



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

NIT No.: TPCODL/P&S/56/2020-21

## **OPEN TENDER NOTIFICATION**

**FOR**

**RATE CONTRACT FOR 11KV AND 33 KV  
ASSOCIATED WORKS (CONSTRUCTION /  
AUGMENTATION) ALL OVER TPCODL AREA**

**Tender Enquiry No.: TPCODL/P&S/56/20-21**

**Due Date for Bid Submission: 19-Aug-2020 [13:00 Hrs.]**

**TP Central Odisha Distribution Limited  
(A TATA Power and Odisha Government Joint Venture)  
Procurement & Stores Department,  
2<sup>nd</sup> Floor, IDCO Towers, Janpath, Bhubaneswar – 751022**



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

NIT No.: TPCODL/P&S/56/2020-21

**CONTENTS OF THE ENQUIRY**

**Contents**

1.0	Event Information.....	3
2.0	Evaluation Criteria .....	5
3.0	Submission of Bid Documents.....	6
4	Bid Opening & Evaluation process .....	9
5	Award Decision.....	10
6	Order of Preference/Contradiction.....	11
7	Post Award Contract Administration.....	11
8	Specification and standards .....	14
9	General Condition of Contract.....	14
10	Safety.....	15
	ANNEXURE I.....	16
	ANNEXURE II.....	56
	ANNEXURE III.....	58
	ANNEXURE IV.....	59
	ANNEXURE V.....	60
	ANNEXURE VI.....	61
	ANNEXURE VII.....	62
	ANNEXURE VIII.....	64
	ANNEXURE IX.....	65
	ANNEXURE X.....	78
	ANNEXURE XI.....	79



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

NIT No.: TPCODL/P&S/56/2020-21

## 1.0 Event Information

### 1.1. Scope of work

**Open Tenders** are invited from interested Bidders entering into a Rate Contract valid for 1 years for the following:

S. No.	Description	EMD Amount (Rs.)	Tender Fee* (Rs.)
1.	Rate Contract for 11kV and 33 kV associated works (Construction / Augmentation) all over TPCODL area	5,00,000	5,000

*\*inclusive of GST*

### 1.2. Availability of Tender Documents

Non-transferable tender documents may be purchased by interested eligible bidders from address given below, on submission of written application to the under mentioned and upon payment of non-refundable Tender Fee.

**Chief (Procurement & Stores)**  
TP Central Odisha Distribution Limited  
2<sup>nd</sup> Floor, IDCO Towers, Janpath, Bhubaneswar – 751022

Tender documents may be downloaded by interested eligible bidders from TPCODL website [www.tpcentralodisha.com](http://www.tpcentralodisha.com) with effect from 24 July 2020. In the event of detailed tender documents are downloaded from TPCODL website, the Tender Fee shall be compulsorily submitted either online through NEFT/ RTGS or demand draft/ Banker's cheque drawn in favor of "TP Central Odisha Distribution Limited", payable at Bhubaneswar only. Any such bid submitted without this Fee shall be rejected.

Bidders are requested to visit TPCODL website [www.tpcentralodisha.com](http://www.tpcentralodisha.com) regularly for any modification/ clarification to the bid documents.

### 1.3. Calendar of Events

(a)	Date of sale/ availability of tender documents from TPCODL Website	24.07.2020 1000 Hours
(b)	Last date and time of Payment of Tender Fee	07.08.2020 1500 Hours
(c)	Last Date of receipt of pre-bid queries, if any	11.08.2020 1000 Hours
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	14.08.2020 1800 Hours
(e)	Last date and time of receipt of Bids	19.08.2020 1500 Hours
(f)	Date & Time of opening technical bids and EMD (Envelope-1 & 2)	19.08.2020 1500 Hours



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

NIT No.: TPCODL/P&S/56/2020-21

**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's office, the last date of submission of bids and date of opening of bids will be the day following working day at appointed times.

**1.4 Mandatory documents required along with the Bid**

- 1.4.1 EMD of requisite value and validity
- 1.4.2 Tender Fee in case the tender is downloaded from website
- 1.4.3 Requisite Documents for compliance to Qualification Criteria mentioned in Clause 1.7.
- 1.4.4 Drawing, Type Test details along with a sample of each item as specified at Annexure I (as applicable)
- 1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.
- 1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.
- 1.4.7 Proper authorization letter/ Power of Attorney to sign the tender on the behalf of bidder.
- 1.4.8 Copy of PAN, GST, PF and ESI Registration (In case any of these documents is not available with the bidder, same to be explicitly mentioned in the 'Schedule of Deviations')

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

**1.5. Deviation from Tender**

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

**1.6. Right of Acceptance/Rejection**

Bids are liable for rejection in absence of following documents:

- i. EMD of requisite value and validity
- ii. Tender fee of requisite value
- iii. Price Bid as per the Price Schedule mentioned in Annexure I (BOQ)
- iv. Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document
- v. Filled in Schedule of Deviations as per Annexure III
- vi. Filled in Schedule of Commercial Specifications as per Annexure IV
- vii. 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**

- a) *The bidder should have an average annual turnover of Rs.10 crores in last three financial years (FY 17-18, FY 18-19 and FY 19-20). Copy of audited Balance Sheet and P&L Account to be submitted in this regard.*
- b) *The bidder must have executed similar jobs for maintenance/ commissioning of 11 kV/33KV network in any utility/companies for a total value of Rs. 1 cr. or one single order*





