 4                                    | Conductor water penetration test                                    | ICEA T-31-610          |                    |  |                    |
| <b>(II) Test on Conductor Screen</b> |   |                        |                    |  |                    |
| 5                                    | Thickness of semi-conducting tape over conductor                    | Clause No. 5(B.2)      | ENG-EHV-1012       | Value to be noted by inspector           |                    |
| 6                                    | Test for conductivity of semi-conducting tape over conductor        | Clause No. 5(B.2)      | ENG-EHV-1012       | Through multimeter                       |                    |
| 7                                    | Resistivity of extruded semi-conducting conductor screen            | Clause No. 5(B.4)      | ENG-EHV-1012       | Annexure E                               | IS 7098 part 2     |
| 8                                    | Thickness of extruded semi-conducting conductor screen              | Clause No. 5(B.3)      | ENG-EHV-1012       | Value to be noted by inspector           |                    |
| <b>(III) Test on Insulation</b>      |   |                        |                    |  |                    |
| 9                                    | Tensile strength & Elongation at break (before ageing)              | Table 1 of Clause No.5 | IS 7098 part 2     | 8  | IS 10810 part 7    |
| 10                                   | Insulation thickness  | Clause No. 5(C.3)      | ENG-EHV-1012       | 8  | IS 10810 part 6    |
| 11                                   | Eccentricity and Ovality of insulation                              | Clause No. 5(C.3)      | ENG-EHV-1012       | Annexure A                               | IS 7098 part 2     |
| 12                                   | Hot set test  | Table 1 of Clause No.5 | IS 7098 part 2     | 8  | IS 10810 part 30   |
| 13                                   | Volume resistivity  | Table 1 of Clause No.5 | IS 7098 part 2     | 8  | IS 10810 part 43   |
| 14                                   | Void & contamination test on core (by silicon dip method)           | Clause No. 5(C.5)      | ENG-EHV-1012       | 20.1                                     | IS 7098 part 3     |

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| 15                                    | Surface smoothness of insulation  | Clause No. 5(C.5)   | ENG-EHV-1012 | To be checked by inspector     |                  |
| <b>(IV) Test on Insulation Screen</b> |   |                     |              |                                |                  |
| 16                                    | Resistivity of insulation screen  | Clause No. 5(D.2.a) | ENG-EHV-1012 | Annexure E                     | IS 7098 part 2   |
| 17                                    | Thickness of insulation screen  | Clause No. 5(D.2)   | ENG-EHV-1012 | Value to be noted by inspector |                  |
| 18                                    | Visual inspection for any convolution/ protrusion between conductor screen and XLPE insulation, XLPE insulation and insulation screen | Clause no. 5(C.5)   | ENG-EHV-1012 | To be checked by inspector     |                  |
| 19                                    | Thickness & % Overlapping of semi-conducting water swellable tape   | Clause no. 5(D.2.b) | ENG-EHV-1012 | Value to be noted by inspector |                  |
| 20                                    | Thickness & % Overlapping of copper tape  | Clause No. 5(D.2.c) | ENG-EHV-1012 | Value to be noted by inspector |                  |
| <b>(V) Test on Inner sheath</b>       |   |                     |              |                                |                  |
| 21                                    | PVC thickness   | Clause No. 5(F.4)   | ENG-EHV-1012 | 8                              | IS 10810 part 6  |
| 22                                    | Colour of inner sheath  | Clause No. 5(F.1)   | ENG-EHV-1012 | To be checked by inspector     |                  |
| <b>(VI) Test on Armour</b>            |   |                     |              |                                |                  |
| <b>For 3 core cable</b>               |   |                     |              |                                |                  |
| 23                                    | Tensile test  | 8                   | IS 3975      | IS 1608                        |                  |
| 24                                    | Mass of zinc coating  | Table 1             | IS 4826      | IS 6745                        |                  |
| 25                                    | Uniformity of zinc coating  | 9                   | IS 3975      | IS 2633                        |                  |
| 26                                    | Adhesion test   | 9                   | IS 3975      | IS 3975                        |                  |
| 27                                    | Diameter and no. of wires   | Clause No. 5(G.3)   | ENG-EHV-1012 | Value to be noted by inspector |                  |
| 28                                    | Coverage %  | Clause No. 5(G.7)   | ENG-EHV-1012 | Value to be noted by inspector |                  |
| <b>For 1 core cable</b>               |   |                     |              |                                |                  |
| 29                                    | Tensile test  | 8                   | IS 8130      | 6                              | IS 1608          |
| 30                                    | Wrapping test   | 8                   | IS 8130      | 5                              | IS 1755          |
| 31                                    | Resistance test   | 8                   | IS 8130      | 8                              | IS 10810 Part 42 |
| 32                                    | Diameter and no. of wires   | Clause No. 5(G.3)   | ENG-EHV-1012 | Value to be noted by inspector |                  |
| 33                                    | Coverage %  | Clause No. 5(G.7)   | ENG-EHV-1012 | Value to be noted by inspector |                  |
| <b>(VII) Test on Outer Sheath</b>     |   |                     |              |                                |                  |

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| 34                                     | Thickness   | Clause No. 5(H.3)   | ENG-EHV-1012     | Value to be noted by inspector                          |                  |
| 35                                     | Tensile strength and Elongation at break (before ageing)  | Table 2   | IS 5831          | 8   | IS 10810 part 7  |
| 36                                     | Colour of outer sheath  | Clause No. 5(H.4)   | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 37                                     | Surface uniformity of outer sheath (on full drum)/ shall be free from any damage- void, nick, cavity. | Clause No. 5(H.5)   | ENG-EHV-1012     | Through rewinding of drum (As per TPCODL specification) |                  |
| 38                                     | Presence of lead naphthenate in PVC outer sheath  | Chemical test Clause no. 5(H.1)   | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 39                                     | Flammability test   | As per IEC 332 part 1   |                  |   |                  |
| 40                                     | Oxygen index  | As per ASTM 2863  |                  |   |                  |
| 41                                     | Temperature index   | As per ASTM 2863  |                  |   |                  |
| 42                                     | Acid gas generation   | As per IEC 60754  |                  |   |                  |
| 43                                     | Smoke density   | As per ASTM 2843  |                  |   |                  |
| <b>(VIII) Tests for complete cable</b> |   |   |                  |   |                  |
| 44                                     | Partial discharge test  | 5 pC  | As per type test | 8   | IS 10810 part 46 |
| 45                                     | High voltage test   | 63 kV for 5 minutes<br>As per Clause no. 20.7.2   | IS 7098 part 2   | 8   | IS 10810 part 45 |
| 46                                     | Raw material consumption verification   | Document verification as proof to be submitted<br>Invoice to be shown from procurement to consumption |                  |   |                  |
| <b>(IX) Additional tests</b>           |   |   |                  |   |                  |
| 47                                     | Colour coding identification over copper screen (for 3C cable)  | Clause no. 5(D.2)   | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 48                                     | Sequential marking check  | Clause no. 6.ii   | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 49                                     | Cable drum length verification  | Clause no. 6  | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 50                                     | Packaging of cable on cable drum  | By recyclable PVC sheet- As per Clause no.12  | ENG-EHV-1012     | To be checked by inspector                              |                  |
| 51                                     | Weight of conductor/km  | Clause No. 5(A.11)  | ENG-EHV-1012     | Value to be noted by inspector                          |                  |
| 52                                     | Diameter of conductor   | Clause No. 5(A.10)  | ENG-EHV-1012     | Value to be noted by inspector                          |                  |
| 53                                     | Weight of XLPE insulation plus semiconducting screen (of conductor &                                  | Value to be noted by inspector  |                  |   |                  |
| Initiator                              |   | HoG (Plant Engineering)   |                  |   |                  |

|                       |  |                              |                   |
|-----------------------|--|------------------------------|-------------------|
|                       | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR</b> |                              |                   |
|                       | <b>TECHNICAL SPECIFICATION</b>                             |                              |                   |
| <b>Document Title</b> | <b>Technical Specification – 33 kV Cable</b>               |                              |                   |
| <b>Document No.</b>   | ENG-EHV-1012   | <b>Eff. Date: 01.06.2020</b> |                   |
| <b>Revision No.</b>   | 00   | <b>Page 23 of 23</b>         |                   |
| <b>Prepared by:</b>   | <b>Reviewed By:</b>  | <b>Approved By:</b>          | <b>Issued By:</b> |

|    |                            |                                |              |                                      |
|----|----------------------------|--------------------------------|--------------|--------------------------------------|
|    | insulation)/ km            |                                |              |                                      |
| 54 | Diameter over core         | Clause no. 5(D.4)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 55 | Weight of core             | Clause no. 5(D.5)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 56 | Weight of copper tape/km   | Clause No. 5(D.6)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 57 | Diameter over inner sheath | Value to be noted by inspector |              |                                      |
| 58 | Weight of armour/ km       | Clause No. 5(G.6)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 59 | Cable sealing end caps     | Clause No. I                   | ENG-EHV-1012 | Provision to be checked by inspector |
| 60 | Weight of outer sheath/ km | Clause No. 5(H.7)              | ENG-EHV-1012 | Value to be noted by inspector       |
| 61 | Diameter of complete cable | Clause No. 5(J.1)              | ENG-EHV-1012 | Value to be noted by inspector       |

|           |  |                         |  |
|-----------|--|-------------------------|--|
| Initiator |  | HoG (Plant Engineering) |  |
|-----------|--|-------------------------|--|



|  |  |   |
|--|--|---|
| TP Central Odisha Distribution Limited |  | SPECIFICATION FOR SUPPLY OF MATERIAL & CONSTR/AGUMENTATION OF HT/LT LINES, SUBSTATION |
| NEG-SPEC-01                            | TP CENTRAL ODISHA DISTRIBUTION LIMITED   | Date of Issue: 05/08/2020   |

## Technical Specifications :

**100x50x6mm MS Channel 75x40x5 mm  
MS Channel 50x50x6 mm Angle**




| No. | Description | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|-----|-------------|--------------------|-------------------|------------------------------|
|     |             | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|     |             | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

|  |   |   |
|--|---|---|
| TP Central Odisha Distribution Limited | <b>TPCODL</b><br>TP CENTRAL ODISHA DISTRIBUTION LIMITED | <b>SPECIFICATION FOR SUPPLY OF MATERIAL &amp; CONSTRN/AGUMENTATION OF HT/LT LINES, SUBSTATION</b> |
| <b>NEG-SPEC-01</b>                     |   | <b>Date of Issue: 05/08/2020</b>  |


| Clause No. | <b>TECHNICAL SPECIFICATIONS OF MILD STEEL CHANNEL &amp; ANGLE</b>  |  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
|------------|--|--|--------------|-------|---|----------|---|---|--|--|---|----------|---|---|----------|--|
| 1.0        | <p><b>SCOPE</b></p> <p>This specification covers design, manufacture, testing and dispatch to owner's stores of M.S. Channel &amp; Angle for use in structures in distribution system.</p>   |  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 2.0        | <p><b>APPLICABLE STANDARD</b></p> <p>Materials shall conform to the latest applicable Indian standards. In case bidders offer steel section and supports conforming to any other international specifications which shall be equivalent or better than IS, the same is also acceptable.</p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Standard No.</th> <th>Title</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>IS: 2062</td> <td>Grade 'A' Quality Specification for M.S.Angles, M.S.Channel</td> </tr> <tr> <td>2</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>IS: 2062</td> <td>Chemical and Physical composition of material</td> </tr> <tr> <td>4</td> <td>IS: 1852</td> <td>Rolling and Cutting Tolerances for Hot Rolled Steel products</td> </tr> </tbody> </table> | S.No.  | Standard No. | Title | 1 | IS: 2062 | Grade 'A' Quality Specification for M.S.Angles, M.S.Channel | 2 |  |  | 3 | IS: 2062 | Chemical and Physical composition of material | 4 | IS: 1852 | Rolling and Cutting Tolerances for Hot Rolled Steel products |
| S.No.      | Standard No.   | Title  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 1          | IS: 2062   | Grade 'A' Quality Specification for M.S.Angles, M.S.Channel  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 2          |  |  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 3          | IS: 2062   | Chemical and Physical composition of material                |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 4          | IS: 1852   | Rolling and Cutting Tolerances for Hot Rolled Steel products |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 3.0        | <b>GENERAL REQUIREMENTS</b>  |  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |
| 3.1        | <p><b>Raw material</b></p> <p>The Steel Sections shall be re-rolled from the BILLETS/INGOTS of tested quality as per latest version of IS: 2830 or to any equivalent International Standard and shall be arranged by the bidder from their own sources. The Chemical composition and Physical properties of the finished material shall be as per the equivalent standards.</p>  |  |              |       |   |          |   |   |  |  |   |          |   |   |          |  |

| No. | Description | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|-----|-------------|--------------------|-------------------|------------------------------|
|     |             | Anil Sah           | Niranjana Khuntia | Pourush Garg                 |
|     |             | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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| <b>TP Central Odisha Distribution Limited</b> |  | <b>SPECIFICATION FOR SUPPLY OF MATERIAL &amp; CONSTRN/AGUMENTATION OF HT/LT LINES, SUBSTATION</b> |
| <b>NEG-SPEC-01</b>                            | TP CENTRAL ODISHA DISTRIBUTION LIMITED   | <b>Date of Issue: 05/08/2020</b>  |

| 3.2 | <b>Length</b><br>The GS Flat to be supplied shall be in 5.5 meters length.   |   |                      |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
|-----|--|---|----------------------|--|---------------------|---|---|---|-----------|---|----|---|----------|---|---|---|------------|---|---|---|------------|---|----|---|-----------|---|----------------------------|--|-----------|
| 3.3 | <b>Weightment</b><br>The weighthment of GS Flat shall be witnessed by the consignee at the time of taking delivery. The weight recorded in the material receipt certificate issued by the consignees shall be final.   |   |                      |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 3.4 | <b>Chemical Composition</b> and Physical Properties of M.S. Angles, M.S. Channels, and M.S.Flat conforming to IS: Conforming to IS:2062/84   |   |                      |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 3.5 | <b>Chemical Composition</b><br><table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 40%; text-align: center;">Chemical composition</th> <th style="width: 20%;"></th> <th style="width: 30%; text-align: center;">For Fe 410 WA Grade</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>C</td> <td style="text-align: center;">-</td> <td style="text-align: center;">0.23% MAX</td> </tr> <tr> <td>2</td> <td>Mn</td> <td style="text-align: center;">-</td> <td style="text-align: center;">1.5% MAX</td> </tr> <tr> <td>3</td> <td>S</td> <td style="text-align: center;">-</td> <td style="text-align: center;">0.050% MAX</td> </tr> <tr> <td>4</td> <td>P</td> <td style="text-align: center;">-</td> <td style="text-align: center;">0.050% MAX</td> </tr> <tr> <td>5</td> <td>SI</td> <td style="text-align: center;">-</td> <td style="text-align: center;">0.40% MAX</td> </tr> <tr> <td>6</td> <td>CE<br/>(Carbon Equivalent)-</td> <td></td> <td style="text-align: center;">0.42% MAX</td> </tr> </tbody> </table> |   | Chemical composition |  | For Fe 410 WA Grade | 1 | C | - | 0.23% MAX | 2 | Mn | - | 1.5% MAX | 3 | S | - | 0.050% MAX | 4 | P | - | 0.050% MAX | 5 | SI | - | 0.40% MAX | 6 | CE<br>(Carbon Equivalent)- |  | 0.42% MAX |
|     | Chemical composition   |   | For Fe 410 WA Grade  |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 1   | C  | - | 0.23% MAX            |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 2   | Mn   | - | 1.5% MAX             |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 3   | S  | - | 0.050% MAX           |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 4   | P  | - | 0.050% MAX           |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 5   | SI   | - | 0.40% MAX            |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 6   | CE<br>(Carbon Equivalent)-   |   | 0.42% MAX            |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 3.6 | <b>Mechanical Properties</b><br>1. Tensile strength Kg/mm <sup>2</sup> – - 410<br>2. Yield stress Min. for thickness/diameter<br>< 20 mm - 26 Kg/mm <sup>2</sup> OR 250 N/ mm <sup>2</sup><br>20-40 mm - 24 Kg/mm <sup>2</sup> OR 240 N/ mm <sup>2</sup><br>> 40 mm - 23 Kg/mm <sup>2</sup> OR 230 N/ mm <sup>2</sup><br>3. Elongation % - 23%<br>4. Bend Test (Internal Dia) - Min-3t<br><br>(t – is the thickness of the material)   |   |                      |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |
| 3.7 | <b>Tolerance</b><br>Variation in ordered quantity for any destination and overall ordered quantity be only to the extent of ±2%. Rolling and weight tolerances shall be as per version of IS: 1852 or to any equivalent International Standard.  |   |                      |  |                     |   |   |   |           |   |    |   |          |   |   |   |            |   |   |   |            |   |    |   |           |   |                            |  |           |

| No. | Description | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|-----|-------------|--------------------|-------------------|------------------------------|
|     |             | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|     |             | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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| <b>TP Central Odisha Distribution Limited</b> |  | <b>SPECIFICATION FOR SUPPLY OF MATERIAL &amp; CONSTRN/AGUMENTATION OF HT/LT LINES, SUBSTATION</b> |
| <b>NEG-SPEC-01</b>                            | TP CENTRAL ODISHA DISTRIBUTION LIMITED   | <b>Date of Issue: 05/08/2020</b>  |

|     |  |
|-----|--|
| 4.0 | <p><b>TEST</b></p> <p>Steel Section shall be tested in IS approved Laboratory or Standard Laboratory the Bidder country having all facilities available for conducting all the test prescribed in relevant IS or IEC or to any equivalent International Standard or any recognized and reputable International Laboratory or Institutions.</p> <p>The bidders are required to specifically indicate that;</p> <ul style="list-style-type: none"> <li>i) They hold valid IS (or equivalent IEC) License.</li> <li>ii) Steel Section offered are bearing requisite IS certification or equivalent marks.</li> </ul> <p>The bidders are required to submit a copy of the valid IS (or equivalent IEC) License clearly indicating size and range of product against respective ISS or any equivalent International Standards along with their offer.</p> |
| 5.0 | <p><b>MARKING</b></p> <p>It is desirable that the bidder should put his identification marks on the finished material. The mark shall be in “legible English letter” given with marking dies of minimum 18 mm size.</p>  |
| 6.0 | <p><b>INSPECTION AND TEST CERTIFICATES</b></p> <p>The material to be supplied will be subject to inspection and approval by the purchaser’s representative before dispatch and/or on arrival at the destination. Inspection before dispatch shall not however, relieve the bidder of his responsibility to supply the Steel Sections strictly in accordance with the specification.</p>  |

| No. | Description | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|-----|-------------|--------------------|-------------------|------------------------------|
|     |             | Anil Sah           | Niranjan Khuntia  | Pourush Garg                 |
|     |             | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

| TATA POWER CENTRAL ODISHA LIMITED   |  |              |                       |
|-------------------------------------|--|--------------|-----------------------|
| TECHNICAL SPECIFICATION             |  |              |                       |
| Document Title                      | <b>TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles</b> |              |                       |
| Document No.                        | EN   |              | Eff. Date: 31.07.2020 |
| Revision No.                        | 00   |              | Page 1 of 20          |
| Prepared By:<br>Rajeeva<br>Tripathy | Reviewed By:   | Approved By: | Issued By :           |

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2. Standards
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8. Chemical properties
9. Mechanical properties
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|   |  |                              |                    |
|---|--|------------------------------|--------------------|
|   | <b>TATA POWER CENTRAL ODISHA LIMITED</b>                 |                              |                    |
|   | <b>TECHNICAL SPECIFICATION</b>                           |                              |                    |
| <b>Document Title</b>                   | <b>TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles</b> |                              |                    |
| <b>Document No.</b>                     | EN   | <b>Eff. Date: 31.07.2020</b> |                    |
| <b>Revision No.</b>                     | 00   | <b>Page 2 of 20</b>          |                    |
| <b>Prepared By:</b><br>Rajeeva Tripathy | <b>Reviewed By:</b>                                      | <b>Approved By:</b>          | <b>Issued By :</b> |

## TECHNICAL SPECIFICATION OF 11 & 13 mtr, R.S Joist Poles

### 1.0 Scope Of Work:

This specification covers design, manufacture, testing and supply of 150mm x 150mm GI RS Joist 11 Meter.&13 Meter long having unit weight of 30.6Kg & 34.6Kg Per Meter.respectively

Thickness of the web shall be 8.4 mm for 11mtr pole & 11.8 mm for 13mtr pole respectively.. All steel structures including RS joist for Line & Outdoor structures in Substations shall be Galvanized type.

| <b>150x150mm RS joist</b> |  |    |        |
|---------------------------|--|----|--------|
| 1                         | 150 x 150 mm R.S. Joist length:-11 mtr, 30.6kg/mtr | MT | 0.3366 |
| 2                         | 150 x 150 mm R.S. Joist length:-13 mtr, 34.6kg/mtr | MT | 0.4498 |

### Applicable Standards:

This specification covers the manufacturing, testing before dispatch and delivery of above R.S Joists.

### 2.0 Standards:

The RS JOISTS shall comply with the requirements of latest issue of IS – 2062 Gr – A except where specified otherwise.

### 3.0 Climatic Conditions :

Please refer chapter E3 of Technical Specification on climatic conditions.

### 4.0 Rolled Steel Joists

| <b>RSJ DESIGNATION</b>                  | <b>150 x 150 mm ISHB</b> |       |
|---|--------------------------|-------|
| Length of Joist in Mtr with +100mm/- 0% | 11mtr                    | 13mtr |
| Weight kg/m with±2.5% Tolerance         | 30.6                     | 34.6  |
| Sectional Area (cm )                    | 39                       | 44.1  |

|   |  |   |
|---|--|---|
|   | <b>TATA POWER CENTRAL ODISHA LIMITED</b>                 |   |
|   | <b>TECHNICAL SPECIFICATION</b>                           |   |
| <b>Document Title</b>                   | <b>TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles</b> |   |
| <b>Document No.</b>                     | EN   | Eff. Date: 31.07.2020                         |
| <b>Revision No.</b>                     | 00   | Page 3 of 20                                  |
| <b>Prepared By:</b><br>Rajeeva Tripathy | <b>Reviewed By:</b>                                      | <b>Approved By:</b><br><br><b>Issued By :</b> |

|   |                |                   |
|---|----------------|-------------------|
| Depth(D) of Section (mm) with +3.0mm/ - 2.0mm Tolerance as per IS 1852-1985   | 150.00         | 150.00            |
| Width (B)of Flange (mm) with $\pm 2.5$ mm Tolerance for 116 x100mm ISMB & $\pm 4.0$ mm Tolerance for 150 x 150 mm ISHB IS 1852-1985 | 150.00         | 150.00            |
| Thickness of Flange (Tf) (mm) with $\pm 1.5$ mm Tolerance   | 9.00           | 9.00              |
| Thickness of Web(Tw) (mm) with $\pm 1.0$ mm Tolerance   | 8.4            | 11.8              |
| Corner Radius of fillet or root (R1) (mm)   | 8.00           | 8.00              |
| Corner Radius of Tow (R2) (mm)  | 4.00           | 4.00              |
| Moment of Inertia<br>Ixx (cm )<br>Iyy (cm )   | 1540<br>460.00 | 1640.00<br>495.00 |
| Radius of Gyration (cm)<br>Rxx<br>Ryy   | 6.29<br>3.44   | 6.09<br>3.35      |
| Flange Slope(a) in Degree   | 94.0           | 94.0              |
| Tolerance in Dimension  | As per IS:1852 | As per IS:1852    |

|  |  |   |
|--|--|---|
| <b>TATA POWER CENTRAL ODISHA LIMITED</b> |  |   |
| <b>TECHNICAL SPECIFICATION</b>           |  |   |
| <b>Document Title</b>                    | <b>TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles</b> |   |
| <b>Document No.</b>                      | EN   | <b>Eff. Date: 31.07.2020</b>                  |
| <b>Revision No.</b>                      | 00   | <b>Page 4 of 20</b>                           |
| <b>Prepared By:</b><br>Rajeeva Tripathy  | <b>Reviewed By:</b>                                      | <b>Approved By:</b><br><br><b>Issued By :</b> |

#### 4.1'Dimensions and Properties

#### 4.2 MECHANICAL PROPERTIES:

|                         |   |
|-------------------------|---|
| Tensile Test :          | Requirement as per IS:2062/<br>1999 Grade-A |
| Yield Stress(MPa)       | Min250                                      |
| Tensile Strength(MPa)   | Min410                                      |
| Lo=(5.65lSo)Elongation% | Min23                                       |
| Bend Test               | Shall not Crack                             |


#### 4.3. CHEMICAL PROPERTIES:

| Chemical Composition     | Requirement as per IS:2062/<br>1999 Grade-A | Permissible variation over the Specified Limit, Percent, Max |
|--------------------------|---|--|
| Grade                    |   |  |
| Chemical Name            |   |  |
| Carbon(%Max.)            | 0.23  | 0.02   |
| Manganese(%Max.)         | 1.5   | 0.05   |
| Sulphur(%Max.)           | 0.050                                       | 0.005  |
| Phosphorous(%Max.)       | 0.050                                       | 0.005  |
| Silicon(%Max.)           | 0.40  | 0.03   |
| Carbon Equivalent(%Max.) | 0.42  | -  |
| De-oxidation Mode        | Semi-killed or killed                       | -  |
| Supply condition         | As rolled                                   | -  |

4.4. However, In case of any discrepancy between the above data & the relevant ISS, the values indicated in the IS shall prevail.

4.5. The Acceptance Tests shall be Carried out as per Relevant ISS.



|   |   |             |                                       |
|---|---|-------------|---------------------------------------|
|  | TPCODL  |             |                                       |
|   | TECHNICAL SPECIFICATION                           |             |                                       |
|   | TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles |             |                                       |
| Document No.  |   |             | Eff. Date: 27 <sup>th</sup> July 2020 |
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| Prepared By<br>Rajeeva Tripathy   | Reviewed By                                       | Approved By | Issued By                             |

### 5.0.150x150mm RS Joists:

RS Joists of Specific Weight 30.6kg/mtr with length of pole being 11 mtr pole weighing 336.6Kg or Specific Weight 34.6kg/mtr with length of pole being 13 mtr weighing 449.8Kg respectively for specified number of poles with specified weight in MT as given in the NIT table given above shall have to be supplied as per IS:2062;2006 Grade "A", IS:808;1989/2001, IS1608:1995 & IS:12779-1989 and their latest amendment if any complying the required Dimension, Weight, Chemical & Mechanical properties confirming to the relevant IS, as per the Tolerrance given Below.

### 6.0 APPLICABLE TOLLERANCES:

1. Length of each pole = + 100mm / - 0 % As per relevant IS: 12779- 1989(with proportionate change in no of Poles)
2. Specific Weight of RS Joists =  $\pm 2.5\%$  As per relevant IS: 1852/1 985
3. Weight for whole lot of supply for all categories =  $\pm 3.0\%$  As per relevant IS: 12779-1989 for both type of RS Joists.


### 7.0. EMBOSSING ON EACH R.S JOIST :

- Following distinct non-erasable embossing is to be made on each R.S Joists a)
- a) Name & Logo of the Manufacturer.
  - b) B.I.S Logo (ISI Mark) if applicable.
  - c) Size of the R.S Joists

### 8.Mechanical Properties :

|                         |   |                     |
|-------------------------|---|---------------------|
| Tensile Test :          | Requirement as per IS:2062/1999 Grade-A | Manufacturer's Data |
| Yeild Stress(MPa)       | Min250                                  |                     |
| Tensile Strength(MPa)   | Min410                                  |                     |
| Lo=(5.65 So)Elongation% | Min23                                   |                     |
| Bend Test               | Shall not Crack                         |                     |

|  |  |  |  |
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|   |   |                                       |           |
|---|---|---------------------------------------|-----------|
|  | TPCODL  |                                       |           |
|   | TECHNICAL SPECIFICATION                           |                                       |           |
|   | TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles |                                       |           |
| Document No.  |   | Eff. Date: 27 <sup>th</sup> July 2020 |           |
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| Prepared By<br>Rajeewa Tripathy   | Reviewed By                                       | Approved By                           | Issued By |

## 9. Chemical Properties :

| Chemical Composition     | Requirement as per IS:2062/1999 Grade-A | Permissible variation over the Specified Limit, Percent, Max | Manufacturer's Data |
|--------------------------|---|--|---------------------|
| Grade                    |   |  |                     |
| Chemical Name            |   |  |                     |
| Carbon(%Max.)            | 0.23                                    | 0.02   |                     |
| Manganese(%Max.)         | 1.5                                     | 0.05   |                     |
| Sulphur(%Max.)           | 0.050                                   | 0.005  |                     |
| Phosphorous(%Max.)       | 0.050                                   | 0.005  |                     |
| Silicon(%Max.)           | 0.40                                    | 0.03   |                     |
| Carbon Equivalent(%Max.) | 0.42                                    | -  |                     |
| De-oxidation Mode        | Semi-killed or killed                   | -  |                     |
| Supply condition         | As rolled                               | -  |                     |

However, In case of any discrepancy between the above data & the relevant ISS, the values indicated in the IS shall prevail.

The Acceptance Tests shall be Carried out as per Relevant ISS.

The RS Joists shall be manufactured conforming to the relevant IS with Manufacturer's name/logo & B.I.S Logo if applicable embossed on it.

Joints (6mtr + 5 mtr) , (7mtr + 4mtr), (6mtr + 7 mtr), (8mtr + 5mtr) are permissible. Jointing is to be done through nuts & bolts by using plates as per the drawings uploaded.

## 10.0 GUARANTEED TECHNICAL PARTICULARS:

GTP for RS Joists of sizes 150mmX150mm is furnished at chapter- **E16** of this T.S.