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

NIT No.: TPCODL/P&S/56/2020-21

*of Rs. 30 lacs or two orders of Rs. 20 lacs each or three order of Rs 10 lac each during last 3 financial years.*

*Note: - In case the bidder has a previous association with TPCODL for similar products and services, the performance feedback for that bidder by TPCODL's User Group shall only be considered irrespective of performance certificates issued by any third organization.*

- c) The bidder should have Valid Electrical Contractor License issued by Govt. of Odisha to execute the electrical works in Odisha. Copy of valid Electrical Contractor License issued by Govt. of Odisha needs to be submitted by bidder. In case bidder is not having this License, Bidder shall submit an undertaking that in case they are the successful bidder, same shall be obtained by them before award of contract by TPCODL.*
- d) The bidder should have performance certificates from at least 2 reputed companies for similar or higher rating of work. The work against these issued certificates should be completed in last seven years from the date of bid submission.*
- e) The bidder must have all statutory compliance like valid PAN no., ESI registration, EPF registration, GSTN etc. The bidder must submit the copy of all these registrations*

### **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 over BOQ basis (all-inclusive lowest cost) for the complete tender as calculated in Schedule of Items [Annexure I].
- The bids will be evaluated on Safety Parameters as mentioned in Annexure-VIII. Bidders have to submit all the documents related to safety bid.
- Bidder has to mandatorily quote against each item of Schedule of Items [Annexure I]. Failing to do so, TPCODL may reject the bids.



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

NIT No.: TPCODL/P&S/56/2020-21

**NOTE:** In case a new bidder is not registered with TPCODL, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However, TPCODL reserves the right to carry out factory 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.

### **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 4 (four) 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 Bank Guarantee / Bank Draft / Bankers Pay Order (issued from a Scheduled Bank) online NEFT/ RTGS transfer favoring 'TP Central Odisha Distribution Limited' payable at Bhubaneswar. The EMD has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted by TPCODL 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 NEFT/ RTGS in case the tender document is downloaded from our website.

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**

**Note-** EMD is preferred in form of Bank Guarantee and to be delivered at the following address. However, in view of present situation if Bidder is finding it difficult to make and submit BG for EMD amount, they can do online transfer of EMD amount in the above mentioned Account and submit proof of the same as part of Bid Submission.

Please note that in such case, Tender Fee and EMD should be strictly 2 separate transactions.

Please note as return of EMD from Bank Account is non-standard practice the same may take more time than return of EMD BG.

**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**

*Property of TPCODL – Not to be reproduced without prior written permission of TPCODL*



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

NIT No.: TPCODL/P&S/56/2020-21

**SECOND PART: “TECHNICAL BID”** shall contain the following documents:

- a) Documentary evidence in support of qualifying criteria
- b) Technical literature/GTP/Type test report etc. (if applicable)
- c) Qualified manpower (if available)
- d) Testing facilities (if applicable)
- e) No Deviation Certificate as per the Annexure III – Schedule of Deviations
- f) Acceptance to Commercial Terms and Conditions viz. Delivery schedule/period, payment terms etc. as per the Annexure IV – Schedule of Commercial Specifications.
- g) Quality Assurance Plan/Inspection Test Plan for supply items (if applicable)

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

**THIRD PART (Safety Bid):** Bidder shall mention the details as required in the safety bid form (As mentioned in annexure- IX). Bidder also has to submit the relevant documents for the same as required by TPCODL

**FOURTH PART: “PRICE BID”** shall contain only the price details and strictly in format as mentioned in Annexure I along with explicit break up of basic prices, Taxes & duties, Freight etc. In case any discrepancy is observed between the item description stated in Schedule of Items mentioned in the tender and the price bid submitted by the bidder, the item description as mentioned in the tender document (to the extent modified through Corrigendum issued if any) shall prevail.

**Price Bid is to be submitted in soft copy through TPCODL E-Tendering system (Ariba) only. Hard copy of Price Bid not be submitted**

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

EMD

**“RATE CONTRACT FOR 11KV AND 33 KV ASSOCIATED WORKS (CONSTRUCTION / AUGMENTATION) ALL OVER TPCODL AREA”**

The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the TPCODL, shall be written in the English Language. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

**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,



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

NIT No.: TPCODL/P&S/56/2020-21

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 bid.

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

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

### **3.2 Contact Information**

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

#### **Communication Details:**

Handling Executive for this Tender:

Name: Vibhor Kumar Singh

Contact No.: 8130485135

E-Mail ID: [vibhor.singh@tpcentralodisha.com](mailto:vibhor.singh@tpcentralodisha.com) / [vibhor.singh@tatapower-ddl.com](mailto:vibhor.singh@tatapower-ddl.com)

Senior General Manager (Material Procurement):

Name: Mr. Deba Prasad Dash

Contact No.: 9438297571

E-Mail ID: [purchase@cescoorissa.com](mailto:purchase@cescoorissa.com)

### **3.3 Bid Prices**

Bidders shall quote for the entire Scope of Supply/ work with a break up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit 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.

#### **Applicable GST to be specified clearly.**

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

### **3.4 Bid Currencies**

Prices shall be quoted in Indian Rupees Only.

### **3.5 Period of Validity of Bids**

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

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.

RC Validity: - The validity of this rate contract shall be one year from the date of issuance.



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

NIT No.: TPCODL/P&S/56/2020-21

### 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 TPCODL against the risk of bidder's conduct which would warrant forfeiture.

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

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

#### ***The EMD shall be forfeited in case:***

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

**Or**

b) The successful Bidder does not

- a) accept the Purchase Order, or
- b) furnish the required Performance Security Bank Guarantee

### 3.9 Type Tests (if applicable)

The type tests 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 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 rejection of the Bidder's Bid.

### 4.2. Technical Bid Opening

Bids will be opened at TPCODL Office, Bhubaneswar. All tender bids shall be opened internally by TPCODL. Presence of any bidder will not be allowed during bid opening process. Technical bid must not contain any cost information whatsoever.

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.

*Property of TPCODL – Not to be reproduced without prior written permission of TPCODL*





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

NIT No.: TPCODL/P&S/56/2020-21

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened, one by one.

#### **4.3. Preliminary Examination of Bids/Responsiveness**

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

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

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

Bid determined as not substantially responsive will be rejected by the TPCODL and 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.

#### **4.5. Price Bid Opening**

Price bids will be opened internally without the presence of any bidder representative. 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.

#### **4.6. 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 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 3.2 above. The decision to place purchase order/LOI solely depends on TPCODL on the cost



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

NIT No.: TPCODL/P&S/56/2020-21

competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that TPCODL may deem relevant.

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

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

## **6 Order of Preference/Contradiction**

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

1. Schedule of Items (Annexure I)
2. Post Award Contract Administration (Clause 7.0)
3. Submission of Bid Documents (Clause 3.0)
4. Scope of Work and SLA (Annexure VII)
5. Technical Specifications (Annexure II)
6. Acceptance Form for Participation in Reverse Auction (Annexure VI)
7. General Conditions of Contract (Annexure VIII)

## **7 Post Award Contract Administration**

### **7.1. Special Conditions of Contract**

- Rate contract shall be valid for a period of 1 years from the placement of Contract. Release Order (RO) shall be placed as per the requirement of TPCODL. Rate shall remain FIRM till the validity of Rate Contract.
- Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 30 days of issuance of order. PBG applicable shall be 5% of Order Value. PBG submitted, shall be released after completion of applicable guarantee period plus one month.
- 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 Bidder, whereas any benefits arising owing to such statutory variation in taxes and duties shall be passed on TPCODL.
- Statutory Variations: Any changes in existing taxes/ Duties and levies, Introduction of new taxes and duties etc. during the period of the contract shall be paid at actuals to BA subject to BA shall submit the tax break up in details, however, where BA has quoted the all-inclusive prices and not shown the tax break-up, this clause will not be applicable. The date of issue of MDCC shall be used for this purpose.
- Quotation in all BOM items is mandatory, and bid shall be rejected if any line of found blank in un price bid.
- There will be no price escalation given to bidder after issue the RO even if there is delayed the project due to ROW permission.
- Quotation in all BOM items is mandatory, and bid shall be rejected if any line of found blank in un price bid.



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

NIT No.: TPCODL/P&S/56/2020-21

- 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
- **Warranty period:** 18 months from Handing over.
- All other terms and conditions of TPCODL General Conditions of Contract shall be applicable.

**Terms of Payment:**

70% on account payment against the actual executed value certified by EIC of TPCODL in running bill on pro-rate basis. Documents to be provided with invoice/bill: Joint measurement sheet/material verification sheet duly verified by EIC.

Balance 30 % payment of the actual executed order value shall be paid after handing over of the Complete system, including clearance of IHI, compliances of final punch point and after reconciliation of material & adjustment of payments, based on the service entry sheet approved by EIC.

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

**7.2 Drawing Submission and Approval**

The relevant drawings and GTPs need to be submitted within two weeks of receipt of firm purchase order by the successful bidder to TPCODL for approval. In case, re-submission of drawings is required on request of TPCODL, same needs to be submitted back to TPCODL within 5 days of such request.

**7.3 Delivery Timelines**

1. Release Orders shall be placed against the awarded Rate Contract by TPCODL as and when the requirements arise.
2. Scope and nature of work for individual RO varies from "Providing supply to a single consumer through a DP mounted sub-station" to "Electrification of large areas involving setting up of electrical distribution networks". The completion period of individual RO varies according to the scope and nature of work. Completion periods (in calendar days) for various categories of activities involved in such issued RO, are detailed hereunder.
3. For each issued RO the following will be the guidelines of completion period: -
  - a. Installation/Refurbishment of complete PMSS/Plinth Mounted SS with any rating of transformer/augmentation of DT, including HT/LT line extension up to five pole.: 2 nos. outages and 7 days.

Installation of new 11KV overhead line with bare conductor /HT ABC: Up to 500 circuit meters - 30 days. For every 500 circuit meters thereafter - 15 additional days.

Refurbishment/Re-string of Conductor of old 11KV overhead line with bare conductor /HT ABC: Up to 1000 circuit meters with replacement of 5 Poles - 7 days with two outages.





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

NIT No.: TPCODL/P&S/56/2020-21

- b. Laying of HT/LT U/G cable in trench/ Trenchless duct including making of trench/trenchless duct:  
Up to 500 circuit meters - 45 days. For every 500 circuit meters thereafter - 15 additional days.
- c. Installation of new LT overhead line with bare conductor /LT ABC: Up to 500 circuit meters - 30 days. For every 500 circuit meters thereafter - 15 additional days.  
  