Bidders are requested to submit the GTP as per the format only

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TPCODL

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles

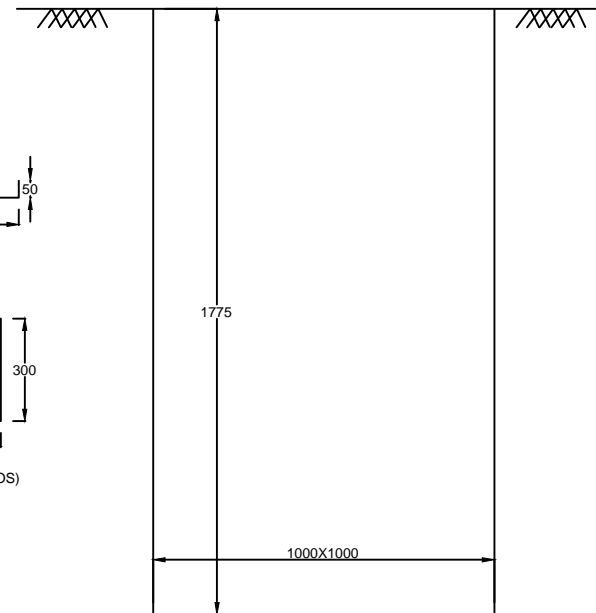
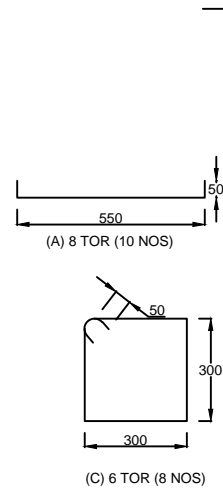
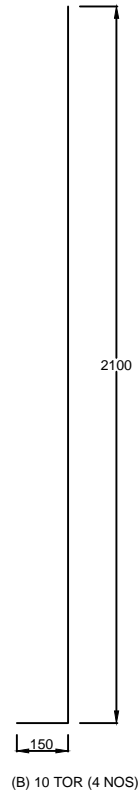
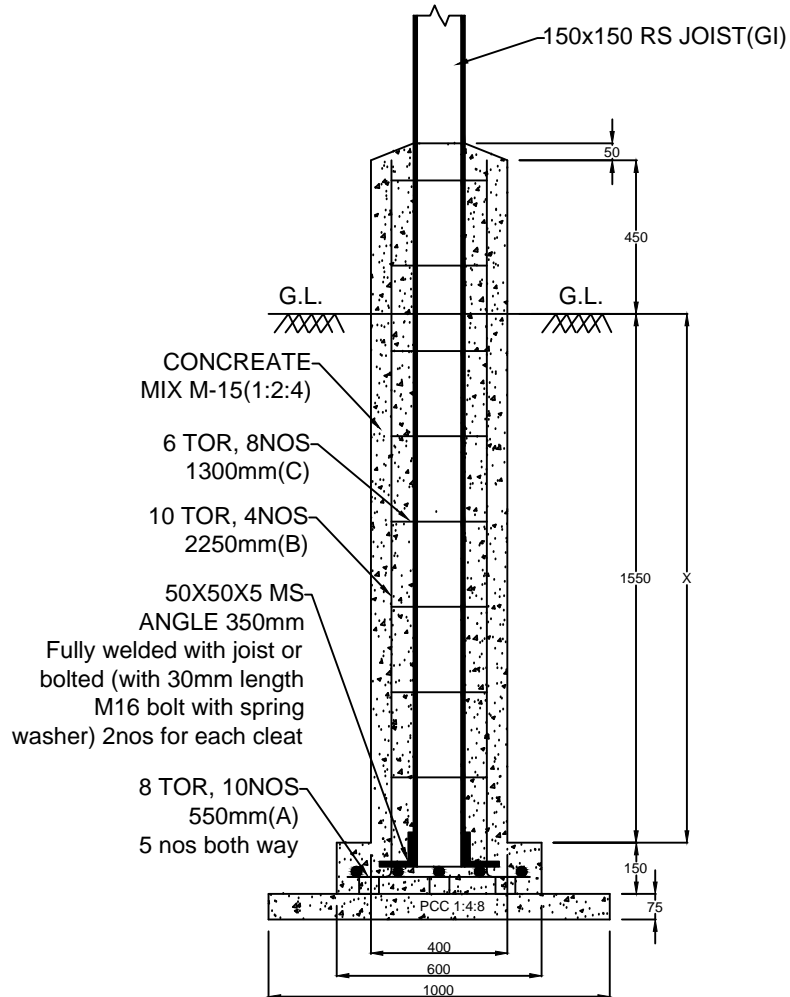
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**Guaranteed Technical Particulars:**

| Sr No | Parameter  | TPCODL Requirement  |                                   |                                   |
|-------|--|---|-----------------------------------|-----------------------------------|
|       |  | 1   | 2                                 | 3                                 |
|       | Description  | Parameter (Unit)  | Joist (150x150) 11Mtr             | Joist (150x150)13Mtr              |
| 1     | Type of Steel  | MS  | MS                                | MS                                |
| 2     | Grade  | E250  | E250 Fe410WA                      | E250 Fe410WA                      |
| 3     | Steel Standard   | IS  | IS:2062 (Gr.-A),808               | IS:2062 (Gr.-A),808               |
| 4     | Section (D x B)  | mm  | 150 x150                          | 150 x150                          |
| 5     | Thickness (T x t)  | mm  | 9 & 8.4                           | 9 & 11.8                          |
| 6     | Radius (R <sub>1</sub> & R <sub>2</sub> )  | Dig   | 8 & 4                             | 8 & 4                             |
| 7     | Moment of Intertia<br>I <sub>xx</sub> (cm <sup>4</sup> )<br>I <sub>yy</sub> (cm <sup>4</sup> ) | cm <sup>4</sup>   | 1540<br>460                       | 1640<br>495                       |
| 8     | Radius og Gyration (cm)<br>R <sub>xx</sub><br>R <sub>yy</sub>                                  | cm  | 6.29<br>3.44                      | 6.09<br>3.35                      |
| 9     | Yield Stress   | N/sq.mm   | Min250 N/mm <sup>2</sup>          | 250 N/mm <sup>2</sup>             |
| 10    | Tensile Strength   | N/sq.mm   | Min410 N/mm <sup>2</sup>          | 410 N/mm <sup>2</sup>             |
| 11    | Dimension Tolerance  | ±   | As per IS:1852 & 12779            | As per IS:1852 & 12779            |
| 12    | Galvanizing Standard   | IS  | 2629 & 2633                       | 2629 & 2633                       |
| 13    | Zinc Coating   | gms/sq.mtr  | 610                               | 610                               |
| 14    | Uniformity   | Withstand   | Six Dips in Standard precede test | Six Dips in Standard precede test |
| 15    | Weight kg/m with±2.5% Tolerance  | Kg  | 30.6                              | 34.6                              |
| 16    | Sectional Area (cm <sup>2</sup> )  | cm <sup>2</sup>   | 39                                | 44.1                              |
| 17    | Cutting length Tolerance As per IS 12779/1989  | mm  |                                   | =100<br>-0                        |
| 18    | Fabrication  | One Hole 18Ø at<br>(1) 1800 mm from root level for Earthing.<br>(2) 100 & 200mm from top. |                                   |                                   |
| 19    | Overall specifications as per IS:800 /2007   |   |                                   |                                   |

# DRAWING FOR CONCRETING OF RS JOIST 150X150X FOR ANGLE POINTS



POLE PIT TO BE EXCAVATED

## NOTE:

1. PCC(1:4:8)= $1 \times 1 \times 0.075 = 0.075$  CUM

2. RCC(1:2:4)=a)  $0.6 \times 0.6 \times 0.150 = 0.054$  CUM

b)  $0.4 \times 0.4 \times 2.025 = 0.324$  CUM

TOTAL = 0.378 CUM

3. ROD= A)  $0.650 \times 10 \times (0.39 \text{kg/mtr}) = 2.535 \text{kg}$

B)  $2.25 \times 4 \times (0.62 \text{kg/mtr}) = 5.58 \text{kg}$

C)  $1.3 \times 6 \times (0.22 \text{kg/mtr}) = 1.716 \text{kg}$

TOTAL = 9.831 kg

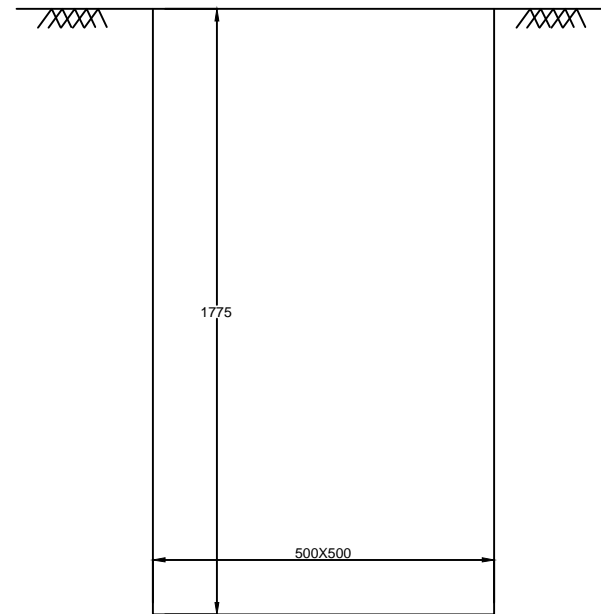
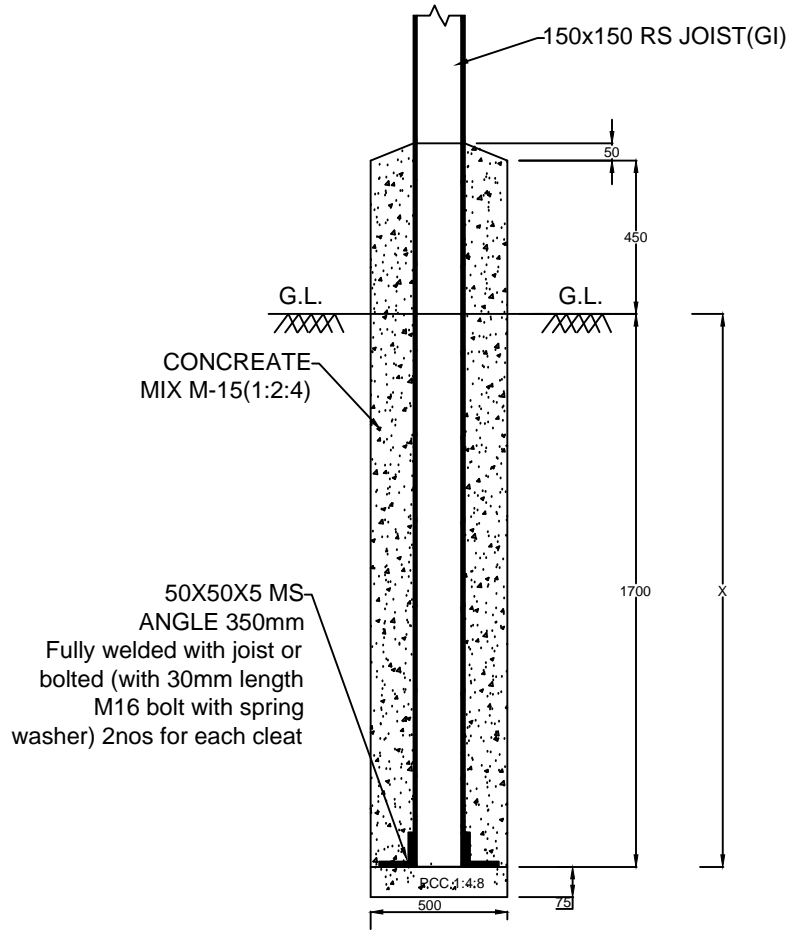
4. MS ANGLE, Fully welded with joist or bolted (with 30mm length M16 bolt with spring washer) 2nos for each cleat =  $0.35 \times (3.8 \text{kg/mtr}) = 1.33 \text{kg}$

5. A) 'X' WILL VARY DEPENDING UPON THE LENGTH OF THE POLE.

B) ALL OTHER DIMENSIONS WILL REMAIN AS IT IS.

C) RODS HAS TO BE PROVIDED IN ANGLE LOCATION MORE THEN 10 degree.

# DRAWING FOR CONCREATING OF RS JOIST 150X150X FOR NORMAL POLES



POLE PIT TO BE EXCAVATED

## NOTE:

1. PCC(1:4:8)= $1 \times 1 \times 0.075 = 0.075$  CUM
2. PCC(1:2:4)=a)  $0.4 \times 0.4 \times 2.2 = 0.352$  CUM
3. MS ANGLE, Fully welded with joist or bolted (with 30mm length M16 bolt with spring washer) 2nos for each cleat =  $0.35 \times (3.8 \text{kg/mtr}) = 1.33 \text{kg}$
4. A) 'X' WILL VARY DEPENDING UPON THE LENGTH OF THE POLE.  
 B) ALL OTHER DIMENSIONS WILL REMAIN AS IT IS.  
 C) RODS HAS TO BE PROVIDED IN ANGLE LOCATION MORE THEN 10 degree.

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|---|------------------------------|---|
| 1 | <b>SCOPE:</b>                | 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 Ball and Socket Disc polymer insulator complete with all the accessories for trouble free and efficient performance.   |
| 2 | <b>APPLICABLE STANDARDS:</b> | <p>Insulator shall comply with the requirements stated in the latest editions of the following standards-</p> <ul style="list-style-type: none"> <li>a) IEC: 61109: Definition, test methods and acceptance criteria for composite insulators for A.C. overhead lines above 1000V.</li> <li>b) IS: 2071/ IEC: 60060-1: Methods of High Voltage Testing</li> <li>c) IS: 2486/ IEC: 60120/IEC: 60372: Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements locking devices</li> <li>d) IEC: 60575: Thermal Mechanical Performance test and mechanical performance test on string insulator units.</li> <li>e) IS: 13134/ IEC: 60815: Guide for the selection of insulators in respect of polluted condition.</li> <li>f) IEC: 60433: Characteristics of string insulator units of the long rod type</li> <li>g) IS: 14329-1995: Malleable Iron Castings</li> <li>h) IS: 60437: Methods of RI Test of HV insulators</li> <li>i) STRI guide 1.92/1: Hydrophobicity Classification Guide.</li> <li>j) CISPR:18-2 part: Radio interference characteristics of overhead power lines and high-voltage equipment</li> <li>k) IS: 8263/ IEC: 260437: Methods of RI Test of HV Insulators</li> <li>l) ANSI C29 13-2000: Standard for insulators – Composite-Distribution Dead-end type</li> <li>m) IS: 4759/ISO: 1459/ ISO: 1461: Hot dip zinc coatings on structural steel &amp; other allied products.</li> <li>n) IS: 2629/ISO: 1461(E): Recommended Practice for Hot, Dip Galvanization for iron and steel.</li> <li>o) IS: 6745/ISO: 1460: Determination of Weight of Zinc Coating on Zinc coated iron and steel articles.</li> <li>p) IS: 3203/ISO: 2178: Methods of testing of local thickness of electroplated coatings.</li> <li>q) IS: 2633: Testing of Uniformity of Coating of zinc coated articles.</li> <li>r) ASTM D 578-05: Standard specification for glass fiber strands.</li> <li>s) ASTM E 1131-03: Standard test method for compositional analysis by Thermo-gravimetric</li> <li>t) IS: 4699: Specification for refined secondary zinc</li> </ul> |

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| <b>3</b> | <b>CLIMATIC CONDITIONS OF THE INSTALLATION</b> | <p>The service conditions shall be as follows:</p> <ol style="list-style-type: none"> <li>1. Maximum altitude above sea level 1,000m</li> <li>2. Maximum ambient air temperature 50°C</li> <li>3. Maximum daily average ambient air temperature 35°C</li> <li>4. Minimum ambient air temperature 0°C</li> <li>5. Maximum relative humidity 95%</li> <li>6. Average number of thunderstorm days per annum (isokeraunic level) 70</li> <li>7. Average number of rainy days per annum 120</li> <li>8. Average annual rainfall 150cm</li> <li>9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g</li> <li>10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g<br/>(g being acceleration due to gravity)</li> <li>11. Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.</li> </ol> <p>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.</p> <p>Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere</p> <p>The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p> |
|----------|--|--|

| <b>4.0 GENERAL TECHNICAL REQUIREMENTS</b> |  |      |  |
|---|--|------|--|
| Sl No.                                    | Description  | Unit | Requirements                                   |
| 1   | Type of Insulator  |      | Polymeric 11 kV Ball and Socket Disc Insulator |
| 2   | Standard according to which the insulators manufactured and tested |      | IEC 61109                                      |
| 3   | Material of housing and weather sheds                              |      | High voltage grade Silicone Rubber             |
| (a)                                       | Material of Core (FRP rod)   | kV   | ECR BORON FREE                                 |
| (b)                                       | Material of end fittings   | Hz   | SGI Cast/Forged Steel                          |
| (c)                                       | Sealing compound for end fittings                                  |      | Silicone Sealant                               |
| 4   | Color of housing   | KN   | Grey   |
| 5   | Electrical characteristics   |      |  |
| (a)                                       | Nominal System Voltage   | kV   | 11   |
| (b)                                       | Highest System Voltage   | kV   | 12   |

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| (d) | Rated Frequency   | Hz       | 50                    |
| (f) | Wet power frequency withstand voltage                     | kV (rms) | 35                    |
| (g) | Dry lightning impulse withstand voltage                   | kV       | 75                    |
| (h) | Visible Discharge Test Voltage                            | kV       | 9                     |
| (i) | Minimum creepage distance                                 | mm       | 320                   |
| (j) | Inclined plane tracking and erosion resistance of housing | kV       | 4.5kV for 360 minutes |
| (k) | FRP rod leakage current at 175 V/mm                       | mA       | <0.05mA               |
| (l) | Minimum Failing load                                      | kN       | 70                    |

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| 5   | <b>GENERAL CONSTRUCTIONS</b> | Polymeric Insulators shall be designed to meet the high quality, safety and reliability and are capable of withstanding a wide range of environmental conditions. Polymeric Insulators shall consist of THREE parts, at least two of which are insulating parts:- (a) Core- the internal insulating part (b)Housing- the external insulating part (c)Metal end fittings.  |
| 5.1 | <b>CORE</b>                  | Core 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 (minimum 80%) and shall exhibit both high electrical integrity and high resistance to acid corrosion. FRP Rod Diameters Should be minimum 16mm for 70KN ball and socket insulator. 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.  |
| 5.2 | <b>POLYMER HOUSING</b>       | The FRP rod shall be covered by a seamless sheath of high voltage grade Silicone rubber housing. It shall be one- piece housing using only Injection Molding process to cover the core. Primer should be used to bond the housing with FRP rod. The housing shall be designed to provide the necessary creepage distance and protection against environmental influences. Housing shall conform to the requirements of IEC 61109/93-93 with latest amendments. 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. 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. |
| 5.3 | <b>WEATHERSHEDS</b>          | The composite polymer weathersheds made of high voltage grade Silicone rubber polymer shall be molded as part of the sheath and shall be free from imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The Weathersheds should have silicon content of minimum 30%  |

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|     |                          | by weight. The interface, if any, between sheds and sheath (housing) shall be free from voids. Housing and weather shed material shall have tensile strength of 3 MPa with 400% elongation minimum and tear strength of 16N/mm.  |
| 5.4 | <b>HARDWARE FITTINGS</b> | <p>a) Ball pin and socket couplings: Ball pin and socket shall be of forged steel and dimensions are as specified in IS 2486 (Part-2): 1989. Insulator metal caps shall be made of malleable cast iron conforming to IS 14329: 1995.</p> <p>b) 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</p> <p>c) All ferrous parts shall be hot dip galvanized in accordance with the latest edition of IS 2629-1985. The Zinc to be used for galvanizing shall conform to grade Zn 99.99 as per IS 209-1992. The Zinc coating shall be uniform, smoothly adherent, reasonably bright, continuous and free from impurities such as flux, ash, rust stains, bulky white deposits and blisters. Before ball fittings are 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</p> |
| 6.0 | <b>MARKING:</b>          | <p>Each insulator box shall be legibly and indelibly marked with "PO no. with moth and year of manufacturing, "Property of TPCL, Bhubaneswar", "CODE NUMBER", along with following:</p> <ol style="list-style-type: none"> <li>Manufacturer's name</li> <li>Type designation or serial no.</li> <li>Minimum failing load in kN</li> <li>No. of relevant standard</li> <li>Month and year of manufacture</li> <li>Country of manufacture</li> </ol> <p>Each insulator shall be embossed with Manufacturer name/Logo.</p>  |
| 7.0 | <b>TESTS</b>             | All routine, acceptance and type tests shall be witnessed by the purchaser/his authorized representative. Following tests for 11kV Ball and Socket Disc polymer insulator should be done as per relevant standards:  |

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| 7.1 | <b>TYPE TESTS OF COMPLETE POLYMER INSULATORS</b> | <ul style="list-style-type: none"> <li>• Dry lightning impulse withstand voltage test.</li> <li>• Wet power frequency test.</li> <li>• Mechanical failing load test.</li> <li>• Radio interference test.</li> <li>• Mechanical performance test</li> <li>• U.V Resistance as per ASTM G 53: 1000 Hrs - UV Light for 8 Hours and condensation for 4 hours in a continuous cycle. Elongation to be limited to 20% (% Elongation to break before and after the test).</li> <li>• Salt Fog test: On insulators for 1000 hours as per IEC.</li> <li>• Galvanization test.</li> <li>• Visual examination.</li> <li>• Verification of dimensions.</li> <li>• Bending test.</li> <li>• Verification of the locking system or the tightness of the interface between end fitting and insulator housing.</li> <li>• Assembled core load time test.</li> <li>• Determination of the average failing load of the core of the assembled insulator.</li> </ul> |
| 7.2 | <b>TYPE TESTS ON SILICONE RUBBER</b>             | <ul style="list-style-type: none"> <li>• Tensile Strength &amp; Elongation</li> <li>• Tear Strength</li> <li>• Inclined Plane Tracking &amp; Erosion</li> <li>• Volume resistivity</li> <li>• Dielectric Strength</li> <li>• Dielectric Constant</li> <li>• Density</li> <li>• Hardness</li> <li>• Arc Resistance</li> <li>• Silicone content</li> <li>• Flammability</li> <li>• Resistance to weathering &amp; UV.</li> <li>• Limiting oxygen index test.</li> <li>• Specific gravity.</li> </ul>   |
| 7.3 | <b>TYPE TESTS ON FRP RODS</b>                    | <ul style="list-style-type: none"> <li>• Verification of dimensions.</li> <li>• Specific Gravity</li> <li>• Glass Content</li> <li>• Water Diffusion Test</li> <li>• Hardness</li> <li>• Dye Penetration Test.</li> <li>• Flexural strength.</li> <li>• Water absorption.</li> <li>• Brittle fracture resistance test.</li> <li>• Visible discharge test.</li> <li>• Dry lightning impulse withstand voltage test.</li> <li>• Wet power frequency withstand voltage test.</li> <li>• Power Arc test.</li> <li>• Accelerated weathering test.</li> <li>• Tracking &amp; erosion test.</li> </ul>  |

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| <b>TECHNICAL SPECIFICATION</b>                 |   |                     |                   |
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| 7.4 | <b>TYPE TESTS ON END FITTINGS</b> | <ul style="list-style-type: none"> <li>• Thickness of Zinc Coating</li> <li>• Uniformity of Zinc Coating</li> <li>• Micro-structural of metal fitting.</li> </ul>  |
| 7.5 | <b>DESIGN TESTS</b>               | <p>For composite insulators it is essential to carry out design test as per clause 4.1 of IEC 61109 / 92-93 with latest amendments. The design tests are intended to verify the suitability of the design, materials and method of manufacture (technology). When a composite insulator is submitted to the design tests, the result shall be considered valid for the whole class of insulators, which are represented by the one tested and having the following characteristics:</p> <ul style="list-style-type: none"> <li>• The materials for the core, and sheds and same manufacturing method;</li> <li>• The material of the fittings, the same design, the same method of attachment;</li> <li>• Polymer insulator should have greater layer thickness of the shed material over the core (including a sheath where used);</li> <li>• Polymer insulator should have smaller ratio of the highest system voltage to insulation length;</li> <li>• Polymer insulator should have smaller ratio of all mechanical loads to the smallest core diameter between fittings</li> <li>• Polymer insulator should have greater diameter of the core.</li> </ul> <p>The tested composite insulators shall be identified by a drawing giving all the dimensions with the manufacturing tolerances.<br/> Manufacturer should submit test reports for Design Tests as per IEC – 61109 (clause – 5) along with the bid. Additionally following tests shall be carried out or reports for the tests shall be submitted after award of contract: UV test: the test shall be carried out in line with clause 7.2 of ANSI C29.13.<br/> In addition, chemical composition test for silicon content would also be added in the testing list.</p> |
| 7.6 | <b>ROUTINE TESTS</b>              | <ul style="list-style-type: none"> <li>• Visual Examination (Free from void, cavity, foreign particle and scratch/nick spot).</li> <li>• Mechanical Routine Test</li> <li>• Electrical Routine Test</li> </ul>   |
| 7.7 | <b>ACCEPTANCE TESTS</b>           | <ul style="list-style-type: none"> <li>• End Sealing test (FRP rod and Silicone rubber housing).</li> <li>• Visual examination (Free from void, cavity, foreign particle and scratch/nick spot).</li> <li>• Verification of dimensions.</li> <li>• Galvanizing Tests.</li> <li>• Bending load test.</li> <li>• Mechanical performance test.</li> <li>• Mechanical Failing Load test.</li> <li>• Dry power frequency withstand voltage test</li> <li>• Wet power frequency withstand voltage test.</li> </ul>   |
| 8.0 | <b>TYPE TEST CERTIFICATES:</b>    | <p>The Bidder shall furnish the type test certificates of the 11 KV Ball and Socket Disc polymer Insulators for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA/International Laboratory as per the relevant standards. 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</p>   |

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|      |  | 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 TPCL.   |
| 9.0  | <b>PRE DISPATCH INSPECTION:</b>            | <p>The material shall be subject to inspection by a duly authorized representative of the TPCL. 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 TPCL's representatives at all times when the work is in progress. Inspection by the TPCL 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 TPCL.</p> <p>Following documents shall be sent along with material</p> <ol style="list-style-type: none"> <li>a) Test reports</li> <li>b) MDCC issued by TPCL</li> <li>c) TPCL Invoice in duplicate</li> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warrantee card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable).</li> </ol>   |
| 10.0 | <b>INSPECTION AFTER RECEIPT AT STORES:</b> | The material received at TPCL, Bhubaneswar, 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 & contracts department.  |
| 11.0 | <b>GUARANTEE:</b>                          | <p>Bidder shall stand guarantee towards design, materials, workmanship &amp; 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.</p> <p>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.</p> |
| 12.0 | <b>PACKING:</b>                            | Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.   |
| 13.0 | <b>TENDER SAMPLE:</b>                      | 1 insulator sample to be provided during submission of technical bid.  |
| 14.0 | <b>QUALITY</b>                             | The bidder shall submit with the offer Quality assurance plan indicating   |

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|       | <b>CONTROL</b>                        | 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.  |                        |                  |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
|-------|---------------------------------------|---|------------------------|------------------|--------------|------------------------|------------------|---|----------------------|---|--|---|---|---------|---|--|---|
| 15.0  | <b>MINIMUM TESTING FACILITIES:</b>    | The tenderer must clearly indicate what testing facilities are available in the works of the manufacturer and whether facilities are adequate to carry out all Routine & acceptance Tests. These facilities should be available to TPCL Engineers if deputed or carry out or witness the tests in the manufacturer's works. If any test cannot be carried out at the manufacturer's work, the reasons should be clearly stated in the tender. The insulators shall be tested in accordance with the procedure detailed in IEC 61109 / 92-93 with latest amendments.   |                        |                  |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
| 16.0  | <b>MANUFACTURING ACTIVITIES:</b>      | The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.   |                        |                  |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
| 17.0  | <b>SPARES, ACCESSORIES AND TOOLS:</b> | Not Applicable.   |                        |                  |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
| 18.0  | <b>DRAWINGS AND DOCUMENTS:</b>        | <p>Following documents shall be prepared based on TPCL specifications and statutory requirements with complete BOM and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>Completely filled in Technical Particulars</li> <li>General description of the equipment and all components including brochures</li> <li>Generalized drawing for Disc Insulator</li> <li>Bill of Material</li> <li>Type test Certificates</li> <li>Experience List.</li> </ol> <p>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.</p> <p>Following Drawings/Documents shall be submitted after the award of the contract:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>S. No</th> <th>Description</th> <th>For Approval</th> <th>For Review Information</th> <th>Final Submission</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Technical Parameters</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td>2</td> <td>General</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> </tbody> </table> | S. No                  | Description      | For Approval | For Review Information | Final Submission | 1 | Technical Parameters | √ |  | √ | 2 | General | √ |  | √ |
| S. No | Description                           | For Approval  | For Review Information | Final Submission |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
| 1     | Technical Parameters                  | √   |                        | √                |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |
| 2     | General                               | √   |                        | √                |              |                        |                  |   |                      |   |  |   |   |         |   |  |   |

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|      |  |   |  | Arrangement drawings           |                        |   |   |
|      |  | 3   | Terminal and connection drawings                                   |                                | √                      |   | √ |
|      |  | 4   | Manual catalogue   |                                |                        | √ |   |
|      |  | 5   | Installation/Commissioning Manuals                                 |                                |                        | √ |   |
|      |  | 6   | Instructions for use   |                                |                        | √ |   |
|      |  | 7   | Transport/shipping dimension drawing                               |                                |                        | √ |   |
|      |  | 8   | QA & QC Plan   |                                | √                      | √ | √ |
|      |  | 9   | Routine, Acceptance and Type test Certificates                     |                                | √                      | √ | √ |
|      |  | <p>All the Documents and Drawings shall be in English Language.<br/> <b>Instruction Manuals:</b> Bidder shall furnish two (2) soft copies (CD) and four (4) hard copies of nicely bound manual (in English Language) covering erection and maintenance instructions and all relevant information pertaining to the main equipment as well as auxiliary devices.</p> |  |                                |                        |   |   |
| 19.0 | <b>GUARANTEED TECHNICAL PARTICULARS:</b> | Sl No.  | Description  | Requirements                   | As furnished by Bidder |   |   |
|      |  | 1   | Type of insulator  | Polymeric Ball and Socket Disc | Bidder has to submit   |   |   |
|      |  | 2   | Standard according to which the insulators manufactured and tested | IEC 61952 & IEC 61109          |                        |   |   |
|      |  | 3   | Material of Housing and Weather sheds                              | High voltage grade             |                        |   |   |
|      |  | 4   | Material of Core (FRP Rod)   | ECR BORON                      |                        |   |   |
|      |  | 5   | Material of end fittings   | SGI Cast/ Forged               |                        |   |   |
|      |  | 6   | Sealing compound for end fittings                                  | Silicone Sealant               |                        |   |   |
|      |  | 7   | Colour of housing  | Grey                           |                        |   |   |
|      |  | 8   | Electrical characteristics   |                                |                        |   |   |

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|  |  | 9  | Nominal system voltage                      | 11kV   |  |
|  |  | 10 | Highest system voltage                      | 12kV   |  |
|  |  | 11 | Rated frequency                             | 50Hz   |  |
|  |  | 13 | Wet power frequency with stand voltage      | 35kV (rms)   |  |
|  |  | 14 | Impulse with stand voltage                  | 75kV (rms)   |  |
|  |  | 15 | Power frequency puncture with stand voltage | 1.3 times the actual dry flashover voltage of the unit |  |
|  |  | 16 | Visible Discharge test Voltage              | 9 kV   |  |
|  |  | 17 | Minimum creepage distance                   | 320mm  |  |
|  |  | 18 | Minimum Failing loads                       | 70 kN  |  |
|  |  | 19 | FRP rod dia.                                | 16 mm  |  |

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| 20.0  | <p><b>SCHEDULE OF DEVIATIONS</b><br/><b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b></p> | <p style="text-align: center;"><b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b></p> <p>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:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">S.No.</th> <th style="width: 25%;">Clause No.</th> <th style="width: 60%;">Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td style="height: 250px;"></td> <td></td> <td></td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above.</p> <p><b>Seal of the Company:</b></p> <p style="text-align: right;"><b>Designation<br/>Signature</b></p> | S.No. | Clause No. | Details of deviation with justifications |  |  |  |
|-------|--|--|-------|------------|--|--|--|--|
| S.No. | Clause No.   | Details of deviation with justifications   |       |            |  |  |  |  |
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**TECHNICAL SPECIFICATION COVER SHEET**


**Document No:** ENG-EHV-115

**Document Title:** SPECIFICATION FOR 33 KV BALL AND SOCKET TYPE SUSPENSION AND TENSION POLYMER INSULATOR 90 KN

|        |                       |          |             |                    |             |                    |             |                    |           |                    |
|--------|-----------------------|----------|-------------|--------------------|-------------|--------------------|-------------|--------------------|-----------|--------------------|
|        |                       |          |             |                    |             |                    |             |                    |           |                    |
|        |                       |          |             |                    |             |                    |             |                    |           |                    |
| 00     | For Tendering purpose | 27/01/17 | PP          | <i>[Signature]</i> | PS          | <i>[Signature]</i> | DRD         | <i>[Signature]</i> | DRD       | <i>[Signature]</i> |
| Rev No | Remarks               | Date     | Initials    | Sign               | Initials    | Sign               | Initials    | Sign               | Initial   | Sign               |
|        |                       |          | Prepared By |                    | Reviewed By |                    | Approved By |                    | Issued By |                    |

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**<Tata Power Delhi Distribution Limited>**  
 <TPDDL Smart Grid Lab,>  
 <Rohini, Sector 15, Delhi – 110 085>




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|  | TECHNICAL SPECIFICATION   |                                   |                                 |
| Doc. Title   | Specification of 33kV Polymer Ball and Socket type Suspension and Tension Insulator 90 KN |                                   |                                 |
| Doc. No  | ENG-EHV-115   | Date: 27.01.2017                  |                                 |
| Rev. No  | 00  | Page 1 of 12                      |                                 |
| Prepared by:<br>Priyanka Patra   | Reviewed By:<br>Pankaj Singhal  | Approved By:<br>D R Dharmadhikari | Issued By:<br>D R Dharmadhikari |

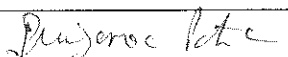
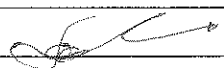
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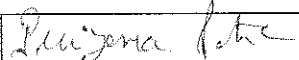
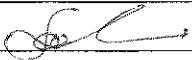
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| 1 | <b>SCOPE:</b>                | This specification covers the technical requirements of design, manufacture, performance, testing at manufacturer's works, packing & forwarding, supply and unloading at store/ site, performance of 33kV Ball and Socket type Suspension and Tension polymer insulator 90kN complete with all the accessories for trouble free and efficient performance.  |
| 2 | <b>APPLICABLE STANDARDS:</b> | <p>Insulator shall comply with the requirements stated in the latest editions of the following standards-</p> <ul style="list-style-type: none"> <li>a) IEC: 61109: Definition, test methods and acceptance criteria for composite insulators for A.C. overhead lines above 1000V.</li> <li>b) IS: 2071/ IEC: 60060-1: Methods of High Voltage Testing</li> <li>c) IS: 2486/ IEC: 60120/IEC: 60372: Specification for insulator fittings for overhead power lines with a nominal voltage greater than 1000V General Requirements and Tests Dimensional Requirements locking devices</li> <li>d) IEC: 60575: Thermal Mechanical Performance test and mechanical performance test on string insulator units.</li> <li>e) IS: 13134/ IEC: 60815: Guide for the selection of insulators in respect of polluted condition.</li> <li>f) IEC: 60433: Characteristics of string insulator units of the long rod type</li> <li>g) IS: 14329-1995: Malleable Iron Castings</li> <li>h) IS: 60437: Methods of RI Test of HV insulators</li> <li>i) STRI guide 1.92/1: Hydrophobicity Classification Guide.</li> <li>j) CISPR:18-2 part: Radio interference characteristics of overhead power lines and high-voltage equipment</li> <li>k) IS: 8263/ IEC: 260437: Methods of RI Test of HV Insulators</li> <li>l) ANSI C29 13-2000: Standard for insulators – Composite-Distribution Dead-end type</li> <li>m) IS: 4759/ISO: 1459/ ISO: 1461: Hot dip zinc coatings on structural steel &amp; other allied products.</li> <li>n) IS: 2629/ISO: 1461(E): Recommended Practice for Hot, Dip Galvanization for iron and steel.</li> <li>o) IS: 6745/ISO: 1460: Determination of Weight of Zinc Coating on Zinc coated iron and steel articles.</li> <li>p) IS: 3203/ISO: 2178: Methods of testing of local thickness of electroplated coatings.</li> <li>q) IS: 2633: Testing of Uniformity of Coating of zinc coated articles.</li> <li>r) ASTM D 578-05: Standard specification for glass fiber strands.</li> <li>s) ASTM E 1131-03: Standard test method for compositional analysis by Thermo-gravimetric</li> <li>t) IS: 4699: Specification for refined secondary zinc</li> </ul> |


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|  | <b>TECHNICAL SPECIFICATION</b>   |                                   |                                 |
| Doc. Title   | <b>Specification of 33kV Polymer Ball and Socket type Suspension and Tension Insulator 90 KN</b> |                                   |                                 |
| Doc. No  | ENG-EHV-115  | Date: 27.01.2017                  |                                 |
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| Prepared by:<br>Priyanka Patra   | Reviewed By:<br>Pankaj Singhal   | Approved By:<br>D R Dharmadhikari | Issued By:<br>D R Dharmadhikari |

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| <b>3</b> | <b>CLIMATIC CONDITIONS OF THE INSTALLATION</b> | <p>a) Max. Ambient Temperature : 50 deg.C<br/> b) Max. Daily average ambient temp : 40 deg.C<br/> c) Min. Ambient Temperature : 0 deg.C<br/> d) Maximum Relative Humidity : 100%<br/> e) Minimum Relative Humidity : 10%<br/> f) Average No. of thunderstorm per annum : 50<br/> g) Average Annual Rainfall : 750 mm<br/> h) Average No. of rainy days per annum : 60<br/> i) Rainy months : June to Oct.<br/> j) Altitude not exceeding : 300 meters.<br/> k) Wind Pressure : 126kg/sq. m up an elevation of 10m.</p> <p>Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g.</p> |
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| <b>4.0 GENERAL TECHNICAL REQUIREMENTS</b> |  |          |   |
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| Sl No.                                    | Description  | Unit     | Requirements  |
| 1   | Type of Insulator  |          | Polymeric 33 kV Ball and Socket type suspension and tension Insulator   |
| 2   | Standard according to which the insulators manufactured and tested |          | IEC 61109   |
| 3   | Material of housing and weather sheds                              |          | High voltage grade Silicone Rubber                                      |
| (a)                                       | Material of Core (FRP rod)   | kV       | ECR BORON FREE  |
| (b)                                       | Material of end fittings   | Hz       | Ball fitting - Forged Steel and Socket fitting - SGI Cast /forged steel |
| (c)                                       | Sealing compound for end fittings                                  |          | Silicone Sealant  |
| 4   | Color of housing   | KN       | Grey  |
| 5   | Electrical characteristics   |          |   |
| (a)                                       | Nominal System Voltage   | kV       | 33  |
| (b)                                       | Highest System Voltage   | kV       | 36  |
| (d)                                       | Rated Frequency  | Hz       | 50  |
| (f)                                       | Wet power frequency withstand voltage                              | kV (rms) | 75  |
| (g)                                       | Dry lightning impulse withstand voltage                            | kV       | 170   |
| (h)                                       | Visible Discharge Test Voltage                                     | kV       | 27  |
| (i)                                       | Minimum creepage   | mm       | 900   |