Refurbishment/Re-string of Conductor of old LT overhead line with bare conductor /LT ABC with: Up to 1000 circuit meters with replacement of 5 Poles - 7 days with two outages.
- d. Installation of the 3 /4 RMU Indoor/ outdoor including cable connection - Indoor type RMU - 7 days. Outdoor type RMU - 15 days.
- e. Installation, testing and commissioning of 1no of Auto-recloser and 3 nos of Sectionalizer in one line (including all activities): 5 days with 2 nos of Outages per Line
- f. 7) Installation, testing and commissioning of 5 nos of 11KV / 33KV AB Switch in one line: 15days
- g. 8) ITC of MCCB box in complete: 3 months for 200 Units subjected to availability of Outage
- h. In case any RO covers two or more categories of activities mentioned herein-above, the longest completion period amongst all the categories of activities covered thereunder, shall be treated as completion period for the RO.
- i. It is however to be noted that in case of any urgency, TPCODL reserves the right to reduce the above mentioned timelines further as per the requirement. The decision of TPCODL in this regard shall be final and binding on the bidder.

**For 33KV Lines:**

For each issued RO the following will be the guidelines of completion period: -

- a. Installation of new 33 KV overhead line with bare conductor /Insulated Conductor: Up to 500 circuit meters - 30 days. For every 500 circuit meters thereafter - 15 additional days.  
  
Refurbishment/Re-string of Conductor of old 33KV overhead line with bare conductor /Insulated Conductor: Up to 1000 circuit meters with replacement of 5 Poles - 7 days with two outages.
- b. Laying of HT U/G cable in trench/ Trenchless duct including making of trench/trenchless duct: Up to 500 circuit meters - 45 days. For every 500 circuit meters thereafter - 15 additional days.



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

NIT No.: TPCODL/P&S/56/2020-21

The Project Completion period shall be 10 months from date of issue of RO/LOI which ever Earlier subject to availability of free issue material from TPCODL and subject to availability of Outage and ROW Permission

#### **7.4 Warranty Period**

As per SCC

#### **7.5 Payment Terms**

As per SCC

#### **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-XI 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 Tata Code of Conduct (TCOC) attached at Annexure X for more information.

Any ethical concerns with respect to this tender can be reported to the following e-mail ID:

[purchase@cescoorissa.com](mailto:purchase@cescoorissa.com) / [pkjain@tatapower.com](mailto:pkjain@tatapower.com)

#### **8 Specification and standards**

As per Annexure II

#### **9 General Condition of Contract**

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



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

NIT No.: TPCODL/P&S/56/2020-21

### **10 Safety**

All jobs are this tender have to be executed strictly in compliance to the Safety terms and Conditions of TP Central Odisha Distribution Limited. 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.

CONFIDENTIAL

**ANNEXURE I**  
**Schedule for Items**

S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	SUPPLY				ERECTION			All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
					Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)		
1	Installation/Erection of (150X 150mm RS joist (11 Mtr long) (30.6 kV Per meter) (Each 336.6kg)) Pole including loading and unloading, transportation from site/tent upto 6 Kms., excavation, fixing of base plate, fixing of clamps, iron fittings, steel fabricated work (Angle installation), refilling, flooding with water, ramming/compacting of foundation as per TP Central Orissa Distribution Ltd. specifications and drawing including removal & disposal of malba as per instruction of EIC. The scope of work excludes Brick bedding, providing & laying of cement concrete, Pole Indexing and Painting of Pole (In Black & Yellow Strips/Zebra)	4022	EA										