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|   | <b>TECHNICAL SPECIFICATION</b>   |  |  |
| <b>Doc. Title</b>   | <b>Specification of 33kV Polymer Ball and Socket type Suspension and Tension Insulator 90 KN</b> |  |  |
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| <b>Prepared by:</b><br>Priyanka Patra   | <b>Reviewed By:</b><br>Pankaj Singhal  | <b>Approved By:</b><br>D R Dharmadhikari | <b>Issued By:</b><br>D R Dharmadhikari |

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|     | distance  |    |                       |
| (j) | Inclined plane tracking and erosion resistance of housing | kV | 4.5kV for 360 minutes |
| (k) | FRP rod leakage current at 175 V/mm                       | mA | <0.05mA               |
| (l) | Minimum Failing load                                      | kN | 90                    |

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| 5   | <b>GENERAL CONSTRUCTIONS</b> | Polymeric Insulators shall be designed to meet the high quality, safety and reliability and are capable of withstanding a wide range of environmental conditions. Polymeric Insulators shall consist of THREE parts, at least two of which are insulating parts:- (a) Core- the internal insulating part (b)Housing- the external insulating part (c) Metal end fittings.   |
| 5.1 | <b>CORE</b>                  | Core 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 (minimum 80%) and shall exhibit both high electrical integrity and high resistance to acid corrosion. FRP Rod Diameters Should be minimum 16mm for 90KN ball and socket type suspension and tension insulator. 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.  |
| 5.2 | <b>POLYMER HOUSING</b>       | The FRP rod shall be covered by a seamless sheath of high voltage grade Silicone rubber housing. It shall be one- piece housing using only Injection Molding process to cover the core. Primer should be used to bond the housing with FRP rod. The housing shall be designed to provide the necessary creepage distance and protection against environmental influences. Housing shall conform to the requirements of IEC 61109/93-93 with latest amendments. 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. 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. |
| 5.3 | <b>WEATHERSHEDS</b>          | The composite polymer weathersheds made of high voltage grade Silicone rubber polymer shall be molded as part of the sheath and shall be free from imperfections. It should protect the FRP rod against environmental influences, external pollution and humidity. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. The Weathersheds should have silicon content of minimum 30% by weight. The interface, if any, between sheds and sheath (housing) shall be free from voids. Housing and weather shed material shall have tensile strength of 3 MPa with 400% elongation minimum and tear strength of 16N/mm. Method of fixing of sheds to housing should be only injection moulding. Also Single mould of injection moulding will be preferred.   |


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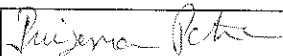
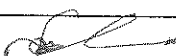
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| 5.4 | <b>HARDWARE FITTINGS</b> | <p>a) Ball pin and socket couplings: Ball pin and socket shall be of forged steel with 16B designation hardware fitting and dimensions are as specified in IS 2486 (Part-2): 1989. Insulator metal caps shall be made of malleable cast iron conforming to IS 14329: 1995.</p> <p>b) 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</p> <p>c) All ferrous parts shall be hot dip galvanized in accordance with the latest edition of IS 2629-1985. The Zinc to be used for galvanizing shall conform to grade Zn 99.99 as per IS 209-1992. The Zinc coating shall be uniform, smoothly adherent, reasonably bright, continuous and free from impurities such as flux, ash, rust stains, bulky white deposits and blisters. Before ball fittings are 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</p> |
| 6.0 | <b>MARKING:</b>          | <p>Each insulator box shall be legibly and indelibly marked with "PO no. with month and year of manufacturing, "Property of TPDDL Delhi", "CODE NUMBER", along with following:</p> <ol style="list-style-type: none"> <li>Manufacturer's name</li> <li>Type designation or serial no.</li> <li>Minimum failing load in kN</li> <li>No. of relevant standard</li> <li>Month and year of manufacture</li> <li>Country of manufacture</li> </ol> <p>Each insulator shall be embossed with Manufacturer name/Logo.</p>   |
| 7.0 | <b>TESTS</b>             | <p>All routine, acceptance and type tests shall be witnessed by the purchaser/his authorized representative. Following tests for 33kV Ball and Socket type Suspension and tension polymer insulator and should be done as per relevant standards:</p>  |

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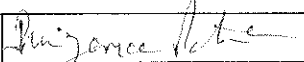
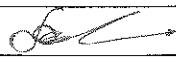
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| 7.1 | <b>TYPE TESTS OF COMPLETE POLYMER INSULATORS</b> | <ul style="list-style-type: none"> <li>• Dry lightning impulse withstand voltage test.</li> <li>• Wet power frequency test.</li> <li>• Mechanical failing load test.</li> <li>• Radio interference test.</li> <li>• Mechanical performance test</li> <li>• U.V Resistance as per ASTM G 53: 1000 Hrs - UV Light for 8 Hours and condensation for 4 hours in a continuous cycle. Elongation to be limited to 20% (% Elongation to break before and after the test).</li> <li>• Salt Fog test: On insulators for 1000 hours as per IEC.</li> <li>• Galvanization test.</li> <li>• Visual examination.</li> <li>• Verification of dimensions.</li> <li>• Bending test.</li> <li>• Verification of the locking system or the tightness of the interface between end fitting and insulator housing.</li> <li>• Assembled core load time test.</li> <li>• Determination of the average failing load of the core of the assembled insulator.</li> </ul> |
| 7.2 | <b>TYPE TESTS ON SILICONE RUBBER</b>             | <ul style="list-style-type: none"> <li>• Tensile Strength &amp; Elongation</li> <li>• Tear Strength</li> <li>• Inclined Plane Tracking &amp; Erosion</li> <li>• Volume resistivity</li> <li>• Dielectric Strength</li> <li>• Dielectric Constant</li> <li>• Density</li> <li>• Hardness</li> <li>• Arc Resistance</li> <li>• Silicone content</li> <li>• Flammability</li> <li>• Resistance to weathering &amp; UV.</li> <li>• Limiting oxygen index test.</li> <li>• Specific gravity.</li> </ul>   |
| 7.3 | <b>TYPE TESTS ON FRP RODS</b>                    | <ul style="list-style-type: none"> <li>• Verification of dimensions.</li> <li>• Specific Gravity</li> <li>• Glass Content</li> <li>• Water Diffusion Test</li> <li>• Hardness</li> <li>• Dye Penetration Test.</li> <li>• Flexural strength.</li> <li>• Water absorption.</li> <li>• Brittle fracture resistance test.</li> <li>• Visible discharge test.</li> <li>• Dry lightning impulse withstand voltage test.</li> <li>• Wet power frequency withstand voltage test.</li> <li>• Power Arc test.</li> <li>• Accelerated weathering test.</li> <li>• Tracking &amp; erosion test.</li> </ul>  |

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| 7.4 | <b>TYPE TESTS ON END FITTINGS</b> | <ul style="list-style-type: none"> <li>• Thickness of Zinc Coating</li> <li>• Uniformity of Zinc Coating</li> <li>• Micro-structural of metal fitting.</li> </ul>  |
| 7.5 | <b>DESIGN TESTS</b>               | <p>For composite insulators it is essential to carry out design test as per clause 4.1 of IEC 61109 / 92-93 with latest amendments. The design tests are intended to verify the suitability of the design, materials and method of manufacture (technology). When a composite insulator is submitted to the design tests, the result shall be considered valid for the whole class of insulators, which are represented by the one tested and having the following characteristics:</p> <ul style="list-style-type: none"> <li>• The materials for the core, and sheds and same manufacturing method;</li> <li>• The material of the fittings, the same design, the same method of attachment;</li> <li>• Polymer insulator should have greater layer thickness of the shed material over the core (including a sheath where used);</li> <li>• Polymer insulator should have smaller ratio of the highest system voltage to insulation length;</li> <li>• Polymer insulator should have smaller ratio of all mechanical loads to the smallest core diameter between fittings</li> <li>• Polymer insulator should have greater diameter of the core.</li> </ul> <p>The tested composite insulators shall be identified by a drawing giving all the dimensions with the manufacturing tolerances. Manufacturer should submit test reports for Design Tests as per IEC – 61109 (clause – 5) along with the bid. Additionally following tests shall be carried out or reports for the tests shall be submitted after award of contract: UV test: the test shall be carried out in line with clause 7.2 of ANSI C29.13. In addition, chemical composition test for silicon content would also be added in the testing list.</p> |
| 7.6 | <b>ROUTINE TESTS</b>              | <ul style="list-style-type: none"> <li>• Visual Examination (Free from void, cavity, foreign particle and scratch/nick spot).</li> <li>• Mechanical Routine Test</li> <li>• Electrical Routine Test</li> </ul>   |
| 7.7 | <b>ACCEPTANCE TESTS</b>           | <ul style="list-style-type: none"> <li>• End Sealing test (FRP rod and Silicone rubber housing).</li> <li>• Visual examination (Free from void, cavity, foreign particle and scratch/nick spot).</li> <li>• Verification of dimensions.</li> <li>• Galvanizing Tests.</li> <li>• Bending load test.</li> <li>• Mechanical performance test.</li> <li>• Mechanical Failing Load test.</li> <li>• Dry power frequency withstand voltage test</li> <li>• Wet power frequency withstand voltage test.</li> </ul>   |
| 8.0 | <b>TYPE TEST CERTIFICATES:</b>    | <p>The Bidder shall furnish the type test certificates of the 33 KV Ball and Socket type Suspension and tension polymer Insulators for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA/International Laboratory as per the relevant</p>   |

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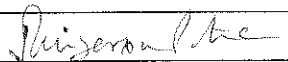
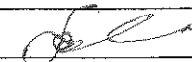
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|      |  | standards. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPDDL.  |
| 9.0  | <b>PRE DISPATCH INSPECTION:</b>            | <p>The material shall be subject to inspection by a duly authorized representative of the TPDDL. 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 TPDDL's representatives at all times when the work is in progress. Inspection by the TPDDL 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 TPDDL.</p> <p>Following documents shall be sent along with material</p> <ol style="list-style-type: none"> <li>a) Test reports</li> <li>b) MDCC issued by TPDDL</li> <li>c) TPDDL Invoice in duplicate</li> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warrantee card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable).</li> </ol>  |
| 10.0 | <b>INSPECTION AFTER RECEIPT AT STORES:</b> | The material received at TPDDL 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.   |
| 11.0 | <b>GUARANTEE:</b>                          | <p>Bidder shall stand guarantee towards design, materials, workmanship &amp; 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.</p> <p>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.</p> |
| 12.0 | <b>PACKING:</b>                            | Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.  |

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| 13.0  | <b>TENDER SAMPLE:</b>                 | 1 insulator sample to be provided during submission of technical bid.   |            |                |              |            |                |  |  |  |  |  |
|-------|---------------------------------------|---|------------|----------------|--------------|------------|----------------|--|--|--|--|--|
| 14.0  | <b>QUALITY CONTROL</b>                | 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.   |            |                |              |            |                |  |  |  |  |  |
| 15.0  | <b>MINIMUM TESTING FACILITIES:</b>    | The tenderer must clearly indicate what testing facilities are available in the works of the manufacturer and whether facilities are adequate to carry out all Routine & acceptance Tests. These facilities should be available to TPDDL Engineers if deputed or carry out or witness the tests in the manufacturer works. If any test cannot be carried out at the manufacturer's work, the reasons should be clearly stated in the tender. The insulators shall be tested in accordance with the procedure detailed in IEC 61109 / 92-93 with latest amendments.  |            |                |              |            |                |  |  |  |  |  |
| 16.0  | <b>MANUFACTURING ACTIVITIES:</b>      | The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.   |            |                |              |            |                |  |  |  |  |  |
| 17.0  | <b>SPARES, ACCESSORIES AND TOOLS:</b> | Not Applicable.   |            |                |              |            |                |  |  |  |  |  |
| 18.0  | <b>DRAWINGS AND DOCUMENTS:</b>        | <p>Following documents shall be prepared based on TPDDL specifications and statutory requirements with complete BOM and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>Completely filled in Technical Particulars</li> <li>General description of the equipment and all components including brochures</li> <li>Generalized drawing for Insulation Piercing Connector</li> <li>Bill of Material</li> <li>Type test Certificates</li> <li>Experience List.</li> </ol> <p>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.</p> <p>Following Drawings/Documents shall be submitted after the award of the contract:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">S. No</th> <th style="width: 40%;">Description</th> <th style="width: 15%;">For Approval</th> <th style="width: 15%;">For Review</th> <th style="width: 10%;">Final Submissi</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | S. No      | Description    | For Approval | For Review | Final Submissi |  |  |  |  |  |
| S. No | Description                           | For Approval  | For Review | Final Submissi |              |            |                |  |  |  |  |  |
|       |                                       |   |            |                |              |            |                |  |  |  |  |  |

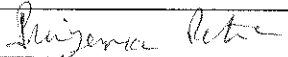
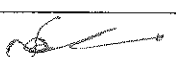
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|-----------|---|--------------------------|---|
| Initiator |  | HOG ( PLANT ENGINEERING) |  |
|-----------|---|--------------------------|---|


|  |  |                                   |                                 |
|--|--|-----------------------------------|---------------------------------|
| <br><b>TATAPOWER-DDL</b> | <b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>  |                                   |                                 |
|  | <b>TECHNICAL SPECIFICATION</b>   |                                   |                                 |
| Doc. Title   | <b>Specification of 33kV Polymer Ball and Socket type Suspension and Tension Insulator 90 KN</b> |                                   |                                 |
| Doc. No  | ENG-EHV-115  | Date: 27.01.2017                  |                                 |
| Rev. No  | 00   | Page 10 of 12                     |                                 |
| Prepared by:<br>Priyanka Patra   | Reviewed By:<br>Pankaj Singhal   | Approved By:<br>D R Dharmadhikari | Issued By:<br>D R Dharmadhikari |

|   |  |   | Information | on |
|---|--|---|-------------|----|
| 1 | Technical Parameters                           | √ |             | √  |
| 2 | General Arrangement drawings                   | √ |             | √  |
| 3 | Terminal and connection drawings               | √ |             | √  |
| 4 | Manual catalogue                               |   | √           |    |
| 5 | Installation/Commissioning Manuals             |   | √           |    |
| 6 | Instructions for use                           |   | √           |    |
| 7 | Transport/shipping dimension drawing           |   | √           |    |
| 8 | QA & QC Plan                                   | √ | √           | √  |
| 9 | Routine, Acceptance and Type test Certificates | √ | √           | √  |

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


|      |  |        |  |   |                        |
|------|--|--------|--|---|------------------------|
| 19.0 | <b>GUARANTEED TECHNICAL PARTICULARS:</b> | Sl No. | Description  | Requirements  | As furnished by Bidder |
|      |  | 1      | Type of insulator  | Polymeric Ball and Socket Disc                                      | Bidder has to submit   |
|      |  | 2      | Standard according to which the insulators manufactured and tested | IEC 61952 & IEC 61109   |                        |
|      |  | 3      | Material of Housing and Weather sheds                              | High voltage grade  |                        |
|      |  | 4      | Material of Core (FRP Rod)   | ECR BORON free  |                        |
|      |  | 5      | Material of end fittings   | Ball fitting Forged Steel and Socket fitting SGI Cast /forged steel |                        |

|           |   |                          |   |
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| Initiator |  | HOG ( PLANT ENGINEERING) |  |
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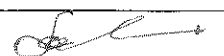
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|  | <b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>  |                                   |                                 |
|  | <b>TECHNICAL SPECIFICATION</b>   |                                   |                                 |
| Doc. Title   | <b>Specification of 33kV Polymer Ball and Socket type Suspension and Tension Insulator 90 KN</b> |                                   |                                 |
| Doc. No  | ENG-EHV-115  | Date: 27.01.2017                  |                                 |
| Rev. No  | 00   | Page 11 of 12                     |                                 |
| Prepared by:<br>Priyanka Patra   | Reviewed By:<br>Pankaj Singhal   | Approved By:<br>D R Dharmadhikari | Issued By:<br>D R Dharmadhikari |

|  |  |     |  |                    |
|--|--|-----|--|--------------------|
|  |  | 6   | Sealing compound for end fittings                    | Silicone Sealant   |
|  |  | 7   | Colour of housing                                    | Grey               |
|  |  | 8   | Electrical characteristics                           |                    |
|  |  | 8.1 | Nominal system voltage                               | 33kV               |
|  |  | 8.2 | Highest system voltage                               | 36kV               |
|  |  | 8.3 | Rated frequency                                      | 50Hz               |
|  |  | 8.4 | Wet power frequency with stand voltage               | 75kV (rms)         |
|  |  | 8.5 | Impulse with stand voltage                           | 170kV (rms)        |
|  |  | 8.6 | Visible Discharge test Voltage                       | 27 kV              |
|  |  | 8.7 | Minimum creepage distance                            | 900 mm             |
|  |  | 8.8 | FRP rod leakage current                              | <0.05 mA           |
|  |  | 9   | Minimum Failing loads                                | 90 kN              |
|  |  | 10  | FRP rod dia. Min                                     | 16mm               |
|  |  | 11  | No. of Weathersheds                                  | As per bidder      |
|  |  | 12  | Length of FRP rod                                    | As per bidder      |
|  |  | 13  | Insulator weight                                     | As per bidder      |
|  |  | 14  | Dia. of weather sheds                                | As per bidder      |
|  |  | 15  | Thickness of housing                                 | As per bidder      |
|  |  | 16  | Type of Sheds  | Aerodynamics       |
|  |  | 17  | Method of fixing of sheds to housing (Single mould ) | Injection Moulding |

|           |                       |                          |                    |
|-----------|-----------------------|--------------------------|--------------------|
| Initiator | <i>Priyanka Patra</i> | HOG ( PLANT ENGINEERING) | <i>[Signature]</i> |
|-----------|-----------------------|--------------------------|--------------------|

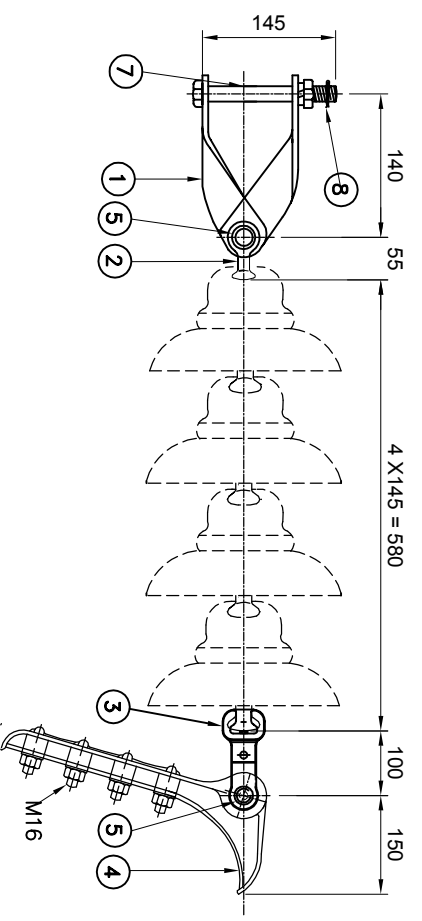
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|---|--|-----------------------------------|---------------------------------|
| <br><b>TATA POWER-DDL</b> | <b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>  |                                   |                                 |
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| Prepared by:<br>Priyanka Patra  | Reviewed By:<br>Pankaj Singhal   | Approved By:<br>D R Dharmadhikari | Issued By:<br>D R Dharmadhikari |

| 20.0  | <b>SCHEDULE OF DEVIATIONS</b><br><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u> | <p style="text-align: center;"><b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b></p> <p>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:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">S.No.</th> <th style="width: 25%;">Clause No.</th> <th style="width: 60%;">Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td style="height: 200px;"></td> <td></td> <td></td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above.</p> <p><b>Seal of the Company:</b></p> <p style="text-align: right;"><b>Designation<br/>Signature</b></p> | S.No. | Clause No. | Details of deviation with justifications |  |  |  |
|-------|---|--|-------|------------|--|--|--|--|
| S.No. | Clause No.  | Details of deviation with justifications   |       |            |  |  |  |  |
|       |   |  |       |            |  |  |  |  |

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| Initiator | <i>Priyanka Patra</i> | HOG ( PLANT ENGINEERING) |  |
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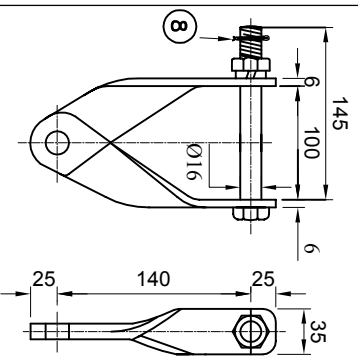


\* TECHNICAL DATA \*



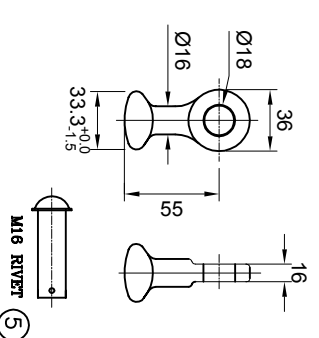
1. U.T.S. OF HARDWARE FITTING : 90 KN
2. MECHANICAL STRENGTH OF TENSION CLAMP : 90 KN
3. SLIP STRENGTH OF TENSION CLAMP : 95% UTS OF CONDUCTOR
4. BALL & SOCKET DESIGNATION : 16 mm AS PER I.S.: 2486, PART-II.
5. SPECN. TO WHICH H/W FITTING CONFORM - I.S.: 2486, PART-I.
6. ALL FERROUS PARTS (EXCEPT SPRING WASHER) SHALL BE HOT DIP GALVANISED CONFORMING TO I.S.: 2633 AND SPRING WASHER ELECTRO GALVANISED CONFORMING TO IS:1573, SERVICE COND. (Hardware:610gm/ sq mtr. & Fastner:305gm/sq mtr.)
7. STAINLESS STEEL R'TYPE SECURITY CLIP WILL BE PROVIDED WITH ALL SOCKET FITTINGS-Gr.-304
8. SS-304, SPLIT PIN WILL BE PROVIDED WITH ALL M16 BOLTS/RIVETS
9. GENERAL TOLERANCE : ±5%.
10. ALL DIMENSION ARE IN MM
11. TOLERANCE IN TOTAL LENGTH OF HARDWARE FITTING ±2%
12. IDENTIFICATION MARK : ON ALL FORGED COMPONENTS (EMBOSSED)

① CROSS ARM



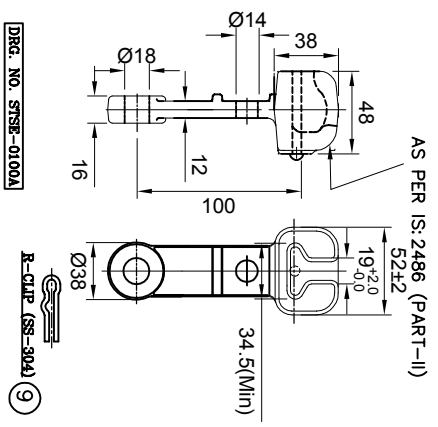
DRG. NO. STCA-01

② BALL EYE



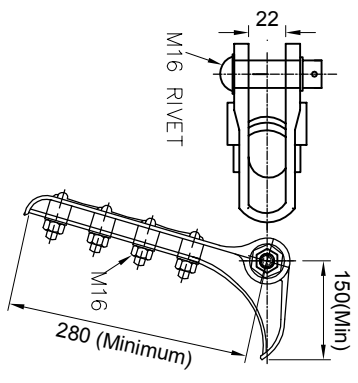
DRG. NO. STBE-01

③ SOCKET EYE



DRG. NO. STSE-0100A

④ TENSION CLAMP



DRG. NO. STTC-040

BILL OF MATERIALS

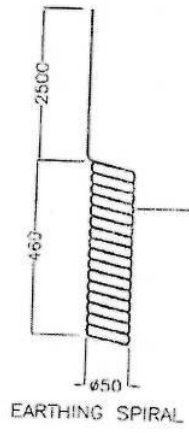
| ITEM NO | COMPONENTS                           | DRG.NO.    | MATERIAL.       | GRADE                          | SURFACE TREATMENT | QTY./ SET |
|---------|--------------------------------------|------------|-----------------|--------------------------------|-------------------|-----------|
| 1       | CROSS ARM (40x6 Flat)                | STCA-01    | M/S             | IS: 2062                       | H.D.G.            | 1 Pair    |
| 2       | BALL EYE                             | STBE-01    | F.S.            | IS: 2004                       | H.D.G.            | 1 NO      |
| 3       | SOCKET EYE                           | STSE-0100A | F.S.            | IS: 2004                       | H.D.G.            | 1 NO      |
| 4       | TENSION CLAMP & KEEPER               | STTC-040   | ALUMINIUM ALLOY | LM6, IS: 617                   | -                 | 1 SET     |
| 5       | M16 RIVET WITH FLAT WASHER           | -          | M/S             | IS: 2062                       | H.D.G.            | 1 SET     |
| 6       | M16 U-BOLT WITH NUT & WASHER         | -          | M/S             | IS: 2062                       | H.D.G.            | 4 SET     |
| 7       | M16 BOLT X 145 MM, NUT & FLAT WASHER | -          | M/S             | Gr.4,6/4.0, Fe-410<br>IS: 2062 | H.D.G.            | 1 SET     |
| 8       | SPLIT PIN                            | -          | S/S             | AISI - 304                     | -                 | 3 NOS     |
| 9       | R-CLIP (16)                          | -          | S/S             | AISI - 304                     | -                 | 1 NO      |

90KN B&S TYPE 4 BOLTED TENSION HARDWARE FITTINGS  
SUITABLE FOR PANTHER AAC CONDUCTOR

**GUARANTEED TECHNICAL PARTICULARS FOR HOT DIP GALVANIZED EARTHING COIL**

| SL NO | DESCRIPTIONS   | Values Specified  |
|-------|--|---|
| 1     | Makers Name and Adress   |   |
| 2     | Place of Manufacture   |   |
| 3     | Standard according to which earthing coil shall be manufactured and tested | IS:2629/1996, IS:4826/1979 with latest amendment, REC construction standard J-1 |
| 4     | Diameter of GI Wire  | 4mm ± 2.5%  |
| 5     | Minimum No of turns  | 115 Nos   |
| 6     | External Dia of Coil   | 50 mm   |
| 7     | Minimum leangth of coil  | 460 mm  |
| 8     | Free leangth of GI wire at end of the coil                                 | 2500 mm   |
| 9     | Other particulars  | General Tolerance ± 5%  |
| 10    | Weight of one finished earthing coil(min)                                  | 1.850 Kg.   |

ALL DIMENSIONS ARE IN CM. & METRIC. ARE IN BUSINESS UNITS (SPECIES)




NO.8  
4MM G.I. WIRE CLOSELY  
WOUND 115 NO. OF TURN.

Nominal dia of GI Wire - 4 mm (tolerance ± 2.5%) NO.8  
 Minimum no. of turns - 115 Nos.  
 External dia of Coil (Min) - 50mm  
 Length of Coil (Min) - 460 mm  
 Free length of GI Wire at one end coil (Min.) - 2500 mm  
 Weight of one finished Earthing Coils (min.) - 1.850 Kg.

Galvanizing Tests - Minimum Mass of Zinc On GI Wire used 280 gm/m<sup>2</sup> & After Coiling - 286 gm/m<sup>2</sup>.  
 Dip Test - Dip test shall stand 3 dips of 1 minute and one dip of 1/2 minute before coiling and 4 dips of 1 minute after coiling as per IS: 4826/1979  
 Adhesion Test - As per ISS 4826 - 1979.


**APPROVED** For elephant Corridor  
 Empowerment Area project

*[Signature]*  
 Sr. General Manager (Elec.)  
 Technical, CESU


|   |  |                      |           |
|---|--|----------------------|-----------|
|  | TATA POWER CENTRAL ODISHA DISTRIBUTION LIMITED,<br>BHUBANESWAR |                      |           |
|   | <b>TECHNICAL SPECIFICATION</b>                                 |                      |           |
| Document Title  | SPECIFICATION FOR GALVANISED IRON (GI) EARTH PIPE              |                      |           |
| Document No.  |  | Eff. Date:06/08/2020 |           |
| Revision No.  | 00   | Page 1 of 7          |           |
| Prepared By<br>Md Zaffir Alam   | Reviewed By  | Approved By          | Issued By |

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|   |  |                      |           |
|---|--|----------------------|-----------|
|  | TATA POWER CENTRAL ODISHA DISTRIBUTION LIMITED,<br>BHUBANESWAR |                      |           |
|   | <b>TECHNICAL SPECIFICATION</b>                                 |                      |           |
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|  |  |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
|--|--|---|-----------------------------|------------|------------------------------------|------------|-----------------------------|-----------|---------------------|--------|---------------------|-------|--|------|----------------------------|----------|--|------|-----------------|----------------|---------------------------|---------------|------------------|--|
| <b>1.0</b>                               | <b>SCOPE</b>                               | <p>This specification covers technical requirements of design, manufacturing, testing, Inspection, Supply &amp; transportation of Heavy type Galvanised Iron (GI) earth pipe electrode for TATA Power-CODL stores/site.</p> <p>This specification shall cover different Range of GI earth pipe, as mentioned below,</p> <ol style="list-style-type: none"> <li>1. GI earth pipe of size Nominal Bore (NB) 40mm.</li> <li>2. GI earth pipe of size Nominal Bore (NB) 65mm.</li> <li>3. GI earth pipe of size Nominal Bore (NB) 100mm.</li> </ol>   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| <b>2.0</b>                               | <b>APPLICABLE STANDARDS</b>                | <p>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:</p> <ul style="list-style-type: none"> <li>• IS 1239 (Part1): Specification for Steel Tubes, Tubulars &amp; other wrought steel fittings.</li> <li>• IS 1239 (Part2): Specification for Steel Tubes, Tubulars &amp; other steel fittings.</li> <li>• IS 228: Method for chemical analysis of steels.</li> <li>• IS 4736 : Specification for Hot dip zinc coating on mild steel tubes</li> <li>• IS 4759: Specification for Hot dip zinc coating on structural steel and other allied products.</li> <li>• IS 1387: General requirements for the supply of metallurgical materials.</li> <li>• IS 1608: Mechanical testing of metals-Tensile Strength.</li> <li>• IS 4711: Methods for sampling of steel pipes, tubes and fittings.</li> <li>• IS 4740: Code of practice for packaging of steel tubes.</li> <li>• IS 10748: Hot rolled steel strip for welded tubes &amp; pipes.</li> <li>• IS 12278: Method for ring tensile test on metallic tubes.</li> <li>• IS 3043-1987: Code of practice for earthing.</li> <li>• IS 1367: Technical supply conditions for threaded steel fastener.</li> <li>• IS 14394: Industrial fasteners-Nuts of product Grade C- Hot Dip Galvanised.</li> <li>• IS 2016:-1997: Specification for plain washers.</li> <li>• IS 1730-1989: Steel plates, sheets, strips and flats for structural And general engineering purpose-Dimensions</li> <li>• IS 814-2004: covered electrodes for manual metal Arc welding Of carbon and carbon Manganese steel- specification.</li> </ul> |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| <b>3.0</b>                               | <b>CLIMATIC CONDITIONS OF INSTALLATION</b> | <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">a) Max. Ambient Temperature</td> <td style="text-align: right;">: 50 deg.C</td> </tr> <tr> <td style="padding-left: 20px;">b) Max. Daily average ambient temp</td> <td style="text-align: right;">: 40 deg.C</td> </tr> <tr> <td style="padding-left: 20px;">c) Min. Ambient Temperature</td> <td style="text-align: right;">: 2 deg.C</td> </tr> <tr> <td style="padding-left: 20px;">d) Maximum Humidity</td> <td style="text-align: right;">: 100%</td> </tr> <tr> <td style="padding-left: 20px;">e) Minimum Humidity</td> <td style="text-align: right;">: 10%</td> </tr> <tr> <td style="padding-left: 20px;">f) Average No. of thunderstorm per annum</td> <td style="text-align: right;">: 40</td> </tr> <tr> <td style="padding-left: 20px;">g) Average Annual Rainfall</td> <td style="text-align: right;">: 750 mm</td> </tr> <tr> <td style="padding-left: 20px;">h) Average No. of rainy days per annum</td> <td style="text-align: right;">: 50</td> </tr> <tr> <td style="padding-left: 20px;">i) Rainy months</td> <td style="text-align: right;">: June to Oct.</td> </tr> <tr> <td style="padding-left: 20px;">j) Altitude not exceeding</td> <td style="text-align: right;">: 300 meters.</td> </tr> <tr> <td style="padding-left: 20px;">k) Wind Pressure</td> <td style="text-align: right;">: 195 kg/sq. m up an elevation of 30m.</td> </tr> </table>  | a) Max. Ambient Temperature | : 50 deg.C | b) Max. Daily average ambient temp | : 40 deg.C | c) Min. Ambient Temperature | : 2 deg.C | d) Maximum Humidity | : 100% | e) Minimum Humidity | : 10% | f) Average No. of thunderstorm per annum | : 40 | g) Average Annual Rainfall | : 750 mm | h) Average No. of rainy days per annum | : 50 | i) Rainy months | : June to Oct. | j) Altitude not exceeding | : 300 meters. | k) Wind Pressure | : 195 kg/sq. m up an elevation of 30m. |
| a) Max. Ambient Temperature              | : 50 deg.C                                 |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| b) Max. Daily average ambient temp       | : 40 deg.C                                 |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| c) Min. Ambient Temperature              | : 2 deg.C                                  |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| d) Maximum Humidity                      | : 100%                                     |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| e) Minimum Humidity                      | : 10%                                      |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| f) Average No. of thunderstorm per annum | : 40                                       |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| g) Average Annual Rainfall               | : 750 mm                                   |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| h) Average No. of rainy days per annum   | : 50                                       |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| i) Rainy months                          | : June to Oct.                             |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| j) Altitude not exceeding                | : 300 meters.                              |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |
| k) Wind Pressure                         | : 195 kg/sq. m up an elevation of 30m.     |   |                             |            |                                    |            |                             |           |                     |        |                     |       |  |      |                            |          |  |      |                 |                |                           |               |                  |  |

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|  | TATA POWER CENTRAL ODISHA DISTRIBUTION LIMITED,<br>BHUBANESWAR |                      |           |
|   | <b>TECHNICAL SPECIFICATION</b>                                 |                      |           |
| Document Title  | SPECIFICATION FOR GALVANISED IRON (GI) EARTH PIPE              |                      |           |
| Document No.  |  | Eff. Date:06/08/2020 |           |
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|     |                                       | Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g.   |                           |             |              |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|-----|---------------------------------------|--|---------------------------|-------------|--------------|--------------|-------|--|---|--------------|----|----|----|-----|---|------------------|----|--|--|--|----------|------|------|-------|----------|------|------|-----|---|----------------|----|-----|-----|-----|---|------------------------|------|------|------|------|---|---------------------------|-------------|-----|-----|-----|---|------------------|----------|-----|-----|-----|---|------------|---|----|----|----|---|--------|---|-----|-------|-------|--|--|--|--|
| 4.0 | <b>GENERAL TECHNICAL REQUIREMENTS</b> | <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Description</th> <th>Units</th> <th colspan="3">Requirements</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Nominal Bore</td> <td>mm</td> <td>40</td> <td>65</td> <td>100</td> </tr> <tr> <td rowspan="3">2</td> <td rowspan="3">Outside Diameter</td> <td>mm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Min.(mm)</td> <td>47.9</td> <td>75.3</td> <td>113.1</td> </tr> <tr> <td>Max.(mm)</td> <td>48.8</td> <td>76.6</td> <td>115</td> </tr> <tr> <td>3</td> <td>Wall Thickness</td> <td>mm</td> <td>4.0</td> <td>4.5</td> <td>5.4</td> </tr> <tr> <td>4</td> <td>Mass of tube plain end</td> <td>Kg/m</td> <td>4.37</td> <td>7.93</td> <td>14.5</td> </tr> <tr> <td>5</td> <td>Mass of Zinc Coating Min.</td> <td>g/sq. meter</td> <td>360</td> <td>360</td> <td>360</td> </tr> <tr> <td>6</td> <td>Tensile strength</td> <td>N/sq. mm</td> <td>320</td> <td>320</td> <td>320</td> </tr> <tr> <td>7</td> <td>Elongation</td> <td>%</td> <td>20</td> <td>20</td> <td>20</td> </tr> <tr> <td>8</td> <td>Length</td> <td>m</td> <td>3/6</td> <td>3/6/9</td> <td>3/6/9</td> </tr> </tbody> </table>   | Sl. No.                   | Description | Units        | Requirements |       |  | 1 | Nominal Bore | mm | 40 | 65 | 100 | 2 | Outside Diameter | mm |  |  |  | Min.(mm) | 47.9 | 75.3 | 113.1 | Max.(mm) | 48.8 | 76.6 | 115 | 3 | Wall Thickness | mm | 4.0 | 4.5 | 5.4 | 4 | Mass of tube plain end | Kg/m | 4.37 | 7.93 | 14.5 | 5 | Mass of Zinc Coating Min. | g/sq. meter | 360 | 360 | 360 | 6 | Tensile strength | N/sq. mm | 320 | 320 | 320 | 7 | Elongation | % | 20 | 20 | 20 | 8 | Length | m | 3/6 | 3/6/9 | 3/6/9 |  |  |  |  |
|     |                                       | Sl. No.  | Description               | Units       | Requirements |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 1  | Nominal Bore              | mm          | 40           | 65           | 100   |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 2  | Outside Diameter          | mm          |              |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       |  |                           | Min.(mm)    | 47.9         | 75.3         | 113.1 |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       |  |                           | Max.(mm)    | 48.8         | 76.6         | 115   |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 3  | Wall Thickness            | mm          | 4.0          | 4.5          | 5.4   |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 4  | Mass of tube plain end    | Kg/m        | 4.37         | 7.93         | 14.5  |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 5  | Mass of Zinc Coating Min. | g/sq. meter | 360          | 360          | 360   |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
| 6   | Tensile strength                      | N/sq. mm   | 320                       | 320         | 320          |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
| 7   | Elongation                            | %  | 20                        | 20          | 20           |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
| 8   | Length                                | m  | 3/6                       | 3/6/9       | 3/6/9        |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
| 5.0 | <b>GENERAL CONSTRUCTION</b>           | <p>For welded and seamless plain end steel tubes intended for different use in electricity distribution utility shall comply IS 1239 (part1). Plain ends of the tube are cleanly finished by normal deburring process. For tubes of any thickness the minimum mass of zinc coating is 360 g/sq. meter. The zinc coating on the tubes shall be uniform and tested in accordance with IS 4736.Tubes. The tensile strength shall be at least 320 MPa (320 N/sq. mm).The elongation percent for nominal bore of 40mm, 65mm and 100 mm dia. is 20%.The Hot Rolled coil used for manufacturing of Galvanised Mild Steel tubes shall be of grade-2 in accordance with IS 10748.2004 and shall be strictly from approved vendors' i.e. SAIL, TATA Steel, ESSAR, JSW Steel and TATA steel BSL. 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, &amp; washers provided shall be as per relevant IS.</p> <p>Chemical compositions for G.I. Earth Pipe are in below:</p> <p>Carbon: 0.20% (max.)<br/>Manganese: 1.30% (max.)<br/>Phosphorous: 0.04% (max.)<br/>Sulphur: 0.04% (max.)</p> <p>Constructional drawings are attached as annexure-I, annexure-II, annexure-III should be followed for fabrication.</p> |                           |             |              |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |
|     |                                       | 6.0  |                           |             |              |              |       |  |   |              |    |    |    |     |   |                  |    |  |  |  |          |      |      |       |          |      |      |     |   |                |    |     |     |     |   |                        |      |      |      |      |   |                           |             |     |     |     |   |                  |          |     |     |     |   |            |   |    |    |    |   |        |   |     |       |       |  |  |  |  |

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|   | <b>TECHNICAL SPECIFICATION</b>                                 |                      |           |
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|              | <b>NAME PLATE AND MARKING</b>   | <p>The body of the device shall be appropriately marked with “PROPERTY OF TATA POWER-CODL, BHUBANESWAR” and the RC /RO no. at suitable location such that it is permanent and does not harm the body of the device. Each tube shall be marked with class of tubes i.e. H for Heavy type. The different classes of tubes shall be distinguished by color bands:</p> <p>Heavy tubes: Red</p>   |
| <b>7.0</b>   | <b>TESTS</b>                    | All routine, acceptance & type tests shall be carried out in accordance with the relevant IS.  |
| <b>7.i)</b>  | <b>TYPE TEST</b>                | <p>The following tests shall constitute the type tests and shall be carried out as per IS: 1239 Part-1: 2004(Latest Amendment)</p> <ol style="list-style-type: none"> <li>1)Test for Mechanical Properties (As per 1239 Part-1: 2004 or Latest Amendment clause no.14.1 &amp; 14.1.1) <ul style="list-style-type: none"> <li>• Percentage of Elongation.</li> <li>• Tensile strength.</li> </ul> </li> <li>2) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1)</li> <li>3) Chemical composition. (As per 1239 Part-1: 2004 or Latest Amendment clause no.6.1.1)</li> </ol>   |
| <b>7.ii)</b> | <b>ROUTINE/ ACCEPTANCE TEST</b> | <p>The following tests shall be got conducted in presence of purchaser 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.</p> <ol style="list-style-type: none"> <li>1) Dimension of GI pipe. (As per IS 1239 Part-1: 2004 clause No.9.1 a &amp; b)-Test shall be performed.</li> <li>2) Chemical composition (Manufacturer’s Test Certificate for raw material-Document Review only.)</li> <li>3) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1)- Test shall be performed.</li> <li>4) Test for mechanical properties (Manufacturer’s Test Certificate for raw material-Document Review only.)</li> </ol>   |
| <b>8.0</b>   | <b>TYPE TEST CERTIFICATE S</b>  | The bidder shall furnish the type test certificates as mentioned as above as per the corresponding standards, if asked for by TATA Power-CODL. All type tests shall be conducted from NABL accredited Lab as per the relevant standards 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 TATAPOWER-CODL.   |
| <b>9.0</b>   | <b>PRE DISPATCH INSPECTION</b>  | The Material shall be subject to inspection by a duly authorized representative of the TATA Power-DDL. 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 TATAPOWER-CODL’s representatives at all times when the work is in progress. Inspection by the TATA Power-CODL 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 TATAPOWER-CODL. The pre-dispatch inspection shall be carried out as per annexure-IV |

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|------|---|---|
|      |   | <p>Following documents shall be sent along with material</p> <ol style="list-style-type: none"> <li>a) Test reports</li> <li>b) MDCC issued by TATA POWER-CODL</li> <li>c) Invoice in duplicate</li> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warrantee card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable)</li> </ol>  |
| 10.0 | <b>INSPECTION AFTER RECEIPT AT STORES</b> | The material received at TATA POWER-CODL 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 | <b>GUARANTEE</b>                          | <p>Bidder shall stand guarantee towards design, materials, workmanship &amp; 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.</p> <p>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.</p> |
| 12.0 | <b>PACKING</b>                            | 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 | <b>TENDER SAMPLE</b>                      | Not Applicable  |
| 14.0 | <b>TRAINING</b>                           | Not Applicable  |
| 15.0 | <b>QUALITY CONTROL</b>                    | The bidder shall have a prove track of not less than 10 years in GI earth Pipe 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  |

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|        |   | 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   | <b>MINIMUM TESTING FACILITIES</b>                         | Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards.   |                        |                  |              |                        |                  |   |                              |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |
| 17.0   | <b>MANUFACTURING ACTIVITIES</b>                           | 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   | <b>SPARES ACCESSORIES AND TOOLS</b>                       | Not Applicable   |                        |                  |              |                        |                  |   |                              |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |
| 19.0   | <b>DRAWINGS AND DOCUMENTS</b>                             | <p>Constructional drawings are attached as annexure-I, annexure-II, annexure-III should be followed for fabrication.</p> <p>Following documents shall be prepared based on TATAPOWER-CODL specifications and statutory requirements with complete BOM and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>Completely filled in Technical Particulars.</li> <li>General description of the equipment and all components including brochures.</li> <li>Bill of Material</li> <li>Type test Certificates</li> <li>Experience List.</li> </ol> <p>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.</p> <p>Following Drawings/Documents shall be submitted after the award of the contract:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sl. No</th> <th>Description</th> <th>For Approval</th> <th>For Review Information</th> <th>Final Submission</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>General Technical Parameters</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td>2</td> <td>Manual/Catalogues/drawings for all components.</td> <td></td> <td style="text-align: center;">√</td> <td></td> </tr> <tr> <td>3</td> <td>Technical details and test certificates of the component.</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td>4</td> <td>Instructions for use</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td>5</td> <td>Transport/shipping dimension drawing</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td>6</td> <td>QA &amp; QC Plan</td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td>7</td> <td>Routine, Acceptance and Type test Certificates</td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> </tbody> </table> <p>All the Documents and Drawings shall be in English Language.</p> | 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 | √ | √ | √ |
| 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            | √  | √                      | √                |              |                        |                  |   |                              |   |  |   |   |  |  |   |  |   |   |  |   |   |   |                      |  |   |   |   |                                      |  |   |   |   |              |   |   |   |   |  |   |   |   |



|                               |  |                      |           |
|-------------------------------|--|----------------------|-----------|
| <b>TPCODL</b>                 | TATA POWER CENTRAL ODISHA DISTRIBUTION LIMITED,<br>BHUBANESWAR |                      |           |
|                               | <b>TECHNICAL SPECIFICATION</b>                                 |                      |           |
| Document Title                | SPECIFICATION FOR GALVANISED IRON (GI) EARTH PIPE              |                      |           |
| Document No.                  |  | Eff. Date:06/08/2020 |           |
| Revision No.                  | 00   | Page 7 of 7          |           |
| Prepared By<br>Md Zaffir Alam | Reviewed By  | Approved By          | Issued By |

|             |   |   |
|-------------|---|---|
|             |   |   |
| <b>20.0</b> | <b>GUARANTEED TECHNICAL PARTICULARS</b> | Clause wise compliance shall be provided by bidders |

|             |                               | <p><b><u>(TO BE ENCLOSED WITH THE BID)</u></b></p> <p>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 TATA POWER-CODL's specifications:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 15%;">S.No.</th> <th style="width: 20%;">Clause No.</th> <th style="width: 65%;">Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"></td> <td></td> <td></td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above.</p> <p>Seal of the Company:</p> <div style="text-align: right; margin-top: 20px;">           Signature<br/>           Designation         </div> | S.No. | Clause No. | Details of deviation with justifications |  |  |  |
|-------------|-------------------------------|---|-------|------------|--|--|--|--|
| S.No.       | Clause No.                    | Details of deviation with justifications  |       |            |  |  |  |  |
|             |                               |   |       |            |  |  |  |  |
| <b>21.0</b> | <b>SCHEDULE OF DEVIATIONS</b> |   |       |            |  |  |  |  |

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| <b>TP Central Odisha<br/>Distribution Limited</b> | <b>TPCODL</b><br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 25 x 3 GI Flat<br/>for Earthing</b> |
| <b>NEG-SPEC-11</b>                                |  | <b>Date of Issue: 01/09/2020</b>                         |

**Technical Specification  
for  
25 x 3 GI Flat for Earthing**

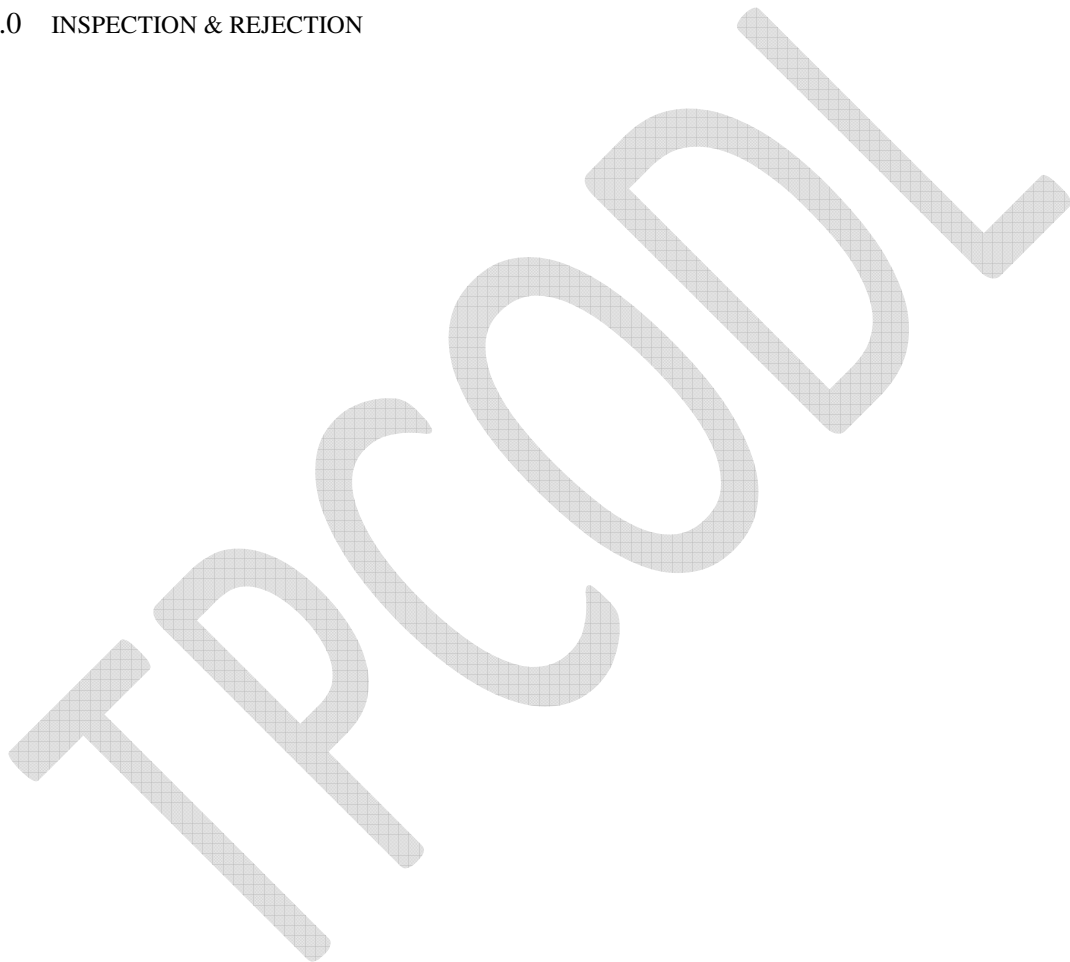
**TP Central Odisha Distribution Limited.  
Network Engineering Group  
2<sup>nd</sup> Floor, IDCO Tower  
Janpath, Bhubaneswar- 751022**

| Rev No. | Description                                   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|---|--------------------|-------------------|------------------------------|
| R0      | Specification for 25 x 3 GI Flat for Earthing | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |


|   |  |  |
|---|--|--|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <b>TPCODL</b><br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 25 x 3 GI Flat<br/>for Earthing</b> |
| <b>NEG-SPEC-11</b>                                |  | <b>Date of Issue: 01/09/2020</b>                         |

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- 1.0 SCOPE
- 2.0 APPLICABLE STANDARDS
- 3.0 GENERAL TECHNICAL REQUIREMENTS
- 4.0 INSPECTION & REJECTION



| Rev No. | Description                                   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
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| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b><br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 25 x 3 GI Flat<br/>for Earthing</b> |
| <b>NEG-SPEC-11</b>                                |   | <b>Date of Issue: 01/09/2020</b>                         |

### 1. SCOPE:

The specification provides for design, manufacturing, testing before dispatch for Hot dip Galvanized flats of size 25X3 mm.

### 2. APPLICABLE STANDARDS:

MS flat shall conform to IS 2062 & its latest amendments for steel & Galvanization as per IS 4759 & its Latest amendments.

### 3. GENERAL TECHNICAL REQUIREMENTS:

The flat shall be coated with Zn 98 Zinc grade.

The minimum Zinc coating shall be 610 gm/sqm.

### 4. INSPECTION & REJECTION:

a) The representative of TPCODL shall pick up samples at random from the GI Flats offered for carrying out routine tests as per specified IS.

b) The representative shall make visual inspection on each & every GI flats.

c) The purchaser reserves the right to reject on inspection after the same is received at destination.

| Sl no | Particulars                                 | Bidders Offer         |
|-------|---|-----------------------|
| 1     | Location of factory or place of manufacture |                       |
| 2     | Maker's name,Address & country              |                       |
| 3     | Size of G.I. Flat                           | 25*3 mm               |
| 4     | Standard length in Mtr                      | 5 TO 13 METER         |
| 5     | Glavanisation Process                       | IS2062, GRADE A       |
| 6     | Galvanisation thickness                     | 610 gm/m <sup>2</sup> |
| 7     | Galvanisation tests to be conducted         |                       |

| Rev No. | Description                                   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|---|--------------------|-------------------|------------------------------|
| R0      | Specification for 25 x 3 GI Flat for Earthing | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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| <b>TATA POWER COMPANY ODISHA DISTRIBUTION LIMITED, ODISHA</b> |                                       |                     |                   |
| <b>TECHNICAL SPECIFICATION</b>                                |                                       |                     |                   |
| <b>Doc. Title</b>   | <b>Specifications for HT Stay Set</b> |                     |                   |
| <b>Doc. No</b>  |                                       | <b>Eff. Date:</b>   |                   |
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7. TESTS
8. TYPE TEST CERTIFICATES
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|-----------|--|----------|--|
| Initiator |  | Approver |  |
|-----------|--|----------|--|

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| <b>Prepared by:</b>   | <b>Reviewed By:</b>                   | <b>Approved By:</b> | <b>Issued By:</b> |

### 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 4579 -96             | Hot Dip Galvanizing For Fabrication                                   |
| IS 1852 – 85            | Tolerance For Raw Material  |
| IS 1367part (13) - 1983 | Hot Dip Galvanizing For Tension Screw                                 |
| IS 2062                 | Manufactured from raw material as per IS 2062 grade E-250 quality 'A' |

### 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

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   | Units | Requirement   | Tolerance    |
|------|---|-------|---|--------------|
| 1.   | Material  |       | Manufactured from raw material as per IS 2062 grade E-250 quality 'A' |              |
| 2.   | Anchor Rod  | mm    |   |              |
| a    | Nominal Diameter of rod                                     | mm    | 20 mm diameter  | (+/-) 0.5 mm |
| b    | Length of rod   | mm    | 2100 mm   | (+/-) 0.5 %  |
| 3.   | RCC Base Plate  |       | Mix of concrete 1:2:4   |              |
| a    | Dimension [L x B x Thickness]                               | mm    | 450 mm x 450 mm x 75 mm   | (+/-) 5 mm   |
| b    | Rectangular opening at center                               | mm    | 25 mm x 75 mm   | (+/-) 0.5 mm |
| 4.   | Tension Screw   |       |   |              |
| a    | Eye Bolt  | mm    | 2 No. with 20 mm dia; inner diameter of rounded part of screw 24 mm.  | (+/-) 0.5 mm |
| b    | Length of the central part                                  | mm    | 310 mm  |              |
| c    | Total length after full tightening of both screw / Eye bolt | mm    | 445 mm  | (+/-) 5 mm   |

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|    |  |    |   |                                       |
|----|--|----|---|---------------------------------------|
| d  | Total length after full opening of both screw / Eye bolt | mm | 665 mm                                  |                                       |
| 5. | MS Angle   | mm | 50 mm x 50 mm x 6 mm; Long 250 mm       | (+/-) 0.5 mm;<br>in length (+/-) 5 mm |
| 6. | Stay Collar  | mm | All dimensions as mentioned in drawing. | (+/-) 5 mm                            |

## 5. GENERAL CONSTRUCTIONS

### 5.1 ANCHOR ROD WITH MS ANGLE

Overall length of rod should be 2100 mm to be made out of 20 mm diameter MS rod. One end of rod to be made into a round eye having an inner diameter of 24 mm and outer dia 64 mm with best quality welding. Other end fitted with MS Angle 50 mm x 50 mm x 6 mm; 250 mm long. Hot Dip galvanized as per IS 4759-1996. Details are indicated in the drawing.

### 5.2 RCC BASE PLATE

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

### 5.3 TENSION SCREW

Two no. of eye bolt to be made of 20 mm dia MS Rod having an overall length of 250 mm. One end of the rod to be threaded up to 185 mm length. The other end of the rod shall be rounded into a circular eye of 24 mm inner dia with proper and good quality welding. Tension screw central part shall be one piece forging with total width 310 mm. Tension screw being a threaded fastener be hot dip galvanized as per relevant IS : 1367 (part 13) – 1983. And all other constructional details & dimensions as mentioned in drawing.

### 5.4 STAY COLLAR

To be made of 50 x 6 MS plate and hot dip galvanized as per IS 4759 and all other constructional details & dimensions as mentioned in drawing.

## 6. MARKING

The HT Stay Set shall carry the following information contained in a label attached to it:

- Reference to the Standards.
- Manufacturer's name
- Year of manufacture.
- The following shall be embossed on the HT Stay Set," PROPERTY OF TPCODL, Odisha."

## 7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All Routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the HT Stay Set in additions to others specified in the IS/IEC/SANS Standards.

### Following tests shall be applicable.

- Visual examination, Verification of dimension and marking test.
- Tensile Strength.
- Galvanization (Uniformity) test.
- Cube test/ Compression test

## 8. TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates of the HT Stay Set for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI/ERDA/Other NABL accredited Laboratory 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

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additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPCODL, Odisha.

**9. PRE DISPATCH INSPECTION**

The Material shall be subject to inspection by a duly authorized representative of the TPCODL, Odisha. 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, Odisha 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, Odisha.

Following documents shall be sent along with material

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

**10. INSPECTION AFTER RECEIPT AT STORES**

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

**11. GUARANTEE**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder’s risks and costs and recover all such expenses plus the Purchaser’s own charges (@ 20% of expenses incurred), from the Bidder or from the “Security cum Performance Deposit” as the case may be.

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

**12. PACKING**

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.

**13. TENDER SAMPLE**

Bidder shall submit the sample of material with the offer (in case of first supply to TPCODL, Odisha).

**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

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|-----------|--|----------|--|
| Initiator |  | Approver |  |
|-----------|--|----------|--|



|   |                                       |                     |                   |
|---|---------------------------------------|---------------------|-------------------|
| <b>TATA POWER COMPANY ODISHA DISTRIBUTION LIMITED, ODISHA</b> |                                       |                     |                   |
| <b>TECHNICAL SPECIFICATION</b>                                |                                       |                     |                   |
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| <b>Prepared by:</b>   | <b>Reviewed By:</b>                   | <b>Approved By:</b> | <b>Issued By:</b> |

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

**15. MINIMUM TESTING FACILITIES**

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

**16. MANUFACTURING ACTIVITIES**

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

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable

**18. DRAWINGS AND DOCUMENTS**

Following documents shall be prepared based on TPCODL, Odisha 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

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

| S. No | Description                                    | For Approval | For Review Information | Final Submission |
|-------|--|--------------|------------------------|------------------|
| 1     | Technical Parameters                           | √            |                        | √                |
| 2     | Manual/Catalogues/drawings for all components. |              | √                      |                  |
| 3     | Technical details and test certificates.       |              | √                      | √                |
| 4     | Installation Instructions                      |              | √                      | √                |
| 5     | Transport/shipping dimension drawing           |              | √                      | √                |
| 6     | QA & QC Plan                                   | √            | √                      | √                |
| 7     | Routine, Acceptance and Type test Certificates | √            | √                      | √                |

All the Documents and Drawings shall be in English Language.

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

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| Initiator |  | Approver |  |
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| <b>TATA POWER COMPANY ODISHA DISTRIBUTION LIMITED, ODISHA</b> |                                       |                     |                   |
| <b>TECHNICAL SPECIFICATION</b>                                |                                       |                     |                   |
| <b>Doc. Title</b>   | <b>Specifications for HT Stay Set</b> |                     |                   |
| <b>Doc. No</b>  |                                       | <b>Eff. Date:</b>   |                   |
| <b>Rev. No</b>  | 00                                    | <b>Page 6 of 8</b>  |                   |
| <b>Prepared by:</b>   | <b>Reviewed By:</b>                   | <b>Approved By:</b> | <b>Issued By:</b> |

**19. GUARANTEED TECHNICAL PARTICULARS**

| <b>S No</b> | <b>Description</b>  | <b>Units</b> | <b>To be furnished by bidder</b> | <b>Requirement</b> |  |
|-------------|---|--------------|----------------------------------|--------------------|--|
|             |   |              |                                  |                    |  |
| <b>1.</b>   | Material  |              |                                  |                    |  |
| <b>2.</b>   | Anchor Rod  | mm           |                                  |                    |  |
| a           | Nominal Diameter of rod                                     | mm           |                                  |                    |  |
| b           | Length of rod   | mm           |                                  |                    |  |
| <b>3.</b>   | RCC Base Plate  |              |                                  |                    |  |
| a           | Dimension [L x B x Thickness]                               | mm           |                                  |                    |  |
| b           | Rectangular opening at center                               | mm           |                                  |                    |  |
| <b>4.</b>   | Tension Screw   |              |                                  |                    |  |
| a           | Eye Bolt  | mm           |                                  |                    |  |
| b           | Length of the central part                                  | mm           |                                  |                    |  |
| c           | Total length after full tightening of both screw / Eye bolt | mm           |                                  |                    |  |
| d           | Total length after full opening of both screw / Eye bolt    | mm           |                                  |                    |  |
| <b>5.</b>   | MS Angle  | mm           |                                  |                    |  |
| <b>6.</b>   | Stay Collar   | mm           |                                  |                    |  |

**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:

| <b>S. No</b> | <b>Clause No.</b> | <b>Details of deviation with justifications</b> |
|--------------|-------------------|---|
|              |                   |   |

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

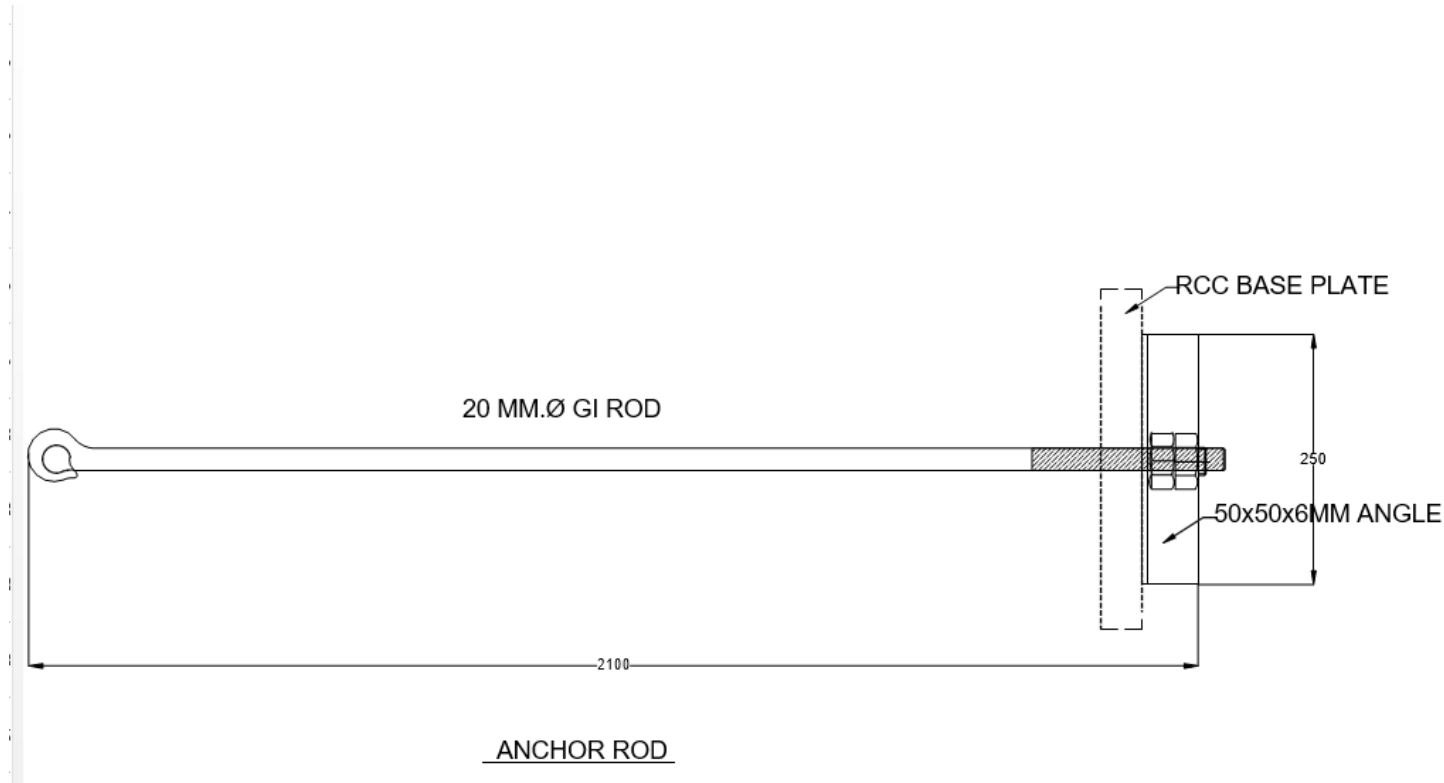
Seal of the Company:

Signature

Designation

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| Initiator |  | Approver |  |
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|---|---------------------------------------|---------------------|-------------------|
| <b>TATA POWER COMPANY ODISHA DISTRIBUTION LIMITED, ODISHA</b> |                                       |                     |                   |
| <b>TECHNICAL SPECIFICATION</b>                                |                                       |                     |                   |
| <b>Doc. Title</b>   | <b>Specifications for HT Stay Set</b> |                     |                   |
| <b>Doc. No</b>  |                                       | <b>Eff. Date:</b>   |                   |
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| <b>Prepared by:</b>   | <b>Reviewed By:</b>                   | <b>Approved By:</b> | <b>Issued By:</b> |



**NOTE:-**

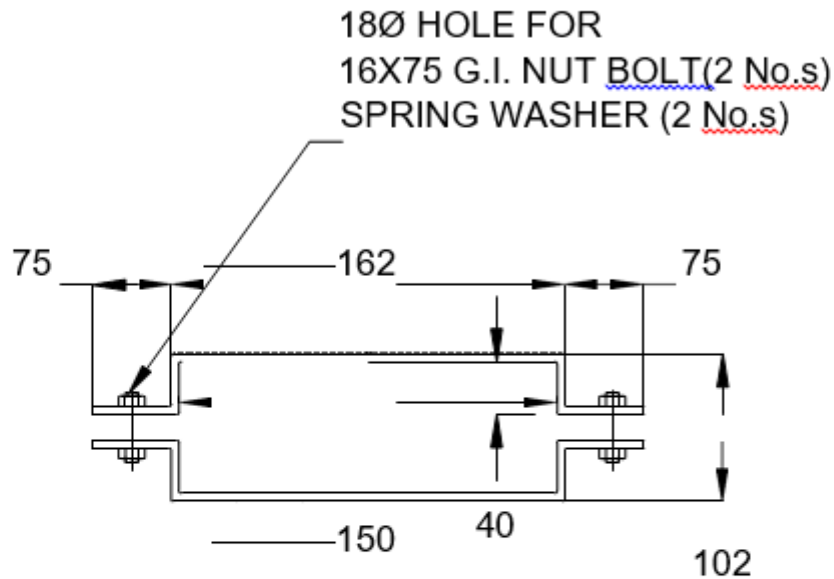
- All dimensions are in mm unless otherwise specified.
- The material shall be used for fabricating anchor rod shall conform to latest IS-2062 & IS-1732.
- The grade of steel shall be E250.
- Hot dip galvanizing shall be done as per latest IS-4759.
- The dimension of the material shall conform to the latest IS-808.
- The dimensional Tolerance shall conform to the latest IS-1852.
- The galvanizing procedure shall conform to the latest IS-2629.
- The testing of galvanizing shall conform to the latest IS-4759&2633.
- The hot dip galvanizing shall be done after the complete fabrication of the material.
- The chemical analysis tests for material shall conform to latest IS-228.
- The mechanical strength tests for material shall conform to latest IS-1608.
- The business associate shall provide the sample at the time of GTP approval.
- The supply of bolt & washer is in Business Associate scope.