2	Installation/Erection of 150X 150mm RS joist (13 Mtr long) (34.6 kg Per meter)	760	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	(Each 449.8 kg)) Pole including loading and unloading, transportation from site/tent upto 6 Kms., excavation, fixing of base plate,fixing of clamps ,iron fittings, steel fabricated work(Angle installation), refilling, flooding with water, ramming/compacting of foundation as per TP Central Orissa Distribution Ltd. specifications and drawing including removal & disposal of malba as per instruction of EIC. The scope of work excludes Brick betting, providing & laying of cement concrete, Pole Indexing and Painting of Pole (In Black & Yellow Strips/Zebra)												
3	Supply and Fixing of HT Complete Stay Set as per TP Central Orissa Distribution Ltd. specifications and drawing. The scope of work includes excavation for all type of soils/RCC/Bituminous/ Rocky/Rajasthani tiles etc., breaking of asphalt, fixing of Base Plate,Anchor road,	3480	ST										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Tension screw, Egg insulator, back filling removal & disposing of malba as per instruction of EIC etc. Including stringing of GI Wire, fabrication works and providing and laying of cement concrete.												
4	Brick batting for Pole foundation including supply of consumables and strengthening as per TP Central Orissa Distribution Ltd. specification/drawing (Price per pole/foundation)	4782	EA										
5	Supply and Glanding for armoured 1.1 kV XLPE AL Cable - 4CX300 sqmm, including making hole in base plate and dressing of cable along with Vermin proofing properly	700	EA										
6	Supply Installation of Bird Cap for Lightning Arrestor	4128	EA										
7	Supply and Installation of V cross arm/Cross arm on HT Joist pole for 11kv Line as per Drawing	3372	EA										
8	Supply and Installation of V cross arm/Cross arm on HT	960	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Joist pole for 33kv Line as per Drawing												
9	Supply and laying of sand in substation cable trench (where it is not included in the scope)	500	M3										
10	Installation of 4Cx300 sqmm O/D Termination	2928	EA										
11	Supply and Glanding armoured 1.1 kV XLPE AL Cable - 4CX150 sqmm, including making hole in base plate and dressing of cable	4500	EA										
12	Supply and Fixing of Rubber Mat & First Aid Chart(MAT RUBBER 15KV SIZE 1X2MX2.5MM THICK)	100	EA										
13	Supply and Installation of Mini Wedge Connector for different size of conductor(CONNECTOR MINI WEDGE 125/148/232 SQMM TO 125/148/232)	3408	EA										
14	Supply and Installation of 100 mm dia GI Pipe for earth wire/Cable protection(PIPE G.I.100MM DIA HEAVY CLASS PLAIN END)	4752	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
15	Supply and Crimping and Fixing/connecting to terminal of AL Lugs 150 sqmm	18000	EA										
16	Supply and Crimping and Fixing/connecting to terminal of AL Lugs 300 sqmm	3024	EA										
17	Supply and Crimping and Fixing/connecting to terminal of AL Lugs 630 sqmm	10976	EA										
18	Supply and Installation of Template for Transformer maintenance Record	1136	EA										
19	Supply, Fabrication and Erection of Wooden Cleat set, MS strip and hard ware for fixing cable including painting one coat of red oxide & two coats of black paint for 990 kVA Transformer. Scope also includes supply of ISI marked paint. (Price per set)	92	ST										
20	Supply and Installation of CONNECTOR PALM LT BRASS 1000A for 630KVA distribution transformer	2560	EA										
21	Supply and Installation of CONNECTOR PALM LT BRASS 2000A for 1000KVA distribution transformer	184	EA										