**REFERENCE:-**

- IS 2062: Steel for general structural purposes-specification.
- IS 228: Method for chemical analysis of steels.
- IS 1852: Tolerances for rolling and cutting Tolerances for hot rolled steel products.
- IS 808: Dimensions for hot rolled steel beams, Columns, channel and angle sections
- 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 1367: Technical supply conditions for threaded steel nuts, washers, bolts, screws, nuts of product Code C: Hot Dip Galvanised.
- IS 14394: Industrial Nuts of product Code C: 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

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| Initiator |  | Approver |  |
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| TATA POWER COMPANY ODISHA DISTRIBUTION LIMITED, ODISHA |                                |              |            |
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1. All dimensions are in mm unless otherwise specified.
2. The material for collar/bracket shall be used with 508mm (2.36kg/m) Flat.
3. The grade of steel shall be E250 and shall conform to latest IS-2062.
4. Hot dip galvanizing shall be done as per latest IS-4759.
5. The dimension of the material shall conform to the latest IS-808.
6. The dimensional Tolerance shall conform to the latest IS-1852.
7. The galvanizing procedure shall conform to the latest IS-2629.
8. The testing of galvanizing shall conform to the latest IS-4759&2633.
9. The hot dip galvanizing shall be done after the complete fabrication of the material.
10. The chemical analysis tests for material shall conform to latest IS-228.
11. The mechanical strength tests for material shall conform to latest IS-1608.
12. The business associate shall provide the sample at the time of GTP approval.
13. The MS strips shall conform to latest IS 1730.
14. The supply of nut, bolt & washer is in Business Associate scope.

- Old release drawing no. TPO-S-216-S-032-R01 Q&A, 10.01.13.
- IS 2002:2002 for general structural purposes-specification.
- IS 228: Method for chemical analysis of steels.
- IS 1852:2002 for rolling and curing Tolerances for hot rolled steel products.
- IS 808: Dimensions for hot rolled steel channel and angle sections
- IS 4759: Specification for Hot dip zinc coating on structural steel and other allied products.
- IS 1367: General requirements for the supply of metallurgical materials.
- IS 1608: Mechanical testing of metals-Tensile Strength.
- IS 1367: Technical supply conditions for threaded steel bolts.
- IS 14394: Industrial nuts of product: Grade- Hot Dip Galvanized
- IS 2610-1997: Specification for plain washers.
- IS 1736-1989: Steel plates, sheets, strips and flats for structural And general engineering purposes-Dimensions

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| <b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b> |  |
| <b>TECHNICAL SPECIFICATION</b>                 |  |
| <b>Doc. Title</b>                              | <b>Specification for Stay Wire 7/8 SWG</b>     |
| <b>Doc. No</b>                                 | ENG-HV-22                                      |
| <b>Rev. No</b>                                 | 00   |
| <b>Prepared by:</b>                            | Reviewed By:                      Approved By: |
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|           |  |                   |  |
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| Initiator |  | HoG (Engineering) |  |
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### 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 Stay Wire for trouble free and efficient operation.

### 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 / IEC and shall conform to the regulations of the local authorities.

- a) IS 2141 : Specification for Hot Dip Galvanized Stay Strand.
- b) IS 4826 : Specification for hot-dipped galvanized coatings on round steel wires.
- c) IS 2633 : Methods for testing uniformity of coating on zinc coated articles.
- d) IS 6745 : Method for determination of mass of zinc coating on zinc coated iron and steel articles.

### 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following climatic conditions,

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

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

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#### 4.0 GENERAL TECHNICAL REQUIREMENTS

| Sl. No. | Technical Parameter                                  | Unit | Requirement                                |
|---------|--|------|--|
| 1       | Size of Wire   |      | Stay Wire 7/8 SWG                          |
|         | Standard   | mm   | 4 mm                                       |
|         | Min  | mm   | 3.97 mm                                    |
|         | Max  | mm   | 4.06 mm                                    |
| 2       | Diameter of Strand                                   | mm   | 12 mm                                      |
| 3       | Min breaking force of strand                         | KN   | 54.9 KN                                    |
| 4       | Min Tensile strength of single wire before stranding | KN   | 8.80 KN                                    |
| 5       | Lay ratio  |      | 12-18 times of strand dia                  |
| 6       | Weight of Zn coating after strand                    |      | 275 gms/meter <sup>2</sup>                 |
| 7       | No of dips (Uniformity of Zn coating) before Strand  |      | 3 dips of one minute                       |
|         | After strand   |      | 2 dips of one minute & 1 dip of 1/2 minute |
| 8       | Adhesion of Zn coating                               |      | 10 complete turns                          |
| 9       | Min Elongation                                       | %    | 6%   |

#### 5.0 GENERAL CONSTRUCTION

All material shall be as per IS: 2141. Uniform Zinc coating on hot dip galvanized wire to be done as per IS: 4826 for protection from rust. All finished wires shall be well and cleanly drawn to the dimensions specified. The wire shall be sound, free from splits, surface flaws, rough jagged and imperfect edges and other harmful surface defects.

#### 6.0 MARKING

Each coil of wire shall be marked legibly with the finish, size of wire, lot number and year of manufacture. And the unit shall be marked as "PROPERTY OF TPCL, BHUBANESWAR".

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## 7.0 TESTS

All routine, acceptance and type tests of Stay Wire shall be carried out in accordance with the relevant IS 2141 standards. All routine/acceptance tests shall be witnessed by the Purchaser/his authorized representative. Following tests shall be necessarily conducted on the Stay Wire as specified in IS standards.

### TYPE TESTS

- a) Diameter of the wire.
- b) Chemical composition test.
- c) Breaking load of complete strand.
- d) Wrapping test of the wire.
- e) Lay Ratio.
- f) Mass of zinc coating.
- g) Uniformity of zinc coating.
- h) Adhesion of zinc coating.
- i) Elongation test

### ACCEPTANCE TESTS

- a) Diameter of the wire.
- b) Overall diameter of the strand.
- c) Chemical composition test.
- d) Breaking load of complete strand.
- e) Wrapping test of the wire.
- f) Lay Ratio.
- g) Mass of zinc coating.
- h) Uniformity of zinc coating.
- i) Adhesion of zinc coating.
- j) Elongation test

### ROUTINE TESTS

- a. Diameter of the wire.
- b. Overall diameter of the strand.
- c. Chemical composition test.
- d. Breaking load of complete strand.
- e. Wrapping test of the wire.
- f. Lay Ratio.
- g. Mass of zinc coating.
- h. Uniformity of zinc coating.
- i. Adhesion of zinc coating.
- j. Elongation test

## 8.0 TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates of the Stay Wire for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI, ERDA or from any NABL accredited laboratory 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 TPCL.

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### 9.0 PRE DISPATCH INSPECTION

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

Following documents shall be sent along with material:

- a) Test reports
- b) PO copy
- c) MDCC issued by TPCL
- d) Invoice in duplicate
- e) Packing list
- f) Inspection report
- g) Drawings (if applicable) & catalogue
- h) Guarantee / Warrantee card
- i) Delivery Challan
- j) Other Documents (as applicable).

### 10.0 INSPECTION AFTER RECEIPT AT STORES

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

### 11.0 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 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 TPCL.

### 12.0 PACKING

Each coil of wire shall be suitably bound and fastened compactly. Each coil shall be packed by suitable wrapping. The bidder shall ensure that all the Stay Wire shall be adequately protected and specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

### 13.0 TENDER SAMPLE

Bidder shall submit the sample of material with the offer.

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#### 14.0 QUALITY CONTROL

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

#### 15.0 MINIMUM TESTING FACILITIES

Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards. In case of supply by the channel partner, the manufacturer shall have the in house testing facilities to carry out the routine and acceptance tests.

#### 16.0 MANUFACTURING ACTIVITIES

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

#### 17.0 SPARES, ACCESSORIES AND TOOLS

Not applicable

#### 18.0 DRAWINGS AND DOCUMENTS

Following documents shall be prepared based on TPCL 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 TPCL.

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

| S.No | Description                                    | For Approval | For Review Information | Final Submission |
|------|--|--------------|------------------------|------------------|
| 1    | Technical Parameters                           | √            |                        | √                |
| 2    | Manual/Catalogues/drawings for all components. |              | √                      |                  |
| 3    | Technical details of Stay Wire.                |              | √                      | √                |

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|   |  |   |   |   |
|---|--|---|---|---|
| 4 | Installation Instructions                      |   | √ | √ |
| 5 | Instructions for use                           |   | √ | √ |
| 7 | Transport/shipping dimensions                  |   | √ | √ |
| 8 | QA & QC Plan                                   | √ | √ | √ |
| 9 | Routine, Acceptance and Type test Certificates | √ | √ | √ |

All the Documents and Drawings shall be in English Language.

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

#### 19.0 GUARANTEED TECHNICAL PARTICULARS

| Sl. No. | Technical Parameter                                  | Unit | Requirement               |
|---------|--|------|---------------------------|
| 1       | Size of Wire   |      | To be submitted by bidder |
|         | Standard   | mm   |                           |
|         | Min  | mm   |                           |
|         | Max  | mm   |                           |
| 2       | Diameter of Strand                                   | mm   |                           |
| 3       | Min breaking force of strand                         | KN   |                           |
| 4       | Min Tensile strength of single wire before stranding | KN   |                           |
| 5       | Lay ratio  |      |                           |
| 6       | Weight of Zn coating after strand                    |      |                           |
| 7       | No of dips (Uniformity of Zn coating) before Strand  |      |                           |
|         | After strand   |      |                           |
| 8       | Adhesion of Zn coating                               |      |                           |
| 9       | Min Elongation                                       | %    |                           |

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| Initiator |  | HoG (Engineering) |  |
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|                     | <b>TECHNICAL SPECIFICATION</b>                 |                     |                   |
| <b>Doc. Title</b>   | <b>Specification for Stay Wire 7/8 SWG</b>     |                     |                   |
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| <b>Prepared by:</b> | <b>Reviewed By:</b>                            | <b>Approved By:</b> | <b>Issued By:</b> |

**20.0**

**SCHEDULE OF DEVIATIONS**

**(TO BE ENCLOSED WITH TECHNICAL BID)**

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

| <b>S. No</b> | <b>Clause No.</b> | <b>Details of deviation with justifications</b> |
|--------------|-------------------|---|
|              |                   |   |

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

Seal of the Company:

Signature

Designation

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| <b>Prepared by:</b>                            | <b>Reviewed By:</b>                                       | <b>Approved By:</b> | <b>Issued By:</b> |

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**1.0 SCOPE**

|           |  |                   |  |
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| Initiator |  | HoG (Engineering) |  |
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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 Stay Wire for trouble free and efficient operation.

## 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 / IEC and shall conform to the regulations of the local authorities.

- a) IS 2141 : Specification for Hot Dip Galvanized Stay Strand.
- b) IS 4826 : Specification for hot-dipped galvanized coatings on round steel wires.
- c) IS 2633 : Methods for testing uniformity of coating on zinc coated articles.
- d) IS 6745 : Method for determination of mass of zinc coating on zinc coated iron and steel articles.

## 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following climatic conditions,

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

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

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#### 4.0 GENERAL TECHNICAL REQUIREMENTS

| Sl. No. | Technical Parameter                                    | Unit                   | Requirement                |                            |
|---------|--|------------------------|----------------------------|----------------------------|
|         |  |                        | Stay Wire 7/10 SWG         | Stay Wire 7/8 SWG          |
| 1       | Size of Wire   |                        |                            |                            |
|         | Standard   | mm                     | 3.15                       | 4                          |
|         | Min  | mm                     | 3.12                       | 3.97                       |
|         | Max  | mm                     | 3.21                       | 4.06                       |
|         | Tolerance of diameter                                  | mm                     | + 0.060                    | - 0.030                    |
| 2       | Diameter of Strand, Nominal                            | mm                     | 9.45                       | 12                         |
| 3       | Tolerance of diameter                                  | mm                     | + 0.060                    | - 0.030                    |
| 4       | Min breaking force of strand                           | KN                     | 34                         | 54.9                       |
| 5       | Minimum Breaking Force of Single Wire Before Stranding | KN                     | 5.46                       | 8.80                       |
| 6       | Lay ratio  |                        | 12-18 times of strand dia. | 12-18 times of strand dia. |
| 7       | Weight of Zn coating after strand                      | gms/meter <sup>2</sup> | 250                        | 275                        |
| 8       | Adhesion of Zn coating                                 |                        | 10 complete turns          | 10 complete turns          |
| 9       | Min Elongation   | %                      | 6                          | 6                          |

#### 5.0 GENERAL CONSTRUCTION

The wires shall be cold drawn from steel made by open hearth basic oxygen or electric furnace process and of such quality that when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wire shall be of uniform quality of zinc coating. The wire shall not contain sulphur and phosphorus exceeding 0.060 percent each. All material shall be as per IS: 2141. The wires shall be so stranded together that when an evenly distributed pull is applied at the end of the completed strand, each wire shall take an equal share of pull. Uniformity of zinc coating shall be determined according to IS: 2633. The wire shall be circular and free from scale, irregularities, imperfections, flaws, splits, and other defects, which may affect the quality of wire. The stay wire are hard and the zinc coating of wire shall be heavily coated as conform to IS 4826. All finished wires shall be well and cleanly drawn to the dimensions specified.

#### 6.0 MARKING

NA.

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## 7.0 TESTS

All routine, acceptance and type tests of Stay Wire shall be carried out in accordance with the relevant IS 2141 standards. All routine/acceptance tests shall be witnessed by the Purchaser/his authorized representative. Following tests shall be necessarily conducted on the Stay Wire as specified in IS standards.

### TYPE TESTS

- a) Diameter of the wire.
- b) Chemical composition test.
- c) Breaking load of complete strand.
- d) Wrapping test of the wire.
- e) Lay Ratio.
- f) Mass of zinc coating.
- g) Uniformity of zinc coating.
- h) Adhesion of zinc coating.
- i) Elongation test

### ACCEPTANCE TESTS

- a) Diameter of the wire.
- b) Overall diameter of the strand.
- c) Chemical composition test.
- d) Breaking load of complete strand.
- e) Wrapping test of the wire.
- f) Lay Ratio.
- g) Mass of zinc coating.
- h) Uniformity of zinc coating.
- i) Adhesion of zinc coating.
- j) Elongation test

### ROUTINE TESTS

- a. Diameter of the wire.
- b. Overall diameter of the strand.
- c. Chemical composition test.
- d. Breaking load of complete strand.
- e. Wrapping test of the wire.
- f. Lay Ratio.
- g. Mass of zinc coating.
- h. Uniformity of zinc coating.
- i. Adhesion of zinc coating.
- j. Elongation test

## 8.0 TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates of the Stay Wire for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI, ERDA or from any NABL accredited laboratory 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 TPCL.

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### 9.0 PRE DISPATCH INSPECTION

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

Following documents shall be sent along with material:

- a) Test reports
- b) PO copy
- c) MDCC issued by TPCL
- d) Invoice in duplicate
- e) Packing list
- f) Inspection report
- g) Drawings (if applicable) & catalogue
- h) Guarantee / Warrantee card
- i) Delivery Challan
- j) Other Documents (as applicable).

### 10.0 INSPECTION AFTER RECEIPT AT STORES

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

### 11.0 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 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 TPCL.

### 12.0 PACKING

Each coil of wire shall be suitably bound and fastened compactly. Each coil shall be packed by suitable wrapping. The galvanized steel stay strand protected with paper/polythene/HDPE and outside wooden lagging on drum/reel. The bidder shall ensure that all the Stay Wire shall be adequately protected and specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

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### 13.0 TENDER SAMPLE

Bidder shall submit the sample of material with the offer.

### 14.0 QUALITY CONTROL

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

### 15.0 MINIMUM TESTING FACILITIES

Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards. In case of supply by the channel partner, the manufacturer shall have the in house testing facilities to carry out the routine and acceptance tests.

### 16.0 MANUFACTURING ACTIVITIES

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

### 17.0 SPARES, ACCESSORIES AND TOOLS

Not applicable

### 18.0 DRAWINGS AND DOCUMENTS

Following documents shall be prepared based on TPCL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

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

After the 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 TPCL.

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

| S.No | Description | For Approval | For Review Information | Final Submission |
|------|-------------|--------------|------------------------|------------------|
|------|-------------|--------------|------------------------|------------------|

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|   |  |   |   |   |
|---|--|---|---|---|
| 1 | Technical Parameters                           | √ |   | √ |
| 2 | Manual/Catalogues/drawings for all components. |   | √ |   |
| 3 | Technical details of Stay Wire.                |   | √ | √ |
| 4 | Installation Instructions                      |   | √ | √ |
| 5 | Instructions for use                           |   | √ | √ |
| 7 | Transport/shipping dimensions                  |   | √ | √ |
| 8 | QA & QC Plan                                   | √ | √ | √ |
| 9 | Routine, Acceptance and Type test Certificates | √ | √ | √ |

All the Documents and Drawings shall be in English Language.

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

#### 19.0 GUARANTEED TECHNICAL PARTICULARS

| Sl. No. | Technical Parameter                                    | Unit                   | Requirement               |                   |
|---------|--|------------------------|---------------------------|-------------------|
|         |  |                        | Stay Wire 7/10 SWG        | Stay Wire 7/8 SWG |
| 1       | Size of Wire   |                        |                           |                   |
|         | Standard   | mm                     | To be submitted by bidder |                   |
|         | Min  | mm                     |                           |                   |
|         | Max  | mm                     |                           |                   |
| 2       | Diameter of Strand, Nominal                            | mm                     |                           |                   |
| 3       | Tolerance of diameter                                  | mm                     |                           |                   |
| 4       | Min breaking force of strand                           | KN                     |                           |                   |
| 5       | Minimum Breaking Force of Single Wire Before Stranding | KN                     |                           |                   |
| 6       | Lay ratio  |                        |                           |                   |
| 7       | Weight of Zn coating after strand                      | gms/meter <sup>2</sup> |                           |                   |
| 8       | Adhesion of Zn coating                                 |                        |                           |                   |
| 9       | Min Elongation   | %                      |                           |                   |

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**20.0**

**SCHEDULE OF DEVIATIONS**

**(TO BE ENCLOSED WITH TECHNICAL BID)**

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

| <b>S. No</b> | <b>Clause No.</b> | <b>Details of deviation with justifications</b> |
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We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature

Designation

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| Initiator |  | HoG (Engineering) |  |
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|                     | <b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>                  |                              |                   |
|                     | <b>TECHNICAL SPECIFICATION</b>                                  |                              |                   |
| <b>Doc. Title</b>   | <b>SPECIFICATION FOR BOLT, NUT , WASHERS AND SPRING WASHERS</b> |                              |                   |
| <b>Doc. No</b>      | ENG-C-04  | <b>Eff. Date: 01.11.2012</b> |                   |
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| Initiator |  | HOG<br>(ENGINEERING) |  |
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|  |   | <b>Issued By:</b>            |

**1. SCOPE:**

This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding and unloading at TPDDL stores/site of M.S. Bolt, Nuts, Washers and spring washers for 66kV, 33 kV & 11 kV distribution network operation & maintenance work.

**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 Statutory authorities:

- IS 1367: Technical supply condition for threaded steel fasteners.
- IS 12427: Fasteners – Threaded steel fasteners – Hexagonal head transmission tower bolts.
- IS 14394: Industrial fasteners –Nuts of product grade C - Hot dip Galvanized.
- IS 3063: Fasteners-Single Coil Rectangular section lock washers.
- IS 2629-1996: recommended practice for hot-dip galvanizing of iron and steel.
- IS 2016-1997: Specification for plain washers.

**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

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

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#### 4. GENERAL TECHNICAL REQUIREMENTS

| S.N.   | Description   | Units     | Requirement                   |
|--|---|-----------|-------------------------------|
| <b>Mechanical Properties of Hexagonal Bolts as per (IS:1367 Part-III/1979)</b> |   |           |                               |
| 1  | Tensile Strength (To be arranged on size 150 mm & above) Min. | N/sq. mm. | 400                           |
| 2  | Stress under proof load Min.                                  | N/sq. mm. | 225                           |
| 3  | Brinell Hardness  |           | HB 114(min.) to 238 max.      |
| 4  | Rockwell hardness   |           | HRB-Max. 67(min) to 99.5 max. |
| 5  | Vickers hardness  |           | HV 120 (min) to 250 max.      |
| 6  | Elongation after fracture                                     | %         | 3 Min. 22%                    |
| 7  | Yield Stress ,min.  | N/sq. mm  | 340                           |
| 8  | Strength under wedge loading min.                             | N/sq. mm. | 400                           |
| 9  | Impact Strength, min.   |           | 25                            |
| 10   | Head soundness  |           | No fracture                   |
| <b>Hexagonal Nuts(IS:1367 Part-IV/1980 Table 4)</b>                            |   |           |                               |
| 11   | Proof stress min.   | N/sq. mm. | 610                           |
| 12   | Vickers Hardness  |           | HV-Min. 130 HV-Max. 302       |

#### 5. GENERAL CONSTRUCTIONS FOR NUTS & BOLTS

The Nut & bolt are made of low or medium carbon steel, the quality of zinc, bath temperature and the process of galvanizing in general shall conform to IS 2629-1996. Galvanizing shall be carried out by hot dip process only. The galvanizing process shall provide for substantial diffusion of hydrogen. Bolts & Nuts shall be taken at a temperature of 200 degree. C for a period of 30 minutes. The fasteners after galvanizing shall meet the physical properties of the relevant standards. The minimum average thickness of coating shall be 54µm and mass shall be 375 gm/sq. meter. However minimum individual thickness of coating shall be 43 µm and mass shall be 300 gm/sq. meter.

Fasteners with Internal Threads- Prior to galvanizing and subsequent tapping the dimensions of fasteners with internal threads shall conform to the relevant standards. Internal threads shall be tapped over-size after galvanizing and they shall be oiled for corrosion protection.

Fasteners with External Threads- Prior to galvanizing, the dimensions of fasteners with external threads shall conform to the relevant standards including thread sizes. The thickness of galvanized coating on external threads shall be so controlled in the galvanizing process that galvanized fasteners with external threads can be assembled by hand with internally threaded fasteners. Galvanized external threads shall not be recut.

Allowances for Internal threads to Accommodate Galvanized External threads:

|                                  |                         |
|----------------------------------|-------------------------|
| Nominal size of Internal Threads | Diameter Allowance (mm) |
| Below M16                        | + 0.40                  |

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|                                      |        |
|--------------------------------------|--------|
| M16 to M22                           | + 0.50 |
| Over M22 and up to and including M36 | + 0.65 |

All fasteners, spring washers and pack washers shall be suitable as per IS: 1363.

The length of thread of Hexagonal bolts of length more than 100 mm shall be as per IS 1363 (Part-2) 2002 with amendments up to date.

Hexagonal bolts of length less than 100 mm shall be full threaded as per IS 1363 (Part-3)/2002 with amendments up to date.

The length of Hexagonal bolt & Nuts shall be as per IS 1363(Part-3)/2002 with amendments up to date.

The design of material shall be suitable for the climatic condition as stated above and should be galvanized properly so that no rust can be found in any part of fasteners.

Chemical compositions for Bolts & Nuts are in below:

For Bolts:

Carbon: 0.55% (max.)

Phosphorous: 0.05%.

Sulphur: 0.06%

For Nuts:

Carbon: 0.50% (max.)

Phosphorous: 0.12%.

Sulphur: 0.34%.

#### **GENERAL CONSTRUCTIONS FOR WASHER**

A washer is a thin plate (typically disk-shaped) with a hole (typically in the middle) that is normally used to distribute the load of a threaded fastener. Washers have an outer diameter (OD) about twice the width of the inner diameter (ID).

Washers will be of hardened steel to prevent the loss of pre-load due to Brinelling after the torque is applied.

Washers shall be made of steel or aluminium as per requirement. The washers shall be free from cracks, burrs, pits and other defects. The holes shall be reasonably concentric with the outer periphery; all sharp edges shall be removed.

Two type of washers used in TPCL Electricity network:

- 1) Plain Washers.
- 2) Spring washers.



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**Plain Washer:**

A plain washer (or 'flat washer') is a flat annulus or ring, often of metal, used to spread the load of a screwed fastening. Additionally, a plain washer may be used when the hole is a larger diameter than the fixing nut.

Plain washers of the following types:

- a) Machined washers, for precision and semi-precision grade of general purpose bolts and screws, in the diameter range 1.7 to 155 mm.
- b) Punched washers, type A, for black grade general purpose bolts and screws, in the diameter range 1.8 to 52 mm and
- c) Punched washers type B, for slotted head screws in the diameter range 1.8 to 22 mm.

The diameter for machined washers, punched washers, types A & B, shall be as per IS: 2016.

**Spring Washer:**

Spring washers, sometimes called disc springs, are a subtype of washers. They lend their mechanical capabilities to the unique profile of the material: when subject to a load, the irregularities of the washer compress with a proportionate resistance to return to their predeflected shape. Spring washers are employed in applications where assemblies need a part to take up play, eliminate rattle, maintain assembly tension, compensate for expansion or contraction in materials after assembly, or to absorb intermittent shock loads and provide a controlled reaction under dynamic loads.

**Types of Spring Washer:**

There are two types of spring washers which we use in TPCL Electricity Distribution Network:

**Belleville washers** can support high loads with small deflections. The load and deflection capability is dependent on height/thickness ratio. These are common in thermal expansion applications.

**Crescent washer** is meant for lighter loads and produces a small deflection. There is a uniform spring rate throughout the washer's deflection. This is used in flexible, load-cycling applications..

**Wave washers** offer moderate load capacity and deflection, and are typically used as cushions or spacers. These have multiple waves within the washer.

**A diagram of Spring washer:**



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## 6. MARKING

The body of the device shall be appropriately embossed/marked with “**PROPERTY OF TPCL**” such that it is permanent and does not harm the body of the device.

## 7. TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS. All Routine /acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. The device shall be calibrated against standards which are traceable to National / International standards.

### TYPE TEST:

The following tests shall constitute the type tests and shall be carried out as per relevant IS: 1367 Part-III (Latest amended).

- 1) Chemical Composition Test.
- 2) Test for Mechanical Properties for Hexagonal Bolts
  - Tensile strength.
  - Yield stress.
  - Stress under proof load
  - Brinell Hardness
  - Rockwell Hardness
  - Vickers Hardness
  - Elongation after fracture
  - Strength under Wedge loading
  - Head soundness
- 3) Test for Mechanical Properties for hexagonal Nuts.
  - Proof Stress.
  - Vickers Hardness.

### ROUTINE/ACCEPTANCE TEST:

The following tests shall be got conducted in presence of purchaser representative as per relevant IS: 1367 Part-III/1991 with latest amendment for bolts and IS: 1367 Part-VI/1980 with latest amendment for nuts on the samples taken from the offered lot material for the purpose of acceptance of that lot of material.

- 1) Chemical Composition Test.
- 2) Test for Mechanical Properties for Hexagonal Bolts
  - Tensile strength.
  - Yield stress.
  - Stress under proof load
  - Brinell Hardness
  - Rockwell Hardness
  - Vickers Hardness
  - Elongation after fracture
  - Strength under Wedge loading
  - Head soundness

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3) Test for Mechanical Properties for hexagonal Nuts.

- Proof Stress.
- Vickers Hardness.

#### 8. TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates of the individual component for the tests as mentioned as above as per the corresponding standards, if asked for by TPCL. All the tests shall be conducted by NABL accredited Lab 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 TPCL.

#### 9. PRE DISPATCH INSPECTION

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

Following documents shall be sent along with material

- a) Test reports
- b) MDCC issued by TPCL
- c) TPCL 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 TPCL, Bhubaneswar, 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 each Contracts and Engineering department.

#### 11. GUARANTEE

Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of 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.

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**12. PACKING**

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

**13. TENDER SAMPLE**

Bidder should submit 3 Nos. (Three) sample along with offer.

**14. QUALITY CONTROL**

The bidder shall have a prove track of not less than 10 years in Ultrasonic device manufacturing and servicing in 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.

**15. MINIMUM TESTING FACILITIES**

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

**16. MANUFACTURING ACTIVITIES**

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

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

**18. DRAWINGS AND DOCUMENTS**

Following documents shall be prepared based on TPCL specifications and statutory requirements with complete BOM and shall be submitted with the bid:

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- a) Completely filled in Technical Particulars.
- b) General description of the equipment and all components including brochures.
- c) Bill of Material
- d) Type test Certificates
- e) 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.

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

| S. No | Description   | For Approval | For Review Information | Final Submission |
|-------|---|--------------|------------------------|------------------|
| 1     | Technical Parameters                                      | √            |                        | √                |
| 2     | Manual/Catalogues/drawings for all components.            |              | √                      |                  |
| 3     | Technical details and test certificates of 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.

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

#### 19. GUARANTEED TECHNICAL PARTICULARS

| S.N.   | Description | Units | Requirement |
|--|-------------|-------|-------------|
| <b>Mechanical Properties of Hexagonal Bolts as per (IS:1367 Part-III/1979)</b> |             |       |             |

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|   |   |           |                       |
|---|---|-----------|-----------------------|
| 1   | Tensile Strength (To be arranged on size 150 mm & above) Min. | N/sq. mm. | Bidder should provide |
| 2   | Stress under proof load Min.                                  | N/sq. mm. |                       |
| 3   | Brinell Hardness  |           |                       |
| 4   | Rockwell hardness   |           |                       |
| 5   | Vickers hardness  |           |                       |
| 6   | Elongation after fracture                                     | %         |                       |
| 7   | Yield Stress ,min.  | N/sq. mm  |                       |
| 8   | Strength under wedge loading min.                             | N/sq. mm. |                       |
| 9   | Impact Strength, min.   |           |                       |
| 10  | Head soundness  |           |                       |
| <b>Hexagonal Nuts(IS:1367 Part-IV/1980 Table 4)</b> |   |           |                       |
| 11  | Proof stress min.   | N/sq. mm. | Bidder should provide |
| 12  | Vickers Hardness  |           |                       |

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:

|           |  |                      |  |
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| 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

|           |  |                      |  |
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|---|---|---|
| TP Central Odisha<br>Distribution Limited | <br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | Specification for 11KV / 33KV<br>LA with Porcelain Polymer<br>insulator |
| NEG-SPEC-11                               |   | Date of Issue: 05/08/2020   |

**Technical Specification**  
**For**  
**11KV / 33KV LA with Porcelain Polymer insulator**

**TP Central Odisha Distribution Limited.**  
**Network Engineering Group**  
**2<sup>nd</sup> Floor, IDCO Tower**  
**Janpath, Bhubaneswar- 751022**

| Rev No. | Description   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|---|--------------------|-------------------|------------------------------|
| R0      | Specification for 11KV / 33KV LA with Porcelain Polymer insulator | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |



|   |   |  |
|---|---|--|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b> | <b>Specification for 11KV / 33KV<br/>LA with Porcelain Polymer<br/>insulator</b> |
| <b>NEG-SPEC-11</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b>   | <b>Date of Issue: 05/08/2020</b>   |

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| R0      | Specification for 11KV / 33KV LA with Porcelain Polymer insulator | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

|   |   |  |
|---|---|--|
| <b>TP Central Odisha<br/>Distribution Limited</b> | <b>TPCODL</b>                                 | <b>Specification for 11KV / 33KV<br/>LA with Porcelain Polymer<br/>insulator</b> |
| <b>NEG-SPEC-11</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b> | <b>Date of Issue: 05/08/2020</b>   |

| <b>1.0</b>                    | <b>SCOPE</b>   | <ol style="list-style-type: none"> <li>1. This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading of 9 kV,10kA, DH class and SM class Lightning Arrester at site/stores complete with all accessories for efficient and trouble free-operation. The specific requirements are covered in the enclosed technical data sheet.</li> <li>2. The material 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</li> <li>3. Such of the parts that may have not been specifically included, but otherwise form part of the Lightning arrester as per standard trade and/or professional practice and/or are 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. notwithstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.</li> </ol>   |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
|-------------------------------|--|--|----------------------------|-------|-----------------------|---|------------------------------|---|------------------------------|--|------------------------------|---|-------------------------------|--|-------------------------|---|
| <b>2.0</b>                    | <b>APPLICABLE STANDARDS</b>  | <p>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 &amp; other relevant standards for components, BEE &amp; CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:</p> <table border="1"> <thead> <tr> <th>Indian Standards ( IS /IEC</th> <th>Title</th> </tr> </thead> <tbody> <tr> <td>IS-3070:1993 (Part-3)</td> <td>Specification for Lightning arresters for alternating current system.</td> </tr> <tr> <td>IS-4759:1996 Reaffirmed 2006</td> <td>Hot dip-zinc-coating on structural steel and other allied products.</td> </tr> <tr> <td>IS-2633:1986 Reaffirmed 2006</td> <td>Method for testing uniformity of coating on zinc coated particles.</td> </tr> <tr> <td>IS-6209:1982 Reaffirmed 2006</td> <td>Method of Partial Discharge Measurement</td> </tr> <tr> <td>IS:6745:19824 Reaffirmed 2006</td> <td>Method for determination of mass of zinc coating on zinc coated iron and steel articles.</td> </tr> <tr> <td>IEC 60099-4 :2014 ed 03</td> <td>Surge arrester without gap for AC System.</td> </tr> </tbody> </table> <p><i>*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.</i></p> | Indian Standards ( IS /IEC | Title | IS-3070:1993 (Part-3) | Specification for Lightning arresters for alternating current system. | IS-4759:1996 Reaffirmed 2006 | Hot dip-zinc-coating on structural steel and other allied products. | IS-2633:1986 Reaffirmed 2006 | Method for testing uniformity of coating on zinc coated particles. | IS-6209:1982 Reaffirmed 2006 | Method of Partial Discharge Measurement | IS:6745:19824 Reaffirmed 2006 | Method for determination of mass of zinc coating on zinc coated iron and steel articles. | IEC 60099-4 :2014 ed 03 | Surge arrester without gap for AC System. |
| Indian Standards ( IS /IEC    | Title  |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IS-3070:1993 (Part-3)         | Specification for Lightning arresters for alternating current system.                    |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IS-4759:1996 Reaffirmed 2006  | Hot dip-zinc-coating on structural steel and other allied products.                      |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IS-2633:1986 Reaffirmed 2006  | Method for testing uniformity of coating on zinc coated particles.                       |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IS-6209:1982 Reaffirmed 2006  | Method of Partial Discharge Measurement  |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IS:6745:19824 Reaffirmed 2006 | Method for determination of mass of zinc coating on zinc coated iron and steel articles. |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |
| IEC 60099-4 :2014 ed 03       | Surge arrester without gap for AC System.  |  |                            |       |                       |   |                              |   |                              |  |                              |   |                               |  |                         |   |


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| <b>3.0</b> | <b>CLIMATIC<br/>CONDITIONS OF<br/>THE<br/>INSTALLATION</b> | <p>The material shall be suitable for following climatic conditions,</p> <ol style="list-style-type: none"> <li>1. Maximum altitude above sea level 1,000m</li> <li>2. Maximum ambient air temperature 50°C</li> <li>3. Maximum daily average ambient air temperature <b>35°C</b></li> <li>4. Minimum ambient air temperature 0°C</li> <li>5. Maximum relative humidity 95%</li> <li>6. Average number of thunderstorm days per annum (isokeraunic level) <b>70</b></li> <li>7. Average number of rainy days per annum <b>120</b></li> <li>8. Average annual rainfall <b>150cm</b></li> <li>9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g</li> <li>10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)</li> <li>11. Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.</li> </ol> <p>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.</p> <p>Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere</p> <p>The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p> |
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| <b>4.0 GENERAL TECHNICAL REQUIREMENTS</b> |   |   |  |
|---|---|---|--|
| S No                                      | Description   | Requirements for 9kV 10kA Distribution Class (DH)   | Requirements for 9kV 10kA Station Class (SM) |
| 1   | Installation  | Outdoor   | Outdoor                                      |
| 2   | Type  | Metal Oxide gapless with adhesive coated single wrap type / nylon direct injection moulding | Metal Oxide gapless cage type                |
| 3   | Housing Material  | Injection moulded silicone rubber   | Injection moulded silicone rubber            |
| 4   | Service Voltage   | 11 kV   | 11 kV  |
| 5   | Rated Voltage   | 12 kV (for 9kV LA)  | 12 kV (for 9kV LA)                           |
| 6   | Rated Frequency   | 50 Hz   | 50 Hz  |
| 7   | Maximum Continuous Operating Voltage (MCOV), Uc             | <b>7.2 kV</b> (rms)   | 7.2 kV (rms)                                 |
| 8   | Arrester Rating Ur  | 9 kV (rms)  | 9 kV (rms)                                   |
| 9   | Nominal Discharge Current In                                | <b>10 kA</b>  | 10 kA  |
| 10  | <b>Distribution Class</b>                                   | <b>Station Class -DH</b>  | <b>Station Class- SM</b>                     |
| 11  | <b>Repetitive Charge transfer withstand (Coulombs ) Qrs</b> | <b>&gt;0.4 C</b>  | <b>&gt;1.6 C</b>                             |
| 12  | <b>Thermal Energy withstand rating</b>                      | <b>Qth (C)</b>  | <b>&gt;1.1 C</b>                             |
|   |   | <b>Wth (kJ/kV)</b>  | <b>-</b>                                     |
|   |   |   | <b>&gt; 7 KJ/kV Ur (2 shots)</b>             |

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| 13          | Insulation Voltage Withstand on Arrester Housing                      |  |  |
| 13.1        | Power Frequency Voltage (Dry/Wet) for one minute.                     | 28 kV (rms)  | 28 kV (rms)  |
| 13.2        | Lightning Impulse Voltage kV Peak                                     | 75kV (Peak)  | 75kV (Peak)  |
| 14          | Rated Short Circuit Current   | 16KA or better   | 16kA or better   |
| 15          | High Current impulse Operating Duty (4/10 $\mu$ s impulse wave) (kAp) | <b>100 (kAp)</b>   | <b>100 (kAp)</b>   |
| 16          | Partial Discharge at 1.05 times M.C.O.V                               | <10 pC   | <10 pC   |
| 15          | Disconnecter  | As per IEC 60099 ed 03   | As per IEC 60099 ed 03   |
| <b>15.1</b> | <b>Disconnecter connecting lead</b>                                   | <b>Insulated flexible tinned plated copper braid with lugs</b> | <b>Insulated flexible tinned plated copper braid with lugs</b> |
| <b>15.2</b> | <b>Size of Insulated Tinned copper braid</b>                          | <b>25 sqmm</b>   | <b>25 sqmm</b>   |
| <b>15.3</b> | <b>Length of Insulated Tinned copper braid</b>                        | <b>300 mm</b>  | <b>300 mm</b>  |
| 16          | <b>Material of Insulating Bracket</b>                                 | <b>UV resistant Fire retardant DMC</b>                         | <b>UV resistant Fire retardant DMC</b>                         |
| 17          | <b>Material of End fittings</b>                                       | <b>Machined / pressure die casted Aluminium</b>                | <b>Machined / pressure die casted Aluminium</b>                |
| 18          | Pull Strength (Min.)  | 1000N  | 1000N  |
| 19          | Cantilever Strength (Min.)  | 12 KGM   | 12 KGM   |
| 20          | Total creepage length of the arrester (Min.)                          | 400mm  | 500mm  |
| 21          | Stack Height  | To be submitted by bidder                                      | To be submitted by bidder                                      |
| 22          | Rating of individual ZnO blocks used for assembly                     | 3kV /4.5kV   | 3kV/ 4.5kV   |
| 23          | <b>Temporary Over Voltage rating (TOV) kVp</b>                        | <b>Bidders to submit the offered product values</b>            | <b>Bidders to submit the offered product values</b>            |
| 23.1        | <b>1Sec</b>   | <b>Min. 12kV</b>   | <b>Min. 12kV</b>   |
| 23.2        | <b>10 Sec</b>   | <b>Min. 12kV</b>   | <b>Min. 10kV</b>   |
| 23.3        | <b>100Sec</b>   | <b>Min. 11kV</b>   | <b>Min. 9.5kV</b>  |
| 24          | Maximum Residual Voltage during impulse discharge of 8/20microsec.    | Desired Maximum Values   | Desired Maximum Values   |
| 24.1        | <b>5kAp</b>   | <b>28 kVpeak</b>   | <b>26kVpeak</b>  |
| 24.2        | <b>10kAp</b>  | <b>28 kVpeak</b>   | <b>28kVpeak</b>  |
| 25          | Max Steep lightning current impulse 1/20 $\mu$ s residual voltage     | 40 kVpeak  | 33kVpeak   |
| 26          | <b>Material of Insulating terminal cap</b>                            | <b>Polyolefin</b>  | <b>Polyolefin</b>  |
| 27          | <b>Material of Nut Bolt washers</b>                                   | <b>Stainless Steel</b>   | <b>Stainless Steel</b>   |
| 28          | Current at MCOV   |  |  |
| 28.1        | a. Resistive Current  | Bidders to submit  | Bidders to submit  |
| 28.2        | b. Capacitive Current   | Bidders to submit  | Bidders to submit  |


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| 29 | The bolt grade | All hardware bolt shall be of 8.8 grade | All hardware bolt shall be of 8.8 grade |
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| 5.0 | <b>GENERAL CONSTRUCTION</b> | <ol style="list-style-type: none"> <li>Lightning arresters shall be designed with gapless metal oxide elements with silicon housing suitable for operation under the system conditions specified.</li> <li>Arresters shall be completely moulded units with <i>absolutely no air volume inside</i>, suitable for mounting on bracket. <i>Arresters of tubular construction i.e arresters assembled in hollow core insulators with enclosed air volume are not acceptable</i></li> <li>The end fittings shall be non-magnetic and of corrosion proof material.</li> <li>The end fittings used in polymer arrester shall be made from aluminium through machining process/pressure die-casting process. Sand casted and gravity casted end fittings are not acceptable.</li> <li>MOV blocks shall have full metallization to have full face contact and to reduce contact resistance between adjacent discs.</li> <li>Each unit of arrester assembly shall be hermetically sealed, leak tested and protected against ingress of moisture.</li> <li>The seal shall be properly designed and tested for operation under extreme weather conditions.</li> <li>Lightning arrester construction shall be suitable to withstand Seismic Loading, Short Circuit Forces and wind load and the force exerted on the arrester base and to the terminal imposed by the line conductor.</li> </ol>  |
| 5.1 | <b>ASSEMBLY</b>             | <ol style="list-style-type: none"> <li>Lightning arrester shall be supplied along with disconnecter, insulating bracket, Insulating terminal Cap, disconnecter, Insulated tinned copper braid and necessary hard-wares.</li> <li>The Assembly consists of stack of nonlinear Metal Oxide (ZnO) elements with highly non-linear voltage current characteristics, connected in series.</li> <li>All the contact surfaces of metal oxide elements and Aluminium blocks must be smooth to have uniform contact surface.</li> <li>Housing shall be made of Silicon rubber via injection molding to provide thermal dissipation of heat generated in the metal oxide elements during overvoltage and line discharge.</li> <li>Polymeric housing shall be free from air bubble, flaws affecting the mechanical and electrical strength of the arrester.</li> <li>Housing shall be capable to withstand the desired pollution stresses without flashover.</li> <li>The polymer material used for the arrester housing must be tracking and erosion resistant, stabilized against UV radiation.</li> <li>All metal parts shall be of non-rusting and non-corroding metal.</li> <li>The arrester disconnecter shall be suitable for screwing directly to L.A with terminal of M10.</li> <li>Stainless Steel Bolts, Nuts, washers shall be provided.</li> <li>All similar parts, particularly removable ones, shall be interchangeable.</li> <li>The arrester shall have thermal stability to withstand the heat generated from the ZnO element due to continuous operating voltage and surges.</li> <li>The 9kV 10kA station class Lightning Arrester shall have L-shaped terminal</li> </ol> |

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|            |                               | clamp suitable for conductor size of 9mm-16mm diameter.  |
| <b>5.2</b> | <b>DISCONNECTOR</b>           | <ol style="list-style-type: none"> <li>Each individual unit of Lightning Arrester with disconnecter shall be hermetically sealed and fully protected against ingress of moisture.</li> <li>The hermetic seal shall be effective for the entire life time of the Lightning Arrester with disconnecter under the specified service conditions.</li> <li>Disconnectors shall give the visible indication of the failed arrester.</li> <li>The Lightning Arrester with disconnecter shall be suitable for bracket type mounting. .</li> <li>The corresponding units of Lightning Arrester with disconnecter of the same rating shall be interchangeable without adversely affecting the performance.</li> <li>All the necessary flanges, bolts, nuts, clamps etc. required for assembly of complete Lightning Arrester with disconnecter and accessories and mounting on purchaser's support structure shall be included in bidder's scope of supply.</li> <li>The mounting details for mounting the Lightning Arrester with disconnecter on purchaser's support shall be given along with the bid.</li> </ol> |
| <b>5.3</b> | <b>MOUNTING BRACKET</b>       | <ol style="list-style-type: none"> <li>The 9kV 10kA Distribution class Lightning Arrester shall be fixed over a mounting bracket made of UV resistance, Fire retardant DMC material.</li> <li>The 9kV 10kA Station class Lightning Arrester shall be fixed over a mounting arrangement made of Hot dip galvanized MS material and additionally one mounting bracket shall be provided</li> </ol>   |
| <b>5.4</b> | <b>MECHANICAL STRENGTH</b>    | <ol style="list-style-type: none"> <li>The Lightning Arrester and its base shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability.</li> <li>The Lightning Arrester shall not come out of their positions by gravity, wind pressure, vibrations or reasonable shocks.</li> </ol>   |
| <b>6.0</b> | <b>NAME PLATE AND MARKING</b> | <ol style="list-style-type: none"> <li>The Lightning Arrester shall be provided with durable and legible name plate embossing, effectively secured against removal.</li> <li>The name plate shall be indelibly and distinctly marked with all essential particulars as per the relevant standards along with the following :</li> <li>The Name plate/product shall have marking of "PO no. with date" &amp; "Property of TPCL"</li> <li>The following information shall be mentioned on the Name Plate: <ol style="list-style-type: none"> <li>Continuous operating Voltage</li> <li>Rated Voltage</li> <li>Rated Frequency</li> <li>Nominal Discharge Current</li> <li>Manufacturer's Name</li> <li>Type and Identification of the complete arrester</li> <li>Year of Manufacture</li> <li>Serial Number</li> </ol> </li> </ol>   |
| <b>7.0</b> | <b>TESTS</b>                  | <ol style="list-style-type: none"> <li>All routine, acceptance &amp; type tests shall be carried out in accordance with the relevant IS/IEC.</li> <li>All acceptance tests shall be witnessed by the purchaser/his authorized representative.</li> <li>All the components and fittings shall also be type tested as per the relevant standards.</li> </ol>   |

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|            |  | <p>4. Following tests shall be necessarily conducted on the Lightning Arrester in addition to others specified in IS/IEC standards.<br/>*In case of any conflict on any technical particular in the specification, the stricter requirement mentioned in the relevant standard shall be valid.</p>   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
|------------|--|--|---------|-----------------|--------------------------|---|--|---------------------------------------|---|---|---------------------------------------|---|------------------------|---------------------------------------|---|---|---------------------------------------|---|---|---------------------------------------|---|----------------------------|---------------------------------------|---|---------------------|---------------------------------------|---|---|---------------------------------------|---|--------------------------------|---------------------------------------|----|---|--------------------------------------|----|---|--------------------------------------|----|----------------------------------|--------------------------------------|----|---|--------------------------------------|----|--|--|----|---------------------|--|----|---------------------|--|----|---------------------------------------|--|----|-------------------------------|--------------------------------|
| <b>7.1</b> | <b>TYPE TEST</b>   | <p>List of type test Reports to be submitted along with offer as per IEC 60099-4 Ed.3</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Test to be done</th> <th>Reference BIS / Document</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Frequency reference Voltage test (Both in Dry and Wet condition)</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.2</td> </tr> <tr> <td>2</td> <td>Lightning impulse residual voltage on complete arrester</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.2</td> </tr> <tr> <td>3</td> <td>Residual voltage tests</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.3</td> </tr> <tr> <td>4</td> <td>Test to verify long term stability under continuous operating voltage</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.4</td> </tr> <tr> <td>5</td> <td>Test to verify the repetitive charge transfer rating, Qrs</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.5</td> </tr> <tr> <td>6</td> <td>Heat dissipation behaviour</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.6</td> </tr> <tr> <td>7</td> <td>Operating duty test</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.7</td> </tr> <tr> <td>8</td> <td>Power-frequency voltage-versus-time test characteristic</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.8</td> </tr> <tr> <td>9</td> <td>Tests of arrester disconnector</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.9</td> </tr> <tr> <td>10</td> <td>Operating withstand Test for Disconnector</td> <td>As per IEC 60099-4 Ed.3 clause 8.9.2</td> </tr> <tr> <td>11</td> <td>Disconnector operation test – Current vs time</td> <td>As per IEC 60099-4 Ed.3 clause 8.9.3</td> </tr> <tr> <td>12</td> <td>Mechanical tests on Disconnector</td> <td>As per IEC 60099-4 Ed.3 clause 8.9.4</td> </tr> <tr> <td>13</td> <td>Temperature cycling and seal pumping test on Disconnector</td> <td>As per IEC 60099-4 Ed.3 clause 8.9.5</td> </tr> <tr> <td>14</td> <td>Short-circuit tests<br/>a. High current SC<br/>b. Low current SC</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.10</td> </tr> <tr> <td>15</td> <td>Bending moment test</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.11</td> </tr> <tr> <td>16</td> <td>Seal leak rate test</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.13</td> </tr> <tr> <td>17</td> <td>Radio interference voltage (RIV) test</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.14</td> </tr> <tr> <td>18</td> <td>Test to verify the dielectric</td> <td>As per IEC 60099-4 Ed.3 clause</td> </tr> </tbody> </table> | Sr. No. | Test to be done | Reference BIS / Document | 1 | Power Frequency reference Voltage test (Both in Dry and Wet condition) | As per IEC 60099-4 Ed.3 clause 10.8.2 | 2 | Lightning impulse residual voltage on complete arrester | As per IEC 60099-4 Ed.3 clause 10.8.2 | 3 | Residual voltage tests | As per IEC 60099-4 Ed.3 clause 10.8.3 | 4 | Test to verify long term stability under continuous operating voltage | As per IEC 60099-4 Ed.3 clause 10.8.4 | 5 | Test to verify the repetitive charge transfer rating, Qrs | As per IEC 60099-4 Ed.3 clause 10.8.5 | 6 | Heat dissipation behaviour | As per IEC 60099-4 Ed.3 clause 10.8.6 | 7 | Operating duty test | As per IEC 60099-4 Ed.3 clause 10.8.7 | 8 | Power-frequency voltage-versus-time test characteristic | As per IEC 60099-4 Ed.3 clause 10.8.8 | 9 | Tests of arrester disconnector | As per IEC 60099-4 Ed.3 clause 10.8.9 | 10 | Operating withstand Test for Disconnector | As per IEC 60099-4 Ed.3 clause 8.9.2 | 11 | Disconnector operation test – Current vs time | As per IEC 60099-4 Ed.3 clause 8.9.3 | 12 | Mechanical tests on Disconnector | As per IEC 60099-4 Ed.3 clause 8.9.4 | 13 | Temperature cycling and seal pumping test on Disconnector | As per IEC 60099-4 Ed.3 clause 8.9.5 | 14 | Short-circuit tests<br>a. High current SC<br>b. Low current SC | As per IEC 60099-4 Ed.3 clause 10.8.10 | 15 | Bending moment test | As per IEC 60099-4 Ed.3 clause 10.8.11 | 16 | Seal leak rate test | As per IEC 60099-4 Ed.3 clause 10.8.13 | 17 | Radio interference voltage (RIV) test | As per IEC 60099-4 Ed.3 clause 10.8.14 | 18 | Test to verify the dielectric | As per IEC 60099-4 Ed.3 clause |
| Sr. No.    | Test to be done  | Reference BIS / Document   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 1          | Power Frequency reference Voltage test (Both in Dry and Wet condition) | As per IEC 60099-4 Ed.3 clause 10.8.2  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 2          | Lightning impulse residual voltage on complete arrester                | As per IEC 60099-4 Ed.3 clause 10.8.2  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 3          | Residual voltage tests   | As per IEC 60099-4 Ed.3 clause 10.8.3  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 4          | Test to verify long term stability under continuous operating voltage  | As per IEC 60099-4 Ed.3 clause 10.8.4  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 5          | Test to verify the repetitive charge transfer rating, Qrs              | As per IEC 60099-4 Ed.3 clause 10.8.5  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 6          | Heat dissipation behaviour   | As per IEC 60099-4 Ed.3 clause 10.8.6  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 7          | Operating duty test  | As per IEC 60099-4 Ed.3 clause 10.8.7  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 8          | Power-frequency voltage-versus-time test characteristic                | As per IEC 60099-4 Ed.3 clause 10.8.8  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 9          | Tests of arrester disconnector   | As per IEC 60099-4 Ed.3 clause 10.8.9  |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 10         | Operating withstand Test for Disconnector                              | As per IEC 60099-4 Ed.3 clause 8.9.2   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 11         | Disconnector operation test – Current vs time                          | As per IEC 60099-4 Ed.3 clause 8.9.3   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 12         | Mechanical tests on Disconnector                                       | As per IEC 60099-4 Ed.3 clause 8.9.4   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 13         | Temperature cycling and seal pumping test on Disconnector              | As per IEC 60099-4 Ed.3 clause 8.9.5   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 14         | Short-circuit tests<br>a. High current SC<br>b. Low current SC         | As per IEC 60099-4 Ed.3 clause 10.8.10   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 15         | Bending moment test  | As per IEC 60099-4 Ed.3 clause 10.8.11   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 16         | Seal leak rate test  | As per IEC 60099-4 Ed.3 clause 10.8.13   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 17         | Radio interference voltage (RIV) test                                  | As per IEC 60099-4 Ed.3 clause 10.8.14   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |
| 18         | Test to verify the dielectric  | As per IEC 60099-4 Ed.3 clause   |         |                 |                          |   |  |                                       |   |   |                                       |   |                        |                                       |   |   |                                       |   |   |                                       |   |                            |                                       |   |                     |                                       |   |   |                                       |   |                                |                                       |    |   |                                      |    |   |                                      |    |                                  |                                      |    |   |                                      |    |  |  |    |                     |  |    |                     |  |    |                                       |  |    |                               |                                |


| Rev No. | Description   | Prepared By & Date | Checked By & Date | Approved for Issue By & Date |
|---------|---|--------------------|-------------------|------------------------------|
| R0      | Specification for 11KV / 33KV LA with Porcelain Polymer insulator | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b> | <b>Specification for 11KV / 33KV<br/>LA with Porcelain Polymer<br/>insulator</b> |
| <b>NEG-SPEC-11</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b>   | <b>Date of Issue: 05/08/2020</b>   |

|            |  | withstand of internal components   | 10.8.15                                |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
|------------|--|--|--|-----------------|--------------------------|---|--|--|---|---|---|---|--|------------------------------|---|-------------------|-----------------------------|---|--|--|---|--|--|---|---|-----------------------|--|
|            |  | 19 Test of internal grading components   | As per IEC 60099-4 Ed.3 clause 10.8.16 |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
|            |  | 20 Thermal cyclic test   | As per IEC 60099-4 Ed.3 clause 8.16.2  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
|            |  | 21 Weather aging Test for 1000 hours of slat fog test and 1000 hours of UV test  | As per IEC 60099-4 Ed.3 clause 10.8.17 |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| <b>7.2</b> | <b>ROUTINE TEST</b>  | <p>The test shall be as per IEC 60099-4 Ed.3 clause no. 9.1 and or IS3070 latest editions,</p> <ol style="list-style-type: none"> <li>1. Measurement of reference voltage test</li> <li>2. Residual Voltage Test on complete arrester</li> <li>3. 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</li> <li>4. Satisfactory absence from partial discharges and contact noise shall be checked on each unit by any sensitive method adopted by the manufacturer.</li> <li>5. For arrester for arrester units with an enclosed gas volume and separate sealing system the sealed housing leakage check shall be made on each unit by any sensitive method adopted by the manufacturer on the arrester and on surge monitor.</li> <li>6. Disconnecter Assembly- Proper assembly of each disconnecter has to be demonstrated by either measurement of resistance / capacitance or partial discharges.</li> </ol>   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| <b>7.3</b> | <b>ACCEPTANCE TEST</b>   | <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Test to be done</th> <th>Reference BIS / Document</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Measurement of power-frequency voltage on the arrester at the reference current.</td> <td>As per IEC 60099-4 Ed.3 clause no. 9.2.1.a or IS:3070 part3 cl.6.2.8</td> </tr> <tr> <td>2</td> <td>Lightning impulse residual voltage on the arrester at nominal discharge current</td> <td>As per IEC 60099-4 Ed.3 clause no. 9.2.1.b or IS:3070 part3 cl.6.4. and table 8</td> </tr> <tr> <td>3</td> <td>Partial Discharge Test (Both in Dry and Wet condition)</td> <td>As per IEC60099 part4 cl.9.1</td> </tr> <tr> <td>4</td> <td>Visual Inspection</td> <td>No damage and loose fitting</td> </tr> <tr> <td>5</td> <td>On disconnecter used in combination with NGLA, bending moment and tensile load tests shall be performed.</td> <td>As per IEC 60099-4 Ed.3 clause no. 9.2.1.d</td> </tr> <tr> <td>6</td> <td>Verification of components and dimensions.</td> <td>As per Approved GTP/TPCL Specification</td> </tr> <tr> <td>7</td> <td>Verification of type test of ZnO Blocks</td> <td>Document Verification</td> </tr> </tbody> </table> | Sr. No.                                | Test to be done | Reference BIS / Document | 1 | Measurement of power-frequency voltage on the arrester at the reference current. | As per IEC 60099-4 Ed.3 clause no. 9.2.1.a or IS:3070 part3 cl.6.2.8 | 2 | Lightning impulse residual voltage on the arrester at nominal discharge current | As per IEC 60099-4 Ed.3 clause no. 9.2.1.b or IS:3070 part3 cl.6.4. and table 8 | 3 | Partial Discharge Test (Both in Dry and Wet condition) | As per IEC60099 part4 cl.9.1 | 4 | Visual Inspection | No damage and loose fitting | 5 | On disconnecter used in combination with NGLA, bending moment and tensile load tests shall be performed. | As per IEC 60099-4 Ed.3 clause no. 9.2.1.d | 6 | Verification of components and dimensions. | As per Approved GTP/TPCL Specification | 7 | Verification of type test of ZnO Blocks | Document Verification |  |
| Sr. No.    | Test to be done  | Reference BIS / Document   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 1          | Measurement of power-frequency voltage on the arrester at the reference current.                         | As per IEC 60099-4 Ed.3 clause no. 9.2.1.a or IS:3070 part3 cl.6.2.8   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 2          | Lightning impulse residual voltage on the arrester at nominal discharge current                          | As per IEC 60099-4 Ed.3 clause no. 9.2.1.b or IS:3070 part3 cl.6.4. and table 8  |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 3          | Partial Discharge Test (Both in Dry and Wet condition)   | As per IEC60099 part4 cl.9.1   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 4          | Visual Inspection  | No damage and loose fitting  |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 5          | On disconnecter used in combination with NGLA, bending moment and tensile load tests shall be performed. | As per IEC 60099-4 Ed.3 clause no. 9.2.1.d   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 6          | Verification of components and dimensions.   | As per Approved GTP/TPCL Specification   |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |
| 7          | Verification of type test of ZnO Blocks  | Document Verification  |  |                 |                          |   |  |  |   |   |   |   |  |                              |   |                   |                             |   |  |  |   |  |  |   |   |                       |  |


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| <b>NEG-SPEC-11</b>                                | <b>TP CENTRAL ODISHA DISTRIBUTION LIMITED</b>   | <b>Date of Issue: 05/08/2020</b>   |


|            |  |  |                                    |   |
|------------|--|--|------------------------------------|---|
|            |  | 8  | Peel off test (removal of housing) | Samples shall confirm to the specified design. Samples shall be free from air void, cavity and other visual defects. shall be Design conformation verification. |
|            |  | 9  | Thermal stability test             | Shall be done randomly on any lot material as per IEC 60099-4 Ed.3 clause 9.2.2 and clause 8.7 or IS:3070 part3 cl.7.3  |
| <b>7.4</b> | <b>SPECIAL TEST as acceptance test</b> | <b>SPECIAL THERMAL STABILITY TEST</b> as per As per IEC 60099-4 Ed.3 clause 9.2.2 and 8.7 or IS:3070 part3 cl.7.3- TPCL. Reserves right to perform special thermal stability test during acceptance if required. No failure from the randomly selected sample shall qualify for acceptance.  |                                    |   |
| <b>8.0</b> | <b>TYPE TEST CERTIFICATES</b>          | <ol style="list-style-type: none"> <li>1. The bidder shall furnish the type test certificates as mentioned above as per the corresponding standards.</li> <li>2. All the tests shall be conducted at CPRI / ERDA as per the relevant standards.</li> <li>3. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid.</li> <li>4. 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 TPCL.</li> </ol>   |                                    |   |
| <b>9.0</b> | <b>PRE-DESPATCH INSPECTION</b>         | <ol style="list-style-type: none"> <li>1. Equipment shall be subject to inspection by a duly authorized representative of TPCL.</li> <li>2. 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.</li> <li>3. Bidder shall grant free access to the places of manufacture to TPCL's representatives at all times when the work is in progress.</li> <li>4. Inspection by TPCL or authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.</li> <li>5. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCL.</li> <li>6. Following documents shall be sent along with material: <ol style="list-style-type: none"> <li>a) Test report</li> <li>b) MDCC issued by TPCL</li> <li>c) Invoice in duplicate</li> <li>d) Packing list</li> <li>e) Drawings &amp; catalogue</li> <li>f) Guarantee / Warrantee card</li> <li>g) Delivery Challan</li> <li>h) Other Documents (as applicable)</li> </ol> </li> </ol> |                                    |   |

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| R0      | Specification for 11KV / 33KV LA with Porcelain Polymer insulator | Suchismita Nayak   | Niranjan Khuntia  | Pourush Garg                 |
|         |   | 05/08/2020         | 05/08/2020        | 05/08/2020                   |

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|---|--|--|
| TP Central Odisha<br>Distribution Limited |  | <b>Specification for 11KV / 33KV<br/>LA with Porcelain Polymer<br/>insulator</b> |
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|             |  |   |
|-------------|--|---|
| <b>10.0</b> | <b>INSPECTION AFTER RECEIPT AT STORE</b> | The material received at TPCL, Bhubaneswar, Odisha store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department.  |
| <b>11.0</b> | <b>GUARANTEE:</b>                        | <ol style="list-style-type: none"> <li>Bidder shall stand guarantee towards design, materials, workmanship &amp; 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.</li> <li>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. 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</li> </ol>  |
| <b>12.0</b> | <b>PACKING</b>                           | <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> </ol> <p><b>Note: Single use plastic not to be used for packing of the material.</b></p>  |
| <b>13.0</b> | <b>TENDER SAMPLE</b>                     | One sample to be submitted during technical bid submission. This shall be Non-returnable basis as we shall perform destructive tests on sample.   |
| <b>14.0</b> | <b>TRAINING</b>                          | NA  |
| <b>15.0</b> | <b>QUALITY CONTROL</b>                   | <p>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. TPCL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.</p> <p>The following information shall necessarily be submitted with the bid:</p> <ol style="list-style-type: none"> <li>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.</li> <li>List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.</li> <li>List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections</li> </ol> |

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|      |                                     |  |
|------|-------------------------------------|--|
|      |                                     | <p>4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.</p> <p>5. QAP withhold points for TPCL</p> <p>6. inspection.</p>   |
| 16.0 | <b>MINIMUM TESTING FACILITIES</b>   | 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.  |
| 17.0 | <b>MANUFACTURING ACTIVITIES</b>     | <p>The successful bidder will have to submit technical compliance document and drawing as per RC line items for getting approval before mass manufacturing.</p> <p>Manufacturing shall start only after getting CAT-A approved drawings or as per intimation from TPCL.</p>  |
| 18.0 | <b>SPARES, ACCESSORIES ND TOOLS</b> | Not Applicable   |
| 19.0 | <b>DRAWINGS AND DOCUMENTS</b>       | <p>Following drawings and documents shall be prepared based on TPCL specifications and statutory requirements and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details.</li> <li>Description of the equipment and all components including brochures.</li> <li>General Drawing arrangement of lightning arrester.</li> <li>Sectional drawing showing internal blocks etc.</li> <li>Bill of material.</li> <li>Experience Certificate and list.</li> <li>Type test certificates.</li> <li>List of makes of major components.</li> </ol> <p><b>Drawings / documents to be submitted after the award of the contract are as under:</b></p> <p><b><u>List of Drawings/Parameters to be submitted:</u></b></p> <ol style="list-style-type: none"> <li>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).</li> <li>General Arrangement Drawing of the Lightning arrester (Front view and Top view. Complete list of</li> </ol> |

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|      |   | <p>fittings to be displayed and quantities to be mentioned with the drawing).</p> <p>3. Sectional drawing showing the blocks arrangement.</p> <p>4. Terminal and connection drawings</p> <p>5. Type Test Certificates.</p> <p>6. Installation/ Mounting Instructions/Drawing.</p> <p><b><u>Additional Documents to be submitted :</u></b></p> <p>a. List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.</p> <p>b. Type test certificates of the raw materials and bought out accessories.</p> <p>c. The successful Bidder shall submit the <b>routine test certificates of bought out accessories</b> and central excise passes for raw material at the time of routine testing.</p> <p>All the documents &amp; 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 TPCL for approval.</p> <p><b><u>Instruction Manuals:</u></b><br/>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.</p> |
| 20.0 | <b>GUARANTEED TECHNICAL PARTICULARS</b> | All clauses and points in the Specification to be complied for along with GTR.   |
| 21.0 | <b>SCHEDULE OF DEVIATIONS</b>           |  |

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| <b>TP Central Odisha<br/>Distribution Limited</b> | <br><b>TPCODL</b><br><small>TP CENTRAL ODISHA DISTRIBUTION LIMITED</small> | <b>Specification for 11KV / 33KV<br/>LA with Porcelain Polymer<br/>insulator</b> |
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**(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 purchaser's specifications:

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


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

Seal of the Company:

Signature

Designation

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**ANNEXURE-I**

**INSPECTION TEST PLAN FOR PRE-DELIVERY OF LIGHTENING ARRESTER**

| <b>Sr. No.</b> | <b>Test to be done</b>  | <b>Reference BIS / Document</b>  | <b>Acceptance criteria</b>   |
|----------------|---|--|--|
| 1              | Power Frequency reference Voltage test (Both in Dry and Wet condition)                                    | As per IEC 60099-4 Ed.3 clause no. 9.2.1.a or IS:3070 part3 cl.6.2.8   | Should withstand as per Specification requirements.                  |
| 2              | Lightning impulse residual voltage on the arrester at nominal discharge current                           | As per IEC 60099-4 Ed.3 clause no. 9.2.1.b or IS:3070 part3 cl.6.4. and table 8  | Should withstand as per Specification requirements.                  |
| 3              | Partial Discharge Test (Both in Dry and Wet condition)  | As per IEC60099 part4 cl.9.1   | Should withstand as per Specification requirements.                  |
| 4              | Visual Inspection   | No damage and loose fitting  | Compliance as per Specification requirements and approved drawings   |
| 5              | Verification of components and dimensions.  | As per Approved GTP/TPCL Specification   | Compliance as per Specification requirements and approved drawings   |
| 6              | Verification of type test of ZnO Blocks   | Document Verification  | Compliance as per Specification requirements and IS/IEC standards    |
| 7              | Peel off test (removal of housing)  | Samples shall confirm to the specified design. Samples shall be free from air void, cavity and other visual defects. shall be Design conformation verification, free | Should meet the Specification requirements without any defect        |
| 8              | On dis-connector used in combination with NGLA, bending moment and tensile load tests shall be performed. | As per IEC 60099-4 Ed.3 clause no. 9.2.1.d   | Dis-connector should withstand parameters as per approved documents. |
| 9              | Thermal stability test  | Shall be done randomly on any lot material as per IEC 60099-4 Ed.3 clause 9.2.2 or IS:3070 part3 cl.7.3  | Shall withstand the variations.                                      |

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|                |   | 05/08/2020                    | 05/08/2020                   | 05/08/2020                              |

# Cable Laying Methodology & Civil Works

## **1. CABLE LAYING**

- 1.0. Notwithstanding anything stated in these specifications, TPCODL reserves the right to assess the bidder's capability to fulfill the scope of the bid, should the circumstances warrant such assessment.