					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
22	Supply and Crimping and Fixing/connecting to terminal of AL Lugs 95 sqmm	3024	EA										
23	Supply, Fabrication and Erection of Wooden Cleat set, MS strip and hard ware for fixing cable including painting one coat of red oxide & two coats of black paint for 630 kVA Transformer. Scope also includes supply of ISI marked paint. (Price per set)	1280	ST										
24	Supply and Fabrication and erection of MS Steel Structure including painting (one coat of red oxide & two coats of synthetic/aluminum paint) as per TP Central Orissa Distribution Ltd. specification / drawing. Scope also includes supply of ISI marked paint.	6400	KG										
25	Supply and Installation of HDPE Pipe - 25mmdia and sealing of the same for wire/Cable protection. Scope also includes providing and laying all required consumable etc. for collar fixing and sealing of Pipe.	27906	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
26	Supply, Fabrication and Erection of Wooden Cleat set, MS strip and hard ware for fixing cable including painting one coat of red oxide & two coats of black paint for Cable . Scope also includes supply of ISI marked paint. (Price per set).	2940	ST										
27	Supply and Crimping and Fixing/connecting to terminal of AL Lugs 70 sqmm	34940	EA										
28	Supply and Installation of Polypro/COVER MVLC	6920	M										
29	Supply and Fixing of GI Nut & Bolts of different size(12MMX50MM HEX,12MMX75MM HEX,16MMX100MM HEX,16MMX150MM HEX,16MMX200MM HEX,16MMX50MM HEX,16MMX75M HEX, etc)	39162	KG										
30	Supply and Fixing of Hexagonal Bolts with Nuts(GI) Nut & Bolts	2373.8	KG										
31	Supply and Installation of Pre - fabricated Hot dip Galvanized Steel Structure of different section (ISMC-	769160.2	KG										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	100*50 GI Channel (9.76KG/M), ISMC-125*65 GI Channel (13.3KG/M), ISMC-75*40 GI Channel (7.24KG/M) as per approved drawing and specification of TP Central Orissa Distribution Ltd. Scope also includes minor modification/fabrication required as per site condition/ for proper fitting.												
32	Supply and Installation of Tape PVC adhesive 19MMX10M	400	EA										
33	Supply and Installation of Pre - fabricated Hot dip Galvanized Steel Structure of different section as per TPDDL approved drawing and specification.	7268.36	KG										
34	Supply installation of TENSION SCREW GI SIZE 750X20MM for 11KV/33KV line	3480	EA										
35	SITC of 9kV 10KA FOR 11KV POLYMERIC LA ( DISTRIBUTION CLASS (DH) including all	4368	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Electric/Earth connections, loading, transportation												
36	SITC Installation of 11kV D.O. Fuse 3 Phase(Price per Set) including Fuse Link on existing structure as per TP Central Orissa Distribution Ltd. specification and drawing	3408	ST										
37	SITC Installation of 33kV Disc Insulator with hardware fitting - 120KN as per TP Central Orissa Distribution Ltd. specification/drawing	2160	EA										
38	SITC Installation of 33kV Post Insulator with hardware fitting as per TP Central Orissa Distribution Ltd. specification/drawing	600	EA										
39	SITC BUS BAR COPPER HDT SIZE 75X10MM	686	M										
40	SITC of PLATE BASE RCC SIZE 450X450X50MM for 150X 150mm RS joist (11 Mtr long)(30.6 kg Per meter)(Each 336.6kg)	4022	EA										
41	SITC of PLATE BASE RCC SIZE 450X450X75MM for 150X 150mm RS joist (13 Mtr long)(34.6 kg Per meter)(Each 449.8 kg)	760	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
42	SITC Installation of 11 kV ,200Amp 3- Phase AB Switch on existing structure including alignment as per TP Central Orissa Distribution Ltd. specification and drawing	1136	ST										
43	SITC Installation of 11 kV 3-Phase G.O Switch 200 AMPS for 250KVA DT, existing structure including alignment as per TP Central Orissa Distribution Ltd. specification and drawing	450	ST										
44	SITC Installation of 33 kV,200Amp 3- Phase AB/G.O Switch on existing structure including alignment as per TP Central Orissa Distribution Ltd. specification and drawing	100	ST										
45	SITC Installation of 11kV LA Single Phase on existing structure as per TP Central Orissa Distribution Ltd. specification and drawing(LA 9KV 5KA FOR 11KV POLYMERIC)	4608	EA										
46	SITC Installation of Anti-Climbing (Barbed Wire) for 11Mtr/13 Meter pole Pole	4782	KG										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	as per TP Central Orissa Distribution Ltd. specification and drawing.												
47	SITC Installation of HT Danger Board as per TP Central Orissa Distribution Ltd. specification	8512	EA										
48	SITC Installation of 11kV Disc Insulator with hardware fitting - 70KN as per TP Central Orissa Distribution Ltd. specification/drawing	6500	EA										
49	SITC Installation of 11kV Disc Insulator with hardware fitting - 90KN as per TP Central Orissa Distribution Ltd. specification/drawing	4800	EA										
50	SITC Installation of 11kV Pin Insulator with hardware/PIN as per TP Central Orissa Distribution Ltd. specification/drawing	12486	EA										
51	SITC Installation of 33kV Pin Insulator (PIN INSULATOR POLYMER 33 KV (10 KN))with hardware/PIN as per TP Central Orissa Distribution Ltd. specification/drawing	3360	EA										
52	Installation of FPI with Communication Box with	4500	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	proper wiring on GPRS modem												
53	Installation, Testing and Commissioning of 11/0.4kV, 630kVA 3-Phase Distribution Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification including loading, unloading, shifting/transportation from site /tent. Scope of work excludes earthing, jumpering/connection at HT and LT side	640	EA										
54	Installation, Testing and Commissioning of 11/0.4kV, 160kVA /315KVA /400KVA /500KVA / 3-Phase Distribution Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification including loading, unloading, shifting/transportation from site /tent. Scope of work excludes earthing, jumpering/connection at HT and LT side	100	EA										
55	Installation, Testing and Commissioning of 11/0.4kV,	46	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	1000kVA 3-Phase Distribution Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification including loading, unloading, shifting/transportation from site /tent. Scope of work excludes earthing, jumpering/connection at HT and LT side												
56	Installation, Testing and Commissioning of 11/0.4kV, 250kVA 3-Phase Distribution Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification including loading, unloading, shifting/transportation from site /tent. Scope of work excludes earthing, jumpering/connection at HT and LT side	450	EA										
57	Installation testing and commissioning of LT ACB 400 Amps with enclosure on existing structure	1464	EA										
58	Installation of Outdoor Type Distribution Box with MCCB for 11/0.4kV, 63kVA Three	20	EA										



					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Phase Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification												
59	Installation of Outdoor Type Distribution Box with MCCB for 11/0.4kV,160kVA Three Phase Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification	10	EA										
60	Installation of Outdoor Type Distribution Box (BOX DIST.WITH 160A 35KA TP MCCB 6 O/G) with MCCB for different capacity of 11/0.4kV,100/315/400 kVA etc. Three Phase Transformer on existing structure as per TP Central Orissa Distribution Ltd. Specification	540	EA										
61	Installation of Outdoor Type Distribution Box(BOX DIST.WITH 500A 50KA TP MCCB 5 O/G) with MCCB for 11/0.4kV,250kVA Three Phase Transformer on existing structure as per TP Central Orissa Distribution Ltd. specification	810	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
62	Installation of Fire Extinguisher by means of proper hooks clamps etc. as required including providing of grouting material (cement etc.) and painting of hooks/clamps. Scope exclude supply of hook/clamp	100	EA										
63	Installation of Fire Bucket including supply of sand by means of proper hooks clamps etc. as required (price per bucket). Scope exclude supply of hooks/clamps/MS stand	100	EA										
64	Installation, Testing and Commissioning of 11kV 3-way Ring Main Unit on existing structure/foundation as per TP Central Orissa Distribution Ltd. specification including grouting, loading, unloading, shifting/transportation from site/tent. Scope of work excludes earthing, jumpering/connection and construction of foundation	60	EA										
65	Construction of RMU Plinth with Brick, Mortar, 12 mm	60	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	cement plaster and painting with enamel paint.												
66	Installation of Auto recloser on RS Joist Pole including associated material as per Drawing.	40	EA										
67	Installation of Sectionaliser on RS Joist Pole including associated material as per Drawing.	120	EA										
68	Sagging & Stringing of Dog Conductor including Jumpering & making of connection hooks etc.(80sq.mm to 125 sq.mm AAAC)	71994	M										
69	Sagging & Stringing of Aluminum Conductor Steel Reinforced(ACSR) (Equivalent to 125 sq mm AAAC Conductor rating) including Jumpering & making of connection hooks, fitting of hardware and fixing of Polypro, MVLC etc.	107991	M										
70	Sagging & Stringing of 148 sqmm All Aluminum Alloy Conductor(AAAC) including Jumpering & making of connection hooks, fitting of	19296	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	hardware and fixing of Polypro/MVLC etc.												
71	Sagging & Stringing of Aluminium Conductor Steel Reinforced(ACSR) (Equivalent to 148 sqmm AAAC Conductor) including Jumpering & making of connection hooks, fitting of hardware and fixing of Polypro/MVLC etc.	28944	M										
72	Sagging & Stringing of 232 sqmm All Aluminium Alloy Conductor (AAAC) including Jumpering & making of connection hooks, fitting of hardware and fixing of Polypro/MVLC etc.	20496	M										
73	Sagging & Stringing of 232 sqmm Aluminium Conductor Steel Reinforced(ACSR) including Jumpering & making of connection hooks, fitting of hardware and fixing of Polypro/MVLC etc.	30744	M										
74	Sagging & Stringing of Insulated Rabbit Conductor including Jumpering & making of connection hooks etc.	26128	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
75	Sagging/Stringing/Drawing of GI wire 7/10SWG for earthing of equipment/structure as per TP Central Orissa Distribution Ltd. specification/drawing.	428690	M										
76	Sagging/Stringing/Drawing of GI wire 4 SWG including Jumpering & making of connection hooks etc. as per TP Central Orissa Distribution Ltd. specification/drawing	396000	M										
77	Laying/stringing of Overhead LT 1.1 kV XLPE insulated PVC sheathed AL conductor GI wire Armoured Cable of size 4CX150 sqmm as per TP Central Orissa Distribution Ltd. specification including testing of cable. BA will provide support during joint making by OEM of joint kit, no separate payment will be paid to BA for this support by BA.	17100	M										
78	Earthing by boring in ordinary soil upto water level (up to 6 Mtr.depth) with fixing of earth Pipe and	6147	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	connecting GI Stay wire 7/8 or 7/10 SWG as per TP Central Orissa Distribution Ltd. Design (Each pit resistance will be measured and recorded and shall be less than 1 ohm). Scope excludes supply of earth pipe(PIPE EARTH G.I. 40MMX 3 M 'C' CLASS), laying of GI Wire and crimping of Lugs.												
79	Earthing by boring in ordinary soil upto water level (above 6 Mtr. to 9 Mtr. depth) with fixing of earth Pipe and connecting GI Stay wire 7/8 or 7/10 SWG as per TP Central Orissa Distribution Ltd. Design (Each pit resistance will be measured and recorded and shall be less than 1 ohm). Scope excludes supply of earth pipe, laying of GI Wire and crimping of Lugs.	3000	EA										
80	Laying of LT, XLPE, GI wire Armoured, AL Cable of size 4CX300 sqmm in S/Sth. Trench/Trenchless duct/Tray/GI Pipe/Hume	23064	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Pipe as per TP Central Orissa Distribution Ltd. specification including testing of cable. Scope of work exclude laying of Hume Pipe, GI Pipe, PVC Pipe and Tray. BA will provide support during joint making by OEM of joint kit, no separate payment will be paid to BA for this support by BA.												
81	Laying (underground) of 1.1kV Armoured XLPE AL Cable of size 4CX300 sqmm in existing trench with supply & laying of 9 bricks horizontally with sand & back filling, ramming and levelling of earth as per TP Central Orissa Distribution Ltd. specification and drawing including testing of cable. Scope also include removal and disposal of loose malba above road/ground level as per instruction of EIC..BA will provide support during joint making by OEM of joint kit,no seperate payment will be paid to BA for this support by BA.	21960	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
82	Laying (underground) of 11kV Armoured XLPE AL Cable of size 3CX400/ 3X300 sqmm (Single Run) in existing trench with supply & laying of 9in bricks/Suitable slab horizontally with sand & back filling, ramming and levelling of earth as per TP Central Orissa Distribution Ltd. specification and drawing including testing of cable. Scope also include removal and disposal of loose malba above road/ground level as per instruction of EIC..BA will provide support during joint making by OEM of joint kit,no seperate payment will be paid to BA for this support by BA.	2400	M										
83	Laying (underground) of 11kV Armoured XLPE AL Cable of size 3CX400/ 3X300 sqmm in existing trench with supply & laying of 9 bricks horizontaly with sand & back filling, ramming and levelling of earth as per TP Central Orissa Distribution Ltd. .BA will	2400	M										