## **2.0. DESIGN – WORKMANSHIP AND INTERPRETATION OF CLAUSES :**

- 2.1 The design and quality of goods supplied and the workmanship shall be in accordance with the best engineering practice to ensure satisfactory performance of the system throughout the service life.
- 2.2 The goods and accessories offered shall be complete in all respects. Any material and / or component thought not specifically stated in this specification but is necessary for trouble free and successful operation shall be deemed to be included. All such components, accessories, etc., shall be supplied at no extra cost.
- 2.3 The goods supplied shall be such that components, accessories of the same type shall be interchangeable. Likewise similar or corresponding parts, components / accessories shall also be interchangeable.
- 2.4 Wherever and whenever a material or article is specified or described by the name of a particular brand, manufacturer, vendor, the specific item mentioned shall be understood as establishing type, function, quality and not as limiting competition. However bidders may offer other similar components / accessories provided they meet with the required standards, design, duties and performance.
- 2.5 Goods and accessories so offered shall conform to type test and shall also be subjected to acceptance and routine tests in accordance with the requirements stipulated in this specification. TPCODL reserves the right for repeating any or all of the type tests to be conducted on the goods supplied.

## **3.0. STANDARDS**

- 3.1. Except as modified by this specification all materials to be supplied shall conform to the requirements of the latest editions of the following standards:
  - a) IS 1255 Code of practice for Installation and maintenance of power cables up to and including 33 and 11 KV rating
  - b) IS 7098 (Part 2 ) Cross – linked Polyethylene PVC sheathed cables.
  - c) IEC 332 Tests on erected cables
  - d) IEC 1329 Allied steel, tubes, tubular and other rough iron fittings.
  - e) IEC 2629 Recommended practice for hot dip galvanizing of iron & steel.
  - f) ASTM-D : 2671 Standard method of testing heat shrinkable or push on Tapex or cold type tubing for electrical use.
  - g) ASTM-D 3111 Flexibility determination of hot melt adhesives by mandrel bend test method.
  - h) IEC 60 High Voltage test
  - i) IS 3043 Code of practice for Earthing

- j) IS 8309 Compression type tubular terminals for aluminum conductors of insulated cable.

#### **4.0. DEVIATION IN SPECIFICATION:**

- 4.1. All deviations in specification shall be brought out by the bidder and detailed clause by clause in appropriate annexure form.
- 4.2. Deviations brought out elsewhere or in any other format will not be considered and are liable for rejection. TPCODL in such an event shall also deem that the bidder has conformed to the clauses in this specification scrupulously.
- 4.3. Deviation in specification shall if possible be quoted with reference to standards. The bidder shall then furnish an authentic English version of such standards.

#### **5.0. LOCAL CONDITIONS :**

- 5.1. It will be imperative on each bidder to fully inform himself of the local conditions and factors which may have any effect on the execution of the supply and services covered under these documents and specification.
- 5.2. It shall be understood and agreed that such factors will have been properly investigated and considered in any bid that is submitted. The purchaser will entertain no claim for financial adjustment to the contract awarded under these specifications and documents. No change in the time schedule of the contract, or any financial adjustment arising thereof that are based on incorrect information, or its effect on the cost of the contract to the bidder shall be permitted by the Purchaser.
- 5.3. Bidders are advised to visit the various areas where the U.G. cables are access, road /drain / footpath crossings to enable them to make proper costing and then quote accordingly.

#### **6.0. DETAILS OF WORK :**

- i) The scope of work involves Supply and laying, testing and commissioning of 3 Core 11 and 33 KV XLPE UG cable.
- ii) **Laying of 11KV/ 33 KV XLPE UG Cables shall be laid in RCC open trench masonry work with slab in usual conventional methods, on bedding free from large stones, pieces of rocks, etc. Cable trench should be 1 meter width x 1meter depth (internal), with RCC cover & sand filling for the protection of cable as per IS 1255-1983. And cable should be drawn in pipes of ducts wherever necessary.** The top of the cable trench should be RCC to hold the RCC covers. Cable loop chamber of size 15'x15'x5' dia & the chamber should be filled with sand and RCC slab arrangement for cable protection. Cable trenches and pre-cast removable RCC covers (with lifting arrangement) shall be constructed using RCC of M15 grade.  
**Special colour code should be given to each cable for ease of identification.**
- b) The cable trenches shall be designed for Dead load of 155 kg/ m length of cable support plus 75 kg on one tier at the end. Cable trench covers shall be designed for (i) self



weight of top slab plus concentrated load of 200 kg at centre of span on each panel and a surcharge load of 2 tons per sq. meter.

- c) The top of trenches shall be kept at least 300 mm above the finished ground level (FGL). The FGL means the finish level of the soil but not the top of metalling surface. The top of cable trench shall be such that the surface rain water does not enter the trench.
- d) All metal parts inside the trench shall be connected to the earthing system.
- e) The covers of the slab are also of RCC with ratio mixing 1:2:4. The thickness of the slab shall be 75 mm (MS Rods to be used 8mm), The MS rods to be used shall be placed at 100 mm centre to centre both way and properly bided .The cover slab shall have provision of lifting hooks at two points for easy lifting of the slabs.
- f) Cables are to be laid in neat lines and at suitable levels. Their depth below ground level will depend upon the voltage associated with the cables but in all cases the excavation must provide a clear trench. Sand filling below, around and above the cables will always be required and protection covers or tiles /bricks will be placed in position over the sand filling before final backfilling to the ground level.
- g) All foundations shall be designed in accordance with the provisions of the relevant parts of latest revisions of IS 2911 and IS 456. Type of foundation system i.e. isolated footing, raft or piling shall be decided based on the load intensity and soil strata.

**6.1.** The contract will be on the turnkey basis and all the required materials as per specifications are to be procured by the contractor himself. The specifications for the major equipment to be procured are as follows :

- a) XLPE Cables of above size as per specifications enclosed.
- b) Cable jointing termination and straight through kits as per specifications enclosed.

**6.2.** All the other materials like coarse and fine aggregate sand, joint markers, sealing, route markers, cable support clamps, terminals and inline connectors, sealing compounds etc., whether specifically mentioned or not in these specifications are deemed to have been included in the scope of supply and installation. Similarly, the contractor has to arrange for all the tools and plants required for the works at his own cost.

## **7.0. SERVICE CONDITIONS :**

- 7.1. The cables are being laid in Bhubaneswar of Khurda district, Odisha, where temperature, humidity effect is heavily experienced.
- 7.2. The climatic conditions are prone to wide variations in ambient temperature, humidity etc., and the accessories offered shall be suitable for installation under

the above tropical conditions, where moderately hot and humid conditions conducive to dust, rust and fungi growth, prevail at site.

## **8.0. COMPLIANCE WITH REGULATIONS :**

- 8.1. All services carried out by the bidder / sub contractor shall be as per the requirements of the I.E.Act-2003 & Indian electricity Rules – 1956, OERC and all other applicable statutory laws governing the services in the state of Orissa
- 8.2. Particular attention is drawn to the necessity of consulting the local authorities and the administrative heads concerned with the operation and maintenance of roads, railways, telegraph and telephone services, water supply and sewerage and other public utilities.

## **9.0. INSPECTION BY ELECTRICAL INSPECTOR**

- 9.1. All Electrical installations and equipments are to be inspected and approved by the Chief Electrical Inspector to the Government of Orissa, before commissioning.
- 9.2. The Contractor will arrange for the payment of the necessary fees for inspection.
- 9.3. Any defects pointed out by the Electrical Inspector, shall be corrected or attended by the bidder /subcontractor at his own cost and he shall pay, for subsequent inspection charges to the Electrical Inspector, for obtaining approval.

## **10.0. INSTALLATION OF U.G. CABLES**

### **11.1. Method Of UG Cable Laying (Open ):**

Laying of 11KV/ 33 KV 3 Core XLPE UG Cables shall be laid in open trench & Brick masonry work with slab in usual conventional methods, on bedding free from large stones, pieces of rocks, etc., **Cable trench should be 1 meter width x 1meter depth, with RCC cover & sand filling for the protection of cable as per IS 1255-1983.** And cable should drawn in pipes of ducts wherever necessary. Cable loop chamber of size 3.5 meter dia & the chamber should filled with sand and RCC slab arrangement for cable protection.

### **11.1. Method Of UG Cable Laying (HDD):**

Laying of 3 core, 33KV / 11 KV, UG Cables shall be laid by trenchless technology adopting horizontal Boring (HDD) by machines at a depth **not less than 3 Mtrs** with adequate drawing capacity in all type of soil. The cable shall be pulled / drawn smoothly in the bored holes ( through HDPE pipe) by the horizontal boring machine itself. The excavated cable trench shall be drained of all water and bed surface shall be smooth, uniform and fairly hard before laying out the cable. The cable shall be pulled in the trench only on cable rollers spaced out at uniform intervals to prevent damage to cable. The laying out process shall be smooth and steady, without subjecting the cable abnormal tension. The cable laid out shall be smoothly and evenly transferred to the ground after providing sand cushion and shall never be dropped. All the snake bends in the cable shall be straightened out

**11.2. ROUTE PLANS:** Tentative cable route plans will be furnished to the contractors, indicating the roads road crossings, findings by excavating trial holes by the contractor. The work should be taken upon only after TPCODL Engineers approve the final route. TPCODL reserves the right to change, alter deviate the route on technical reasons.

**11.3. TRIAL PITS :** The bidder shall excavate trial pits, for alignment purpose at appropriate distance apart as warranted by the local conditions, keep a record of the findings and close the trial holes properly to avoid hindrance / accidents to pedestrian traffic. The final route / alignment of the cables shall be decided based on the finding of the trial holes.

**11.4.** It is the responsibility of the bidder to maintain as far as possible the required statutory clearances from other utility services.

**11.5.** Any damage caused, inadvertently to any utility services shall be the sole responsibility of the contractor.

## **12. LAYINGOUT THE CABLE :**

The cable shall be laid smoothly in the Open trench as per the standard specifications. The excavated cable trench shall be drained of all water and bed surface shall be smooth, uniform and fairly hard before laying out the cable. The cable shall be laid in the trench only on cable rollers spaced out at uniform intervals to prevent damage to cable. The laying out process shall be smooth and steady, without subjecting the cable abnormal tension. The cable laid out shall be smoothly and evenly transferred to the ground after providing sand cushion and shall never be dropped. All the snake bends in the cable shall be straightened out.

**12.2. Loop Cable :** One complete loop of the cable has to be kept at each jointing point and termination point.

## **13. FLAKING**

Wherever it is not possible to lay of the entire cable drum length, the cable should be cut and properly sealed and if it is necessary to remove the cable from the drum, it should be properly flaked. Such cable lengths should be properly stored at site.

## **14. CABLES AND OVER BRIDGES :**

**14.2.** Wherever the cable route crosses bridges the cable shall be laid in the ducts, if provided, by removing and replacing the R.C.C. covers and filled with sand cushion.

**14.3.** In the absence of the cable ducts over bridges, the cable shall be laid in suitable size steel/G.I. pipes or as directed by the engineer-In-charge and the pipe covered by cement concrete if necessary to protect from direct sunrays.

## **15. CABLE CROSSING OPEN DRAINS WITH LONG SPAN :**

**15.2.** Wherever the cable to cross open drains with a long span, the cable shall be laid in suitable size G.I. pipe, properly jointed with suitable collars. The GI pipe shall be firmly supported on pillars, columns, or suitable support of R.C.C. foundation with stone masonry in cement mortar 1:4

**15.3.** Wherever the U.G. cable has to cross the sewerage or water supply line the U.G. cable has to be taken below them maintaining adequate clearance. Further wherever the U.G. cable runs parallel to the telephone cable a separation distance of at least 300-mm shall be maintained.

**15.4.** The cables shall be laid in stoneware pipe wherever the cable and trench crosses private roads, gates, etc. In order to avoid inconvenience the stoneware pipe should be laid first after excavation and excavated trench shall be back filled, compacted and surface properly redone to restore that original condition.

## **16. CABLE AND JOINT MARKERS**

**16.2.** Permanent means of indicating the positions of joints on site should be provided. During the course of permanent reinstatement cable and joint markers, should be laid directly above the route of the cable and the position of the joint respectively.

**16.3.** Wherever it is not possible to place the marker directly over the cable route or joint the marker should be suitably placed near the cable route or joint on which the distance of the cable route or joint at right angles to and parallel to the marker should be clearly indicated.

**16.4.** The position of fixing the markers will be at the discretion of the Engineer-In-charge.

## **17. JOINTING OF CABLES**

**17.2. GENERAL:** It shall be noted that the U.G. cables are of XLPE insulation and needs special care in jointing. The cable jointer and his assistant shall have experience in making joints / terminations. Jointing work should commence as soon as two or three lengths of cables have been laid. All care should be taken to protect the factory-plumbed cap/seal by laying the end solid in bitumen until such time as the jointing is commenced.

**17.3.** Jointing of cables in carriage ways, drives, under costly paving, under concrete or asphalt surfaces and in proximity to telephone cables and water mains, should be avoided whenever possible.

**17.4. JOINT PITS:** The joint pits should be sufficient dimensions as to allow jointers to work with as much freedom of movement and comfort as cables proposed to be jointed. The sides of the pit should be draped with tarpaulin sheet to prevent loose earth from falling on the joint during the course of making. The pit should be well shored with timber, if necessary. An overlap of about 1.0 mtr of the cables to be jointed may be kept, for allowance to adjust the position of the joint. When two or more cables are laid together the joints shall be arranged to be staggered by 2 to 2.5 mtr.

**17.5. SUMP PITS:** When jointing cables in water logged ground or under monsoon conditions, a sump pit should be excavated at one end of the joint pit in such a position so that the accumulating water can be pumped or bailed out by buckets without causing interference to the jointing operation.

**17.6. TENTS:** A tent should be used in all circumstances wherever jointing work is carried out in the open irrespective of the weather conditions. The tent should be so covered as to have only one entrance and the back facing the direction of the wind. The tent cover should be properly weighted or tied down on the sides.

**17.7. MEASUREMENT OF INSULATION RESISTANCE:** Before jointing is commenced the insulation resistance of both sections of the cable to be jointed should be checked by insulation resistance testing instrument. An insulation resistance – testing instrument of 2.5/5 kV shall be used. The Insulation Resistance values, between phases and phase to earth shall be recorded. The actual jointing operation shall start only after the approval of the engineer in charge of works.

**17.8. PRECAUTIONS BEFORE MAKING A JOINT OR CUTTING A CABLE.**

The cable end seals should not be opened until all necessary precautions have been taken to prevent circumstances arising out of rainy/inclement weather conditions, which might become uncontrollable. The cable seals should be examined to ascertain if they are intact and also that the cable ends are not damaged, if the seals are found broken or the lead sheath punctured, the cable ends should not be jointed until after due examination and testing by the engineer-in-charge of the works.

**17.9. PRECAUTIONS TO BE TAKEN ON LIVE CABLES IN SERVICE**

Sometimes it becomes necessary that a H.V. cable, which is in service, be cut for making a straight joint with a new cable. In such cases work on joint should start only after the in service cable is properly identified, isolated, discharged, tested and effectively earthed. Search coils interrupters or cable-identifying instruments should be used for this purpose.

**17.10. IDENTIFICATION NUMBERS / COLOURS AND PHASING :** The cables should be laid and jointed number to number or colour to colour shown on the core identifying marks and prevent cross jointing. In all cases, the cables should be tested and phased out, and more particularly so when the cable terminates at Ring Main Unit / Sub-station.

**17.11. MAKING A JOINT:** The Heat shrinkable joints used shall conform to the specification vide Sec-viii. Alternatively push-on or Tapex or cold shrinkable type can be used with the approval of TPCODL. The contractor should furnish all the technical particulars of these joints and obtain approval only in case they are found superior to the heat shrinkable joints. Epoxy based joints are not permitted. Comprehensive jointing instructions obtained from the manufacturer of joint kits shall be meticulously followed. The connection of the earth wires should be done using flexible bonds connected to cable sheath using clips or soldering. Aluminum conductor strands shall be joined by mechanical compression method, using suitable die and sleeve with a good quality tool. The joints shall conform to specification as per IS 13573-1992.

**17.12. TRANSITION JOINTS:** Wherever straight through joints will have to be made with existing cables under the following conditions, the contractor shall arrange such type of joints and execute them with skilled jointers.

- (1) Between cables having two different types of insulation viz., paper and XLPE
- (2) Between cables having two different types of conductor material, viz. copper and aluminum.
- (3) Or a combination of the above

The transition joints shall conform to IS 13705 – Transition joints for cables for working voltages from 1.1 KV upto and including 33 KV – performance requirements and type tests.

**17.13. CABLE TERMINATIONS:** Cable terminations required are both indoor and outdoor type and invariably be of heat shrinkable type conforming to the specifications vide Sec-viii. Alternatively push-on or Tapex or cold shrinkable type can be used with the approval of TPCODL with appropriate sheds for rainwater in case of outdoor terminations. All the technical particulars to establish the superiority in the performance of these joints shall be furnished while seeking approval. The terminations shall conform to specifications as per IS 13573 – 1992. The instructions furnished by the manufacturer of termination boxes/kits should strictly be followed.

17.14. Whenever a cable raised from the trench to end in termination, to be finally connected to an overhead line or transformer, the following instructions should be complied with

–

- (i) One coil to be made and left in the ground for future needs
- (ii) The rise of cable, immediately from the ground level should be enclosed in suitable diameter GI pipe to height of 2 mt.
- (iii) The balance portion of the cable should be neatly curved, in 'S' shape.
- (iv) The cable and pipe should be properly fastened by using appropriate clamps /support. The hardware of clamps shall be painted with red oxide and enamel paint or galvanized.
- (v) The lugs on the termination shall be compressed with a suitable compression tool.

## **18. EARTHING AND BONDING**

**18.1.** The metal sheath and Armour should be efficiently bonded and earthed at all terminals to earth electrodes provided. The cross sectional area of the bond shall be such that the resistance of each bond connection shall not exceed the combined resistance of an equal length of the metal sheath and Armour of the cable.

## **19. TESTING AFTER LAYING AND JOINTING**

**19.1.** All cables after laying and jointing works are completed should be tested systematically and insulation and pressure tests should be made on all underground cables.

**19.2.** All test results should be recorded in tabular form in logbooks kept for the purpose

**19.3.** The cable cores should be tested for :-

- (i) Continuity
- (ii) Absence of cross phasing
- (iii) Insulation resistance to earth; insulation resistance between conductors.

## **20. H.V. TESTS**

**20.1.** After the laying and jointing work is completed, a high voltage test should be applied to the cable to ensure that the cable has not been damaged during or after the laying operations and there is not defect in the joining

**20.2.** The high voltage tests should be as per IS 1255 or as per international standards. The H.V. testing instruments shall be brought by the turn key contractor.

## **21. TESTING AND RECORD OF CABLE CONSTANTS :**

**21.1.** When the cable is ready, just before commissioning, the cable constants viz, the resistance, capacitance and inductance of each conductor should be determined and

recorded, along with frequency at which the values of capacitance and inductance are determined.

## **22. GUARANTEE**

**22.1.** All the cable joints / termination done by the contractor shall be guaranteed for 24 months from the date of energisation of the complete cable. In the event of failure during the guarantee period, the restoration work shall be done free of cost by the contractor within 24 hours of giving notice or else the expenditure incurred by TPCODL to re-do the joint / termination will be recovered from the performance guarantee amount held with TPCODL.

## **23. CABLE RECORDS**

**23.1.** Accurate neat plans / sketches, drawn to suitable scale (1 cm = 10M) should be prepared and furnished by the contractor after the completion of each work.

**23.2.** All relevant information should be collected at site, during the progress of work and preserved for preparation of drawings.

**23.3.** The following essential data should be incorporated on all drawings

- a) Size, type of cable or cables.
- b) Location of the cable in relation to prominent land mark property, Kerb-line etc., with depths.
- c) The cross section showing where cables are laid in piper or ducts, giving their sizes, type and depths.
- d) Position and type of all joints
- e) Location of other cables which run alongside or across the cable route.
- f) Position and depths of all pipers, ducts, etc., which are met as obstruction to the cable route.
- g) Accurate lengths from joint to joint
- h) Manufacturers name and drum number of the cable, between sections / joint to joint.

Two transparencies and six blue print copies of the cable records prepared as above shall be given to the TPCODL's engineer as a part of the contract as soon as the cable is charged.



APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

*for New Grids & Bay ext. jobs.*

|  |  |
|--|--|
| 66 KV CT / PT / CVT                                  | BHEL / CGL / ABB / AREVA / MEHRU / KAPCO/HEPTACARE   |
| C&R Panels   | ABB/SIEMENS/ALSTOM/HAIL  |
| 66 KV CB   | ABB / SIEMENS  |
| LIGHTNING ARRESTORS                                  | AREVA / CGL / ELPRO / OLBUM/ RAYCHEMM/LAMCO  |
| INSULATORS   | WSI / BHEL / BIRLA NGK (ABIL)/ GENERAL POWER, CJI, IEC   |
| HARDWARE FITTINGS                                    | RASHTRA UDYOG LTD (RUL) / SUPREME/LIGEON ENERGY/ELECTROMECH/TRANSTECH  |
| 11 KV CAPACITORS                                     | SHREEM / EPCOS/ UNIVERSAL/ABB  |
| LIGHT FITTINGS ( INDOOR/ OUTDOOR )                   | PHILIPS / CGL / GE / BAJAJ / WIPRO   |
| 250 KVA DISTRIBUTION TRANSFORMER                     | CGL / AREVA /VOLTAMP / PATSON / KOTSON / VIJAY ELECTRICALS / CAPITAL / NUCON / RAYCHEM / SPEC/ATLANTA/TOSHIBA  |
| CIRCUIT BREAKER/ SWITCHGEARPANELS (33 KV VCB PANELS) | SIEMENS / SCHNEIDER / ABB  |
| CIRCUIT BREAKER/ SWITCHGEARPANELS (11 KV VCB PANELS) | SIEMENS / SCHNEIDER / ABB  |
| 11 KV POWER CABLE ( XLPE)                            | RPG / CCI / NICCO / FORT GLOSTER / POLYCAB / TORRENT/UNIVERSAL/ STERLITE/KEC/KEI   |
| 1.1 KV POWER AND CONTROL CABLE                       | RPG / POLYCAB / KRISHNA ELECTRICALS / TORRENT / GEMSCAB / ALCON / GENUS / ELECTROTECH / PARAGAON / TCL /RAVIN CABLES / MP TELELINK/CAPITAL URJATECH/EMPIRE / PARAMOUNT/KEI |
| 33. KV CABLE   | UNIVERSAL / NICCO / RPG / TORRENT / FORT GLOSTER / CCI / ILGIN / LS /STERLITE  |
| Power Connector                                      | : TYCO-Wedge type connector / Sun Electric   |
| 1.1KV, Electrical wire                               | Finolex / POLYCAB/CAPITAL URJATECH/TCL/Havells/KEI   |



APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

|  |   |  |
|--|---|--|
| Cables Termination Kits / Joints       | : | RAYCHEM / 3M   |
| Cable tray                             |   | BHARATI / SLOTCO / STEEL WAYS, AR enterprises, MME             |
| Battery Charger/ DCDB                  | : | MASSTECH / EMERSON   |
| Battery (Ni-Cd)                        | : | HBL, AMAR RAJA, AMCO   |
| LT Moulded case circuit breaker (MCCB) | : | GE POWER/ SIEMENS / L & T/ABB /SCHNEIDER/ELESCON ENGG. / C & S |
| AC LT panel Boards                     |   | L&T/ Siemens/ Kaybee/Advance/ A TO Z                           |
| LT Fuse Switches / Switch Fuses        | : | GE POWER / SIEMENS / L & T                                     |
| AFDAS (Fire detection system)          |   | Honeywell, Agni Suraksha, System sensor                        |
| Indication Meters                      | : | IMP/ AE  |
| Static Type Energy Meter               | : | SECURE / L & T/ ABB/ ELSTER                                    |
| Control Switches                       | : | SIEMENS / KAYCEE / SALZER                                      |
| Select Switches                        | : | SIEMENS / KAYCEE / SALZER                                      |
| Contactors                             | : | SIEMENS / L & T / GE POWER / C & S                             |
| Push Button                            | : | SIEMENS / Telemechnic/ L & T                                   |
| Indication Lamp                        | : | SIEMENS / Telemechnic/ L & T                                   |
| Annunciator                            | : | MINILEC / AREVA / PROCON                                       |
| Fuses (LT)                             | : | Areva / SIEMENS / L & T  |
| Miniature Circuit Breaker (MCB) /ELCB  | : | MDS / HAGER / MERLIN GERIN                                     |
| Cable glands                           | : | COMET/AXIS   |
| ERW Conduit / PVC Conduit              | : | AKG /Supreme/Finolex   |
| 6A & 16 A Switch - Socket              | : | MK / ANCHOR/ MDS   |
| 63 A & 20A Industrial Socket           | : | MDS /CGL   |
| Ceiling fan / Exhaust Fan              |   | KHAITAN / CROMPTON GREAVES / USHA/ GEC                         |
| Inverter                               |   | Exide, Microtech, Sukam  |
| Metal clad socket                      |   | B & C / CROMPTON / MDS   |

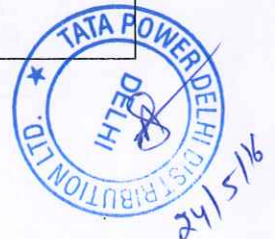


APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

|  |   |
|--|---|
| TMU  | a-eberle,   |
| Terminal Blocks                              | ELMEX / ESSEN   |
| Reinforcement steel (TMT)                    | Rathi / TISCO/SAIL  |
| Fire Extinguisher                            | Ceasefire/Minimax/ Safex  |
| Air Conditioner                              | Voltas  |
| Isolator                                     | ABB,SEIMENS,S&S chennai   |
| Marshalling Kiosk                            | A To Z / Telmos / ECS/ Advance  |
| Earth Enhancement Material                   | Terec + , Erico Gem   |
| Galvanized Structural Steel                  | Nexo/Techno/NL Engineers/RS Steel/ M J<br>engg/Sangam/Jyoti/Good Luck/Mann/Ferro Gelva/salasar<br>Techno/UCIC/Balakra fabricon/ VSP Enterprises |
| LED Lighting                                 | Nichia, cree, seoul, osram, Philips, Bajaj  |
| Pump   | CGL / Kirloskar   |
| RTU/Data Concentrator /<br>Protection relays | Please refer latest revision of protection specification<br>ENG-EHV-105 & automation specification ENG-EHV-106                                  |

Note: Below relay approved make list is subject to fulfillment of all the protection and automation requirement as per protection specification ENG-EHV-105 & automation specification ENG-EHV-106

| Protection |           | O/C E/F  | Trafo Diff | Line Diff (with distance backup) |
|------------|-----------|--|------------|----------------------------------|
| Schneider  | 66KV/33KV | S- 80  | P642       | P543                             |
|            | 11 KV     | S- 80  | N.A.       | N.A.                             |
| ABB        | 66KV/33KV | REC 670  | RET 650    | RED 670                          |
|            | 11 KV     | REF615 with RIO 600  | N.A.       | N.A.                             |
| Siemens    | 66KV/33KV | It shall be as per TPDDL protection & automation specification & to be finalized during detailed engineering | 7UT61      | 7SD5                             |
|            | 11 KV     | 7SJ66  | N.A.       | N.A.                             |
| GE         | 66KV/33KV | F650   | T60        | L90                              |
|            | 11 KV     | F650   | N.A.       | N.A.                             |
| Alstom     | 66KV/33KV | It shall be as per TPDDL protection & automation specification & to be finalized during detailed engineering | P642       | P543                             |
|            | 11 KV     | It shall be as per TPDDL protection & automation specification & to be finalized during detailed engineering | N.A.       | N.A.                             |



APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

Note: The list indicates the make of manufacturers for equipment & material and successful bidder may supply above materials as approved by TPDDL. In addition, Bidder may refer to the attached QR for purchasing the material from other bidders.

**List of Approved Makes(Civil, Sanitary Items)**

| S.No. | Material Description                       | Make   |
|-------|--|--|
| 1     | Cement PPC                                 | Ultratech / Birla Uttam / Binani / Shree Ultra / Gujrat Ambuja / ACC   |
| 2     | White Cement                               | Birla / JK   |
| 3     | Structural Steel                           | TATA / SAIL / RINL / IISCO<br><b>(For quantity more than 10 tonnes)</b>  |
|       |  | Capital, Rana, MC  |
| 4     | Reinforcement Steel                        | Tisco, SAIL <b>(For quantity more than 10 tonnes)</b>  |
|       |  | Rathi, Kamdhenu  |
| 5     | Acid Resistant Tiles                       | Corromandel  |
| 6     | Floatglass / Mirror                        | Modi Guard / Saint Gobain  |
| 7     | Enamel Paint / Primer                      | Premium Quality of Asian / Berger / Nerolac / Dulux  |
| 8     | Cement Paint / Primer                      | Snowcem India  |
| 9     | Interlocking Tiles                         | Nimco / Dalal / HPL  |
| 10    | Aluminium                                  | Hindalco / Jindal / Mahabir  |
| 11    | PVC Water Tank                             | Syntex   |
| 12    | Wash Basin, IWC, EWC etc.                  | Parryware / Hindware   |
| 13    | Kitchen Sink                               | Neelkanth  |
| 14    | PVC Pipes and Fittings                     | Supreme, Finolex, Prakash  |
| 15    | CI Soil Pipes / Waste / Rainwater Pipes    | S.I.F, R.I.F   |
| 16    | CP Brass Bib Cock, Stop Cock etc.          | Parko, Chilli  |
|       |  | Jaguar (Base model) <b>( For Distt. Offices and other major buildings like Corporate, Scada, KPM, Cenpied)</b> |
| 17    | GI Pipe                                    | Jindal B   |
| 18    | GI Fittings                                | Unik   |
| 19    | Laminates                                  | Formica, Greenlam, Merino  |
| 20    | Flush doors                                | ISI mark water proof   |
| 21    | Board / Ply                                | National, Kitply, Durian, Greenlam, Century  |
| 22    | MDF Board - Exterior / Interior Grade      | Nuwud, Duratuff, Bajaj Echotech, Action Tesa   |
| 23    | Particle Board                             | Bajaj, Action tesa, Novapan  |
| 24    | Door Closer / Floor Spring                 | Everite, Doorking, Doorset   |
|       |  | Ozone, Dorma ) <b>( For Distt. Offices and other major buildings like Corporate, Scada, KPM, Cenpied)</b>      |
| 25    | Door Locks and Handles                     | Godrej, Hettich, Doorset   |
| 26    | Adhesive                                   | Fevicol, Vamicol   |
| 27    | Melamine Polish                            | Asian Paints, ICI, MRF, Touchwood, Wemblay   |
| 28    | Fire Retardent Paint (For all frame works) | Viper FR.881 or Approved Equivalent  |
| 29    | Terxtured paint                            | Spectrum, Unitex, Dulux  |
| 30    | Wood For Framing                           | Jammu Kail, Marandi, African Hard Wood   |
| 31    | Veneered Ply                               | Jacksons, United Veneers, Donear, Duro   |



APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

|    |                                |   |
|----|--------------------------------|---|
| 32 | Glazed / Vitrified Tiles       | Kajaria, Somani, Jhonson & Jhonson, Marbonite |
| 33 | PTMT Fittings                  | Prayag or Equivalent                          |
| 34 | Exhaust Fan                    | Crompton                                      |
| 35 | Monoblock Pump Sets            | Kirloskar, Crompton Greaves                   |
| 36 | Submersible Pump and Starter   | KSB   |
| 37 | Brass Bib Cock / Stop Cock     | Benson, Pace                                  |
| 38 | Brass Ferrule, Gunmetal Valves | DRP   |

**LIST OF APPROVED MAKES OF MATERIALS: (ELECTRICAL-Building)**

|     | Material  | Approved Makes  |
|-----|---|---|
| 1.  | M.S. Conduit Pipe (ISI Marked-ERW)  | BEC / SENCO(CALCUTTA) /AKG  |
| 2.  | M.S. Conduit Accessories  | SHARMA/RAMA/PEI   |
| 3.  | PVC Insulated Copper Stranded Conductor   | NATIONAL / SKYLINE / FINOLEX / BATRA-HENALY / RR  |
| a)  | 1.1 KV Grade Cable  | KABLES  |
| b)  | PVC Insulated PVC Sheathed Aluminium /Copper Conductor armoured L.T Cable (1.1 KV)                    | GLOSTER / UNIVERSAL / ICC / INCAB / POLYCAB   |
| 4.  | Moulded Plate Switch Socket with Switch Boxes & accessories / As per Item : Telephone/Music / Sockets | MK  |
| 5.  | Lugs/Ferrules   | DOWELLS/JAINSON   |
| 6.  | Brass Compression Gland (Heavy Duty)  | COMMEX/GRIPWELL   |
| 7.  | MCCB Thermal Magnetic O/C,S/C, E/F (Variable type)  | SIEMENS / L&T / ABB   |
| 8.  | ELCB / MCB (10 KA)  | HAGER / MDS (Legrand) / MERLIN GERIN  |
| 9.  | Distributions Board (Double Door & Metal Clad Socket Outlet)  | HANGER / MDS (Legrand) / MERLIN GERIN   |
| 10. | Telephone Cable   | DELTON / NATIONAL / SKYLINE / FINOLEX   |
| 11. | Telephone Tag Block with Boxes  | KRONE/POUYET  |
| 12. | Cable Trays   | BHARATI / SLOTCO / STEEL WAYS, AR enterprises, MME  |
| 13. | Selector Switch   | L&T / SIEMENS / BCH / SALZER  |
| 14. | L.T. Switch by M.V. Switch Boards (Powder Coated)   | TRICOLITE / ELECTRO CONTROL SYSTEM / MADHU ELECTRICAL./ KAYBEE Electricals (Noida) / KMG ATOZ (NOIDA) |
| 15. | PVC Conduit (ISI)   | BEC / POLYPACK / PRECISION / AKG  |
| 16. | Measuring Meters  | DUCATI / ENERCON / L&T / AE   |
| 17. | Control Fuses   | SIEMENS / GE/ L&T   |
| 18. | CT'S (Cast Resin)   | AEI / KAPPA / PRAGATI / C & S   |
| 19. | MCCB'S  | SIEMENS / L&T / SCHNEIDER / LEGRAND (MDS)   |
| 20. | GICU. Strip & Earthing Material   | BHARATI / INDIANA   |
| 21. | Ceiling Fan (High Breeze)   | CROMPTON / GEC  |
| 22. | Braket Fan  | ALMONARD / CROMPTON / GEC   |
| 23. | G.I. Pipe & Accessories (ISI)   | TATA/JINDAL/PRAKASH/HISSAR  |
| 24. | Light Fixture   | PHILIPS / DECON / WIPRO, OR APPROVED MAKE   |
| 25. | Smoke/Heat Defector   | APOLLO/EST (EDWARD), TATA HONEWELL  |
| 26. | Fire Alarm Panel with SMF Battery & Battery Charger   | MCE / MINIMAX /STYLUSS / AGNI SURAKSHA  |



APPROVED MAKE LIST – Product to be of the following make or equivalent subject to TPDDL approval

|     |   |  |
|-----|---|--|
| 27. | Response Indicator  | APOLLO /EDWARDS /TAT HONEYWELL / AGNI                  |
| 28. | Speaker/ Hooter   | PHILIPS/EDWARD/TAT HONEYWELL / AGNI                    |
| 29. | M.S. Conduit ISI  | BEC / SENCO  |
| 30. | Conduit Accessories Heavy Duty (ISI)                      | SHARMA /PIE EQUIVALENT                                 |
| 31. | FRLS PVC Insulated Copper Wire 1.1 KV Grade (ISI)         | SKYLINE / NATIONAL / FINOLEX / BATRA HANELY/ RR KABLES |
| 32. | Manual Call Station                                       | APOLLO/EDWARD/TAT HONEYWELL / AGNI                     |
| 33. | Exhaust fans  | CROMPTON / Newtec / Alsthom                            |
| 34. | Ceiling Rose, Piano type Switches/ Sockets & lamp holders | ANCHOR   |
| 35. | Changeover Switch / Main switch                           | L & T/ SCHNEIDER / ABB / Siemens                       |



|            |   |               |
|------------|---|---------------|
|            | TP Central Odisha Distribution Ltd Annexure-VIII  |               |
|            | WORK INSTRUCTION /OPERATING GUIDELINES            |               |
| Doc. Title | GENERAL CONDITIONS OF CONTRACT FOR COMPOSITE WORK |               |
| Rev. No    | 0   | Page 1 of 104 |

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## 1.0 ORGANIZATIONAL VALUES

The TPCODL has always been a value driven organization. These values continue to direct the growth and businesses.

**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 register any grievance on ethics violation on Central Control Telephone No. 011-66404040.

## 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

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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.

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- 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, licence 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

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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 |
|-------------|---|------------|
| <b>A</b>    | <b>Bidders already Registered with TPCODL</b>   | <b>100</b> |
|             | <b>Quality of the Products &amp; Services</b>   |            |
|             | a. <u>For Supply Part:</u><br>No Material Rejections in last 2 years<br>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%). | 12         |
| <b>A.1.</b> | b. <u>For Service Part:</u><br>No violation of statutory compliances in last 1 year.<br>Deduction of 2 marks for each instance of violation in last 1 year.   | 12         |
|             | c. <u>Safety</u><br>Deduction of 2 marks for each instance of safety violation in last 1 year.<br>Deduction of 4 marks for each reported Non-Fatal Accident in last 1 year. In case of any reported fatal accident: <b>ZERO MARKS</b>   | 16         |
| <b>A.2.</b> | <b>Timely Execution of Contracts</b><br>Total Achieved Score = {30 – 3 x (Avg. %age LD deductions in last 2 years)}   | 30         |
| <b>A.3.</b> | <b>Legal Issues with TPCODL</b><br>Zero instances of Arbitration procedures / Court Cases / PBG forfeitures in last 2 years: 30 marks else 'Zero' marks   | 30         |
| <b>B</b>    | <b>Bidders new to TPCODL</b>  | <b>100</b> |
|             | <b>Visits</b><br><u>For Supply Part:</u> Factory Visit and Evaluation.<br><u>For Service Part:</u> Client Site Visit where the bidder is providing similar services.  | 30         |
| <b>B.1.</b> | The visits as above shall be arranged by the bidder. However all costs towards conveyance, lodging, boarding etc. shall be borne by ODL. The score assigned by TPCODL based on the above visits shall be final and binding on the bidder.   |            |
|             | <b>Safety:</b>  | 20         |

| S. No.      | Evaluation Parameter   | Max. Score |
|-------------|--|------------|
|             | Score achieved against the BA safety Management System questionnaire.  |            |
| <b>B.2.</b> | <p><b>Client Referrals</b><br/>At least 3 nos. Customer References for similar products/ services in last 3 years. All customer references shall be either of the following:</p> <ul style="list-style-type: none"> <li>▪ Govt. Organizations/ PSUs/ Power Distribution Utilities.</li> <li>▪ Private Organizations with an annual turnover of <math>\geq</math> 500 cr. PO copies or Completion Certificates are admissible.</li> </ul> <p>Each reference: 10 marks</p> | 30         |
| <b>B.3.</b> | <p><b>Blacklisting Information</b><br/>Not blacklisted by any reputed organization / utility in last 2 years: 20 marks else 'Zero' marks.</p>  | 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.

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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.



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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**

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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, cess and duties, particularly Goods and Services Tax as applicable. All government levy / taxes shall be paid only when the invoice is submitted according to the relevant act.

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

The prices shall remain unchanged irrespective of 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.

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- 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 prorata 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

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- 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 Civil Lines III Office, TPCODL.

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 Civil lines-III, Near Vidhan Sabha, TPCODL.

## 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.

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## 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

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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 SA 8000

Further being TPCODL is SA 8000 complied and expects its Associates to follow guidelines of SA8000: 2014 on the following aspects

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

### 9.3 Affirmative Action

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             |

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**\*\*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.

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## **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



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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.

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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

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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

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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.<br>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

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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.

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#### **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/outsourced the schedule of activities of contract TPCODL enters with the associate, in part or full, without TPCODL's prior written approval.

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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**

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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



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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

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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 atleast two business days written notice for contracts having contract completion period less than sixty days and atleast seven business days' notice for all other contracts.

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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:

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- 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.

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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**

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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**

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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](http://www.tpcentralodisha.com) to provide your feedback according to the guidelines mentioned below:

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### 31.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be sent to the following mail ids:

- For all queries during the processing of invoice: purchase@cescorissa.com
- For all queries after the invoice is paid: purchase@cescorissa.com
- For any other grievance/ issues with respect to contract issued to Business Associate, please get in touch with BA Grievance Cell: purchase@cescorissa.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        |



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**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)

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**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

**TP Central Odisha Distribution Ltd  
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 one 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

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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**

- |          |  |
|----------|--|
| 1. _____ | Bank's rubber stamp<br>Banks full address        |
| 2. _____ | Designation of Signatory<br>Bank official number |

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**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

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**TP Central Odisha Distribution Ltd**

**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 one month** from the date of expiry.
5. This guarantee shall not be revoked without express consent and shall not be affected by your granting time or any other indulgence to "the Vendor", which shall include but not be limited to, postponement from time to time of the exercise the same in you or any right which you may have against "the Vendor" and to exercise the same in any covenant contained or implied in the said contract or any other course or remedy or security

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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**

- |          |                          |
|----------|--------------------------|
| 1. _____ | Bank's rubber stamp      |
|          | Banks full address       |
| 2. _____ | Designation of Signatory |
|          | Bank official number     |

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**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)**

|            |  |                |
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**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 severally 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**

**Place**

**Signature**

**Name**

**Designation (Company Seal)**

|            |  |                |
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**ANNEXURE-F**

**PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS  
CERTIFICATE**

To be printed on the letterhead

To,

**The TP Central Odisha Distribution Ltd**

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**



|            |  |                |
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## **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 TPCODL 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 TPCODL is a signatory to the United Nation Global Compact as an integral part of its Governance principles / business. 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:**

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- 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 7<sup>th</sup> / 10<sup>th</sup> 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 / encashing 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

|            |  |                |
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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 'Statutory Compliance Enforcement System' in TPCODL is detailed below for adherence by all concerned. Corporate IR & Welfare Group 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 Corporate IR & Welfare group for completion of statutory requirements.
- c) Normally, the work will be started only after 'Clearance for Commencement of Work (CCW)' is issued by IR & W group 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 IR & W group about the same. Statutory requirements in this case may be completed parallelly.
- 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 IR & W group.

**6.0 Requirements for 'Clearance for Commencement of Work' (CCW):**

- 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 Requirements during execution of work:**

- a) Copy of receipt of application for license / license (if applicable).
- b) Copy of PF Challan (latest by 26<sup>th</sup> day of every Month).
- c) Copy of ESI Challan (latest by 26<sup>th</sup> 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 Requirements for 'No Objection Certificate' (NOC) for closure of work:**

- a) Submission of duly filled up Form VI A (Notice of Completion).

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- 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

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**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)**

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**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:

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**Form XI**

**Undertaking**

With reference to the contract job awarded by TP Central Odisha Distribution Ltd  
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 \_\_\_\_\_



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**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 : \_\_\_\_\_

|            |  |                |
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(iii) Drinking water : \_\_\_\_\_

(iv) Crèches : \_\_\_\_\_

(v) First Aid : \_\_\_\_\_

**Signature of contractor**

Place \_\_\_\_\_

Date \_\_\_\_\_

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**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

|            |  |                |
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**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 / NCR       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**

|                          |  |
|--------------------------|--|
| <b>Your Name</b>         |  |
| <b>Your Designation</b>  |  |
| <b>Your Organization</b> |  |
| <b>Contact Nos.</b>      |  |
| <b>Email</b>             |  |

*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            | 2                     | 3                 | 4                   | 5           | Remarks/<br>Suggestion |
|--------|--|--------------|-----------------------|-------------------|---------------------|-------------|------------------------|
|        |  | Do Not Agree | Slightly in Agreement | In Fair Agreement | Mostly in Agreement | Fully Agree |                        |
| 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/<br>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/<br>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 | District / Zones   |   |   |   |   |   |                        |
| 1.3 | Projects/HOG (TS &P)   |   |   |   |   |   |                        |
| 1.4 | Inspection & Quality Assurance   |   |   |   |   |   |                        |
| 1.5 | Stores   |   |   |   |   |   |                        |
| 1.6 | Metering & Billing   |   |   |   |   |   |                        |
| 1.7 | Accounts / Finance   |   |   |   |   |   |                        |
| 1.8 | Administration   |   |   |   |   |   |                        |
| 1.9 | IT & Automation  |   |   |   |   |   |                        |
| 2   | How would you rate TPCODL in comparison to your other clients in terms of <b>fairness of treatment and transparency</b> with its Business Associates?        |   |   |   |   |   |                        |
| 3   | How would you rate TPCODL in comparison to your other clients in terms of <b>processes and systems to manage partnership</b> with its Business Associates    |   |   |   |   |   |                        |
| 4   | How would you rate TPCODL in comparison to your other clients in terms of <b>building long term &amp; mutually relationship</b> 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/<br>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 |
|---|---|---|---|---|---|---|---|---|----|

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### **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, attitudes that you have observed / experienced elsewhere in Indian/ International organization.

| Recommendation  | <i>Please tick (✓) your top 5 expectations out of the following 10 points listed below -</i>    |  |
|---|---|--|
| (Please list down improvement you expect from TPCODL) | <i>Timely payment</i>   |  |
| 1   | <i>Flexibility in Contracts/PO</i>  |  |
|   | <i>Clarity in PO,s &amp; Contracts</i>  |  |
| 2   | <i>Timely response to quarries</i>  |  |
|   | <i>Timely certification of works executed</i>   |  |
| 3   | <i>Clarity in Specs,drawings,other docs etc</i>   |  |
|   | <i>Adequate information provided on website for tender notification, parties qualified etc.</i> |  |
| 4   | <i>Timely receipt of material at site for execution</i>   |  |
|   | <i>Performance Guarantee/EMD released in time</i>   |  |
| 5   | <i>Inspection &amp; quality assurance support for timely job completion</i>                     |  |

We thank you for your time and courtesy!!

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## **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**



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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.

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### 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 DOSEC of TPCODL before deployment in the field. BA Cell shall recommend the suitability after competency checked by Engineer In-charge and SHE&DM group (or his representative) of TPCODL. After getting the clearance from DOSEC, 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**

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**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 SHE&DM 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



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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 SHE&DM Group of TPCODL.
- 5.5.8 Reporting of unsafe acts, unsafe conditions, near miss, incident or accident to Engineer In-Charge and SHE&DM 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 DOSEC 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 DOSEC, 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*)

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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 SHE&DM 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 SHE&DM 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 SHE&DM 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 SHE&DM team for information. The main form is to be given to BA supervisor / Engineer in-charge. <i>(Automatically generated if Site audit done through Mobile App.)</i> | Engineer In-charge/ NSO / SC / SHE&DM 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). <i>(Automatically generated if Site audit done through Mobile App.)</i>                                  | SHE&DM Group   |
| ↓   |  |
| Forwarding the information Centralized Account Payable  | Engineer In-charge   |

|   |   |
|---|---|
| (CAPS) for amount deduction from the current bill of the BA, if any.  |   |
| ↓   |   |
| HoG (Safety – II) & HoG (Safety & Quality – Commercial) and CAPS to generate the MIS of the violations and the amount deducted. | SHE&DM Group  |
| ↓   |   |
| The pool of the amount generated after the deduction to be utilized in safety welfare of BA employees.                          | SHE&DM 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 3<sup>rd</sup> violation.

### 6.3 Safety Violation Escalation Matrix

#### 6.3.1

| Consequence of Safety Violation Observed<br>(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 penalty 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     | Penalty Amount (in Rs.) | The number of violations are to be calculated cumulatively over the contract period and not on monthly basis. |
|--------|---|--------------------|-------------------------|---|
| A      | Warning letter  | Engineer Incharge  | Nil                     |   |
| 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)-Penalty Matrix for Safety violation (Applicable for Minor Contracts)

| Consequence of Safety Violation Observed<br>(Not related to Incident/ Accident) |  | Violation          |                         |   |     | Subsequent Violations   |
|---|--|--------------------|-------------------------|---|-----|---|
| S.No.   | Safety Violation   | 1st                | 2nd                     | 3rd   | 4th |   |
| 1   | Working without PPE (Helmet/Gloves/Safety Harness/ Safety Shoes etc.)  | B                  | C                       | D   | D   | Will attract the same penalty 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     | Penalty Amount (in Rs.) | The number of violations are to be calculated cumulatively over the contract period and not on monthly basis. |     |   |
| A   | Levy of Penalty  | Engineer Incharge  | 5,000                   |   |     |   |
| 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)-Penalty 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 Addl GM/ GM/ Sr. GM level) and further, *if required*, continuation / extension of contract will only be initiated by Functional Head of the department (equivalent to Sr. GM / VP 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 SHE&DM 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<br>(In case of <b>MAJOR</b> contract) |  | Incident / Accident   |                  |   |          | Action<br>Required              |
|---|--|---|------------------|---|----------|---------------------------------|
| Sl. No  | Type of the injury   | 1st   | 2nd              | 3rd   | 4th      |                                 |
| 1   | Slight injury (First Aid Case)   | <b>F</b><br>(Strengthening of process through continuous improvement in the work procedure) |                  |   |          | Take risk reduction<br>measures |
| 2   | Minor injury (No or Hospitalization less than 48 Hrs)                        | <b>F</b>  | <b>G</b>         | <b>G</b>  | <b>H</b> |                                 |
| 3   | Major injury (Bone injury or burn or Hospitalization more than 48 Hrs)       | <b>G</b>  | <b>G</b>         | <b>H</b>  | <b>I</b> |                                 |
| 4   | Single fatality  | <b>J</b>  | <b>K</b>         |   |          | Intolerable                     |
| 5   | Multiple fatalities (Two or more fatalities during one event)                | <b>K</b>  |                  |   |          |                                 |
| Legend  | Action to be taken   | Responsibility  | Penalty (in Rs.) | The number of violations are to be calculated cumulatively over the contract period and not on monthly basis. |          |                                 |
| <b>F</b>  | Memo to BA and levy of penalty   | Engineer Incharge   | 5,000/-          |   |          |                                 |
| <b>G</b>  | Memo to BA and levy of penalty   | Head of Group   | 20,000/-         |   |          |                                 |
| <b>H</b>  | Memo to BA and levy of penalty   | Head of Group   | 50,000/-         |   |          |                                 |
| <b>I</b>  | Memo to BA and levy of penalty   | Head of Department  | 2,00,000/-       |   |          |                                 |
| <b>J</b>  | Memo to BA and levy of penalty   | Head of Department  | 5,00,000/-       |   |          |                                 |
| <b>K</b>  | 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<br>(In case of <b>MINOR</b> contract) |  | Incident / Accident   |                  |   |          | Action<br>Required              |
|---|--|---|------------------|---|----------|---------------------------------|
| Sl. No  | Type of the injury   | 1st   | 2nd              | 3rd   | 4th      |                                 |
| 1   | Slight injury (First Aid Case)   | <b>L</b><br>(Strengthening of process through continuous improvement in the work procedure) |                  |   |          | Take risk reduction<br>measures |
| 2   | Minor injury (No or Hospitalization less than 48 Hrs)                            | <b>L</b>  | <b>M</b>         | <b>M</b>  | <b>N</b> |                                 |
| 3   | Major injury (Bone injury or burn or Hospitalization more than 48 Hrs)           | <b>M</b>  | <b>M</b>         | <b>N</b>  | <b>O</b> |                                 |
| 4   | Single fatality  | <b>P</b>  | <b>Q</b>         |   |          | Intolerable                     |
| 5   | Multiple fatalities (Two or more fatalities during one event)                    | <b>Q</b>  |                  |   |          |                                 |
| Legend  | Action to be taken   | Responsibility  | Penalty (in Rs.) | The number of violations are to be calculated cumulatively over the contract period and not on monthly basis. |          |                                 |
| <b>L</b>  | Memo to BA and levy of penalty   | Engineer Incharge   | 5,000/-          |   |          |                                 |
| <b>M</b>  | Memo to BA and levy of penalty   | Engineer Incharge   | 10,000/-         |   |          |                                 |
| <b>N</b>  | Memo to BA and levy of penalty   | Head of Group   | 25,000/-         |   |          |                                 |
| <b>O</b>  | Memo to BA and levy of penalty   | Head of Department  | 1,00,000/-       |   |          |                                 |
| <b>P</b>  | Memo to BA and levy of penalty   | Head of Department  | 3,00,000/-       |   |          |                                 |
| <b>Q</b>  | 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

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*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. For Death or Permanent / Total Disablement**

The BA shall take an insurance coverage of at least Rs. 10 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

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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 Ltd   |
| BA                            | Business Associate   |
| HIRA                          | Hazard Identification & Risk Assessment  |
| JSA                           | Job Safety Analysis  |
| EHV                           | Extra High Voltage   |
| SHE&DM                        | 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.  |

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**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 |
| <i>Safety Policy and Management</i>   |       |                      |    |                |
| - <b>Is there a written company Safety policy?</b><br>- If yes provide a copy of the policy, if No please refer Note 1.   | 1     |                      |    |                |
| - <b>Does the company have an Safety Management system</b><br>- If yes provide details, if No please refer Note 1.  | 1     |                      |    |                |
| - <b>Is there a company Safety Management System manual or plan?</b><br>- If yes provide a copy of the content page(s), if No please refer Note 1.  | 2     |                      |    |                |
| - <b>Are Safety and occupational health responsibilities clearly identified for all levels of Management and staff?</b><br>- If yes provide details, if No please refer Note 1.   | 2     |                      |    |                |
| <i>Safe Work Practices and Procedures</i>   |       |                      |    |                |
| - <b>Has the company prepared safe operating procedures or specific safety instructions relevant to its operations and relevant work as per contract?</b><br>- If yes provide a summary listing of procedures or instructions, if No please refer Note 2. | 1     |                      |    |                |

| Certification  |   |  |  |  |
|--|---|--|--|--|
| - Comments   |   |  |  |  |
| - <b>Is there a register of injury or accident?</b><br>- If yes provide a copy (format)  | 1 |  |  |  |
| - <b>Is there a documented incident or accident investigation procedure?</b><br><br>- If yes provide a copy of a standard incident report form, if No please refer Note 2.<br><br>- Comments             | 1 |  |  |  |
| <i>Safety Training</i>   |   |  |  |  |
| - <b>Describe how occupational health and safety training is conducted in your company</b><br><br>If No please refer Note 1.   | 2 |  |  |  |
| - <b>Is a record maintained of all training and induction programs undertaken for employees in your company?</b><br><br>- If yes provide examples of safety training records, if No please refer Note 2. | 1 |  |  |  |
| - <b>Are regular safety inspections / audits are undertaken at worksites?</b><br><br>-If yes provide details (formats), if No please refer Note 3.   | 1 |  |  |  |
| - <b>Is there a procedure by which employees can report hazards at workplaces?</b><br><br>- If yes provide details if No please refer Note 1.  | 1 |  |  |  |
| <i>Safety Monitoring</i>   |   |  |  |  |
| - <b>Is there an officer / supervisor responsible for monitoring workplace / worksite safety?</b>  | 1 |  |  |  |

| Certification   |  |                      |  |  |
|---|--|----------------------|--|--|
| - If yes provide details  |  |                      |  |  |
| <i>Safety Performance Monitoring</i>  |  |                      |  |  |
| - <b>Are employees regularly provided with information on company health and safety performance?</b><br>- If yes provide details  | 1  |                      |  |  |
| - <b>Has the company ever been convicted of an occupational health and safety offence?</b><br>- If yes provide details  | NO<br>Marks<br>(Negative<br>mark<br>ONE for<br>each<br>case) |                      |  |  |
| - Has there been any major accident of employee at TPCODL site in past  | NO<br>Marks<br>(Negative<br>mark<br>ONE for<br>each<br>case) |                      |  |  |
| - Has there been any fatal accident of employee at TPCODL site in past.<br>- (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.<br>- In case of yes please refer Note 4. | NO Mark<br>(Negative<br>mark<br>FIVE for<br>each<br>case)    |                      |  |  |
| Minimum of 75% marks is required for qualification.   |  | Total Marks achieved |  |  |
| <i>Company Reference</i>  |  |                      |  |  |
| 1. <i>Name of company</i><br>2. <i>Name of company</i>  |  |                      |  |  |

**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.

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3: The vendor may utilize the same format of TPCODL or on request SHE&DM group will assist the vendor in developing the audit system. For other points also vendor may take the assistance of SHE&DM 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             | <ol style="list-style-type: none"> <li>1. Mandatory usage of JSA checklist prior to start of work</li> <li>2. Use appropriate ladder</li> <li>3. Use full body safety harness having double lanyard.</li> <li>4. Use Electrical Safety Shoes if working on electrical network otherwise use safety shoes.</li> <li>5. Use Safety helmet.</li> <li>6. Use PPE as per the annexure 7 of this CSM document</li> <li>7. Refer Work instruction related to Working at Height for other details</li> <li>8. Use of metal scaffold to be ensured in height work (cup lock type)</li> <li>9. Deploy competent workforce who are medically fit</li> </ol> |

| Specific Task/Activity                      | Potential Hazards/Consequences                            | Class of Risk | Control Measures  |
|---|---|---------------|---|
| Working on electrical equipment / network   | Electric flash / electrocution                            | 3             | <ol style="list-style-type: none"> <li>1. Mandatory usage of JSA checklist prior to start of work</li> <li>2. Use Electrical Safety Shoes while working on electrical network.</li> <li>3. Use Electrical Safety gloves of appropriate voltage rating.</li> <li>4. Use face shield / visor attached with helmet.</li> <li>5. Use Safety helmet.</li> <li>6. Use PPE as per the annexure 7 of this CSM document</li> <li>7. Mandatory usage of Insulated tools &amp; tackles on electrical system</li> <li>8. Mandatory compliance for Lock Out &amp; Tag out system. Refer Work instruction related to Working on electrical equipment / network for other details</li> </ol> |
| Excavation / Civil work                     | Collapse of soil, Fall in excavated pit leading to Injury | 2             | <ol style="list-style-type: none"> <li>1. Use safety shoes.</li> <li>2. Use Safety helmet.</li> <li>3. Use PPE as per the annexure 7 of this CSM document</li> <li>4. Hard Barricading of the worksite.</li> <li>5. Refer Work instruction related to excavation / civil work for other details</li> </ol>  |
| Material lifting & Mechanical Erection work | Fall of material/object, Topple of crane,                 | 2             | <ol style="list-style-type: none"> <li>1. Mandatory compliance of crane checklist</li> <li>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.</li> <li>3. The operator's physical fitness and alertness should be judged by sup. / EIC.</li> <li>4. Use PPE as per the annexure 7 of this CSM document</li> <li>5. Refer Work instruction related to Material lifting &amp; Mechanical Erection work</li> </ol>  |
| Road Safety                                 | Road Accidents  | 3             | <ol style="list-style-type: none"> <li>1. Mandatory compliance of TPCODL Road Safety policy W07(COR-P-12)</li> </ol>  |

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| 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.

GENERAL CONDITIONS OF CONTRACT

### 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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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.





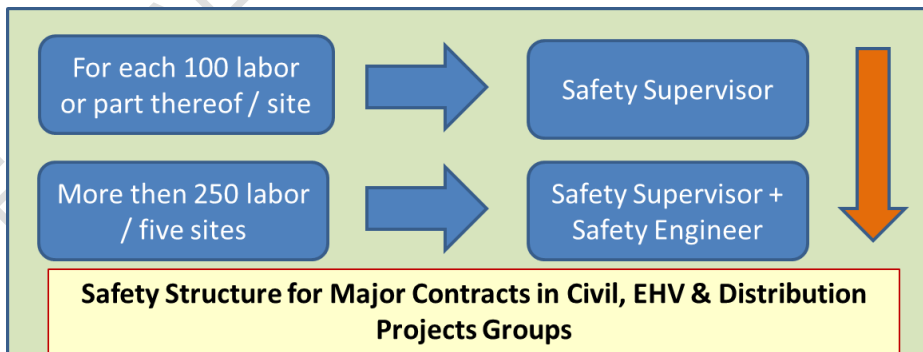
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**Annexure 3.2 (Refer Para 4.0)**

**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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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.

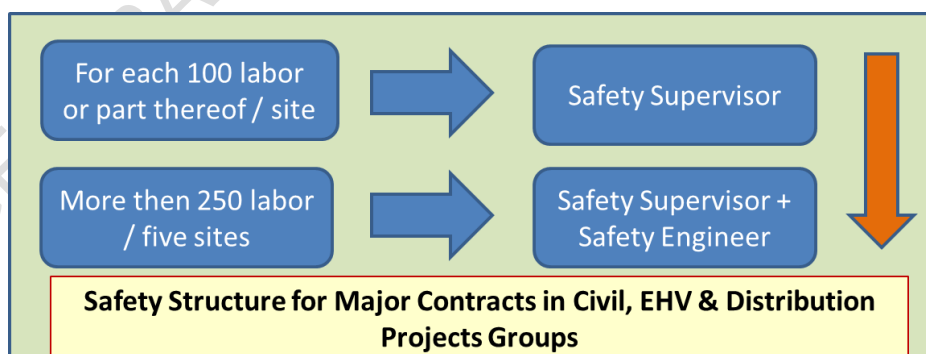


### Annexure 3.3 (Refer Para 4.0)

#### 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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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 fulfill 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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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.



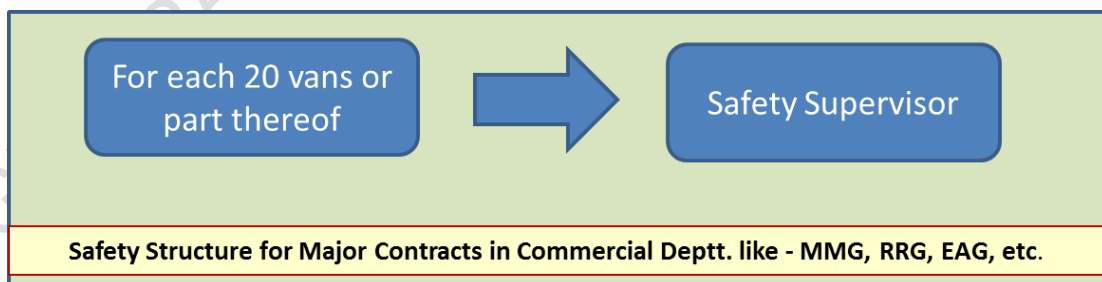
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**Annexure 3.6 (Refer Para 4.0)**

**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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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.



**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 SHE&DM 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 SHE&DM team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SHE&DM 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.



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### **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 Ltd (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.

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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



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**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 NCT of Delhi / 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)

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## **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

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- 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)<br><br>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 )<br><br>Joseph Leslie<br><br>Accent Industries<br><br>Honeywell               |
| 03      | Full body harness (Safety belt)                                     | EN 361                    | Monthly and visual check every day of the bends and the harness.                   |  | Karam (PN Safetech )<br><br>Joseph Leslie<br><br>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 )<br><br>Joseph Leslie<br><br>Accent Industries<br><br>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 SHE&DM 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)<br><br>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<br>EN 358 : 2000<br>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<br><i>(Applicable for the BA involved in major construction works and have storage of flammable material at worksite)</i> |                          | 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:



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| 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  
HoG

Signature of ZM /

Name, E. No. and Date

Name, E. No. Date.

*Note: The original form to be deposited with Engineer in-charge and a copy to SHE&DM group on or before 5<sup>th</sup> 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.*

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**ANNEXURE-M**  
**VENDOR APPRAISAL FORM**

| <b>TO BE SUBMITTED BY VENDOR (To be filled as applicable)</b> |   |  |
|---|---|--|
| <b>VENDOR:</b>  |   |  |
| <b>1.0</b>  | <b>DETAILS OF THE FIRM</b>  |  |
|   | 1.1   | NAME (IN CAPITAL LETTERS) :  |
|   | 1.2   | TYPE OF CONCERN (PROPRIETARY)<br>Partnership, Pvt. Ltd., Public Ltd. etc. :              |
|   | 1.3   | YEAR OF ESTABLISHMENT :  |
|   | 1.4   | LOCATION OF OFFICE<br>POSTAL ADDRESS<br>TELEGRAPHIC ADDRESSES,<br>TELEX NO.<br>FAX NO. : |
|   | 1.5   | LOCATION OF MANUFACTURING UNITS :  |
|   |   | i) UNITS 1 :   |
|   |   | ii) OTHER UNITS :  |
| <b>2.0</b>  | <b>PRODUCTS MANUFACTURED</b> :  |  |
| <b>3.0</b>  | <b>TURNOVER DURING THE LAST 3 YEARS (TO BE VERIFIED WITH THE LATEST PROFIT &amp; LOSS STATEMENT).</b> : |  |
| <b>4.0</b>  | <b>VALUE OF FIXED ASSETS</b> :  |  |
| <b>5.0</b>  | <b>NAME &amp; ADDRESS OF THE BANKERS</b> :  |  |
| <b>6.0</b>  | <b>BANK GUARANTEE LIMIT</b> :   |  |
| <b>7.0</b>  | <b>CREDIT LIMIT</b> :   |  |
| <b>8.0</b>  | <b>TECHNICAL</b>  |  |
|   | 8.1   | NO.OF DESIGN ENGINEERS (INDICATE<br>NO.OF YEARS EXPERIENCE IN RELATED<br>FIELDS) :       |
|   | 8.2   | NO.OF DRAUGHTSMEN :  |
|   | 8.3   | COLLABORATION DETAILS (IF ANY) :   |
|   |   | 8.3.1 DATE OF COLLABORATION :  |
|   |   | 8.3.2 NAME OF COLLABORATOR :   |

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|            |                    |   |   |
|------------|--------------------|---|---|
|            |                    | 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 / COLLABORATOR'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   | : |
| <b>9.0</b> | <b>MANUFACTURE</b> |   |   |
|            | 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   | : |
| <b>10.0</b> | <b>INSPECTION / QC / QA / TESTING</b>  |  |   |
|             | 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                          | : |
| <b>11.0</b> | <b>EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)</b> |  |   |
| <b>12.0</b> | <b>SALES, SERVICE AND SITE ORGANISATIONAL DETAILS</b>  |  |   |

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|--------|---|---|
| 13.0   | <b>CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)</b>  | : |
| 14.0   | <b>POWER SITUATION</b>  | : |
| 15.0   | <b>LABOUR SITUATION</b>   | : |
| 16.0 * | <b>APPLICABILITY OF SC/ST RELAXATION (Y/N)<br/>IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED</b>  |   |
| 17.0   | <b>ORGANIZATIONAL DETAILS</b><br>1. PF NO<br>2. ESI NO<br>3. INSURANCE FOR WORK MAN COMPENSATION ACT NO<br>4. ELECTRICAL CONTRACT LIC NO<br>5. ITCC / PAN NO<br>6. SALES TAX NO<br>7. WC TAX REG. NO  | : |
| 18.0   | <b>DOCUMENTS TO BE ENCLOSED:</b><br>1. FACTORY LICENSE<br>2. ANNUAL REPORT FOR LAST THREE YEARS<br>3. TYPE TEST REPORT FOR THE ITEM<br>4. PAST EXPERIENCE REPORTS<br>5. ISO CERTIFICATE –QMS, EMS, OHAS, SA<br>6. REGISTRATION OF SALES TAX<br>7. COPY OF TIN NO.<br>8. COPY OF SERVICE TAX NO.<br>9. REGISTRATION OF CENTRAL EXCISE<br>10. COPY OF INCOME TAX CLEARANCE.<br>11. COPY OF PF REGISTRATION<br>12. COPY OF ESI REGISTRATION<br>13. COPY OF INSURANCE FOR WORK MAN COMPENSATION ACT NO<br>14. COPY OF ELECTRICAL CONTRACT LIC NO<br>15. COPY OF PAN NO<br>16. COPY OF WC TAX REGISTRATION<br>17. DOCUMENTS IN SUPPORT OF SC/ST RELAXATION AT S.NO.16.0<br>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)*

|            |  |                 |
|------------|--|-----------------|
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Date: .....

Tender Enquiry No.: .....

To,

Head (Contracts & Stores)

The 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

GENERAL CONDITIONS OF CONTRACT