					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	provide support during joint making by OEM of joint kit, no seperate payment will be paid to BA for this support by BA. specification and drawing including testing of cable. Scope also include removal and disposal of loose malba above road/ground level as per instruction of EIC												
84	Laying of 11kV Armoured XLPE AL Cable 3CX400/ 3X300 sqmm in S/Stn. Trench/Tray as per TP Central Orissa Distribution Ltd. specification including testing of cable. Scope of work exclude fixing of Tray. BA will provide support during joint making by OEM of joint kit, no seperate payment will be paid to BA for this support by BA.	2400	M										
85	Stringing/Laying of 1.1kV XLPE insulated PVC sheathed AL conductor Cable of size 1CX300 sqmm as per TP Central Orissa Distribution Ltd. specification including	2064	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	testing of cable.BA will provide support during joint making by OEM of joint kit, no separate payment will be paid to BA for this support by BA.												
86	Stringing/Laying of 1.1kV XLPE insulated PVC sheathed AL conductor Cable of size 1CX630 sqmm as per TP Central Orissa Distribution Ltd. specification including testing of cable	45100	M										
87	Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centering, shuttering, finishing and reinforcement-All work up to plinth level b) 1:2:4 (1 cement : 2 coarse sand :4 graded stone aggregate 20 mm nominal size.	1706.4	M3										
88	Stringing/Laying of 1.1kV XLPE insulated PVC sheathed AL conductor Cable of size 1CX95 sqmm as per TPDDL specification including testing of cable.	1600	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	BA will provide support during joint making by OEM of joint kit, no separate payment will be paid to BA for this support by BA.												
89	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:2:4 (1 cement : 2 coarse sand (Zone - III) : 4 graded stone aggregate 20 mm nominal size)	30	M3										
90	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level : 1:3:6 (1 Cement : 3 coarse sand (Zone - III) : 6 graded stone aggregate 20 mm nominal size).	100	M3										
91	Treated Pipe earthing with 40mm dia 3 Mtr long Class-B GI Pipe with earth chamber as per TP Central Orissa Distribution Ltd. specification and drawing (Each pit resistance will be measured and recorded and	9027	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	shall be less than 1ohm). Scope include supply of all required material like Earth Electrode, Salt, Charcoal, Funnel, Cast iron cover, Nuts and Bolt, PVC Pipe PCC and brick work etc. Scope exclude supply and laying of earth connector GI Strip 50X6 for connecting to equipment and shall be paid as separate item.												
92	Excavation of cable trench up to 975 mm depth & 450 mm width in Ordinary Soil as per TP Central Orissa Distribution Ltd. drawing and specification for laying of 11/1.1kV one Cable. Scope of work excludes laying of HUME/PVC pipe/GI Pipe. For each additional cable 50% will be payable against above activity	7320	M3										
93	Excavation of cable trench upto 1075 mm depth & 450 mm width in Ordinary Soil as per TP Central Orissa Distribution Ltd. drawing and specification for laying of 11kV one Cable. Scope of	2400	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	work excludes laying of HUME/PVC pipe/GI Pipe. For each additional cable 50% will be payable against above activity												
94	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth as per direction of EIC for all kinds of soil.	100	M3										
95	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, including getting out the excavated soil and disposal of surplus excavated soil as directed by EIC for all kinds of soil	100	M3										
96	Fixing /installation of Cable Trench Cover.	4000	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
97	Indoor Termination of 11 kV Armoured XLPE, AL Cable 3CX400 sqmm including consumable	120	ST										
98	Jointing of I/D or O/D of HT (11KV /33KV) UGC including all related work and Approved Jointer	240	EA										
99	Jointing of I/D or O/D of LT UGC including all related work and Approved Jointer	2928	EA										
100	Making & Fixing of Guard Lace of G.I. Wire 4 SWG for HV Line (price per lacing)	72552	EA										
101	Mounting of Cable (above 150 sqmm) at Pole, after passing through suitable size of GI Pipe proper clamping and fixing wooden bush along with clamping of End Box. Scope of work including supply and erection of Wooden Cleat set (Including Nomenclature , phase marking and numbering)	17100	ST										
102	Outdoor Termination of 11 kV Armoured XLPE, AL Cable 3CX400 sqmm including consumable	120	ST										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
103	Painting of Pole In Black & Yellow Strips/Zebra as per TP Central Orissa Distribution Ltd. specifications and indexing/numbering of Poles as per GIS format, scope also include site survey for GIS indexing and supply of ISI Marked good quality paint. (this item shall be paid for old poles only and where this not mentioned in scope)	4862	EA										
104	Sign writing on Transformer, double pole structure & fencing as per details mentioned in the scope of work and specification	5918	EA										
105	Sign writing - substation name as per details mentioned in the scope of work and specification	1216	EA										
106	Sign writing on leg of 11 KV RMU as per details mentioned in the scope of work and specification (price per RMU)	60	EA										
107	Transportation of various items from TP Central Orissa Distribution Ltd.	2000	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	store/site to other site or vice versa in TP Central Orissa Distribution Ltd. operational area - Tempo 709 with labours as required (price per trip). Scope of work also include loading and unloading of materials except heavy items like HT Panel, Transformer, Cable Drum, LT Board where loading, unloading is to be done with crane and will be paid separately												
108	Transportation of various items from TP Central Orissa Distribution Ltd. store/site to other site or vice versa in TP Central Orissa Distribution Ltd. operational area - Tempo 407 with labours as required (price per trip). Scope of work also include loading and unloading of materials except heavy items like HT Panel, Transformer, Cable Drum, LT Board where loading, unloading is to be done with crane and will be paid separately	2500	EA										



					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
109	Transportation of various items from TP Central Orissa Distribution Ltd. store/site to other site or vice versa in TP Central Orissa Distribution Ltd. operational area - Three wheeler/Vikram with labors as required (price per trip). Scope of work also include loading and unloading of materials except heavy items like HT Panel, Transformer, Cable Drum, LT Board where loading, unloading is to be done with crane and will be paid separately	3000	EA										
110	Loading of HT panel, Transformer, LT board, Cable drum with crane or tripod Per truck/tempo (Price per Truck/tempo)	3000	EA										
111	Unloading of HT panel, Transformer, LT board, Cable drum with crane or tripod Per truck/tempo (Price per Truck/tempo)	3000	EA										
112	Loading, transportation and Unloading of PSCC/JOIST Pole above 9m long from TP Central Orissa Distribution	4782	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Ltd. store/site to other site or vice versa (above 6 km) - price per Pole.												
113	Dismantling/Removal of all hardware fittings & Insulator etc. from Double Pole Structure including loading, transportation, unloading and staking of dismantled material at a proper place in safe position and returning the material to TPCODL Store is in BA scope.	5000	EA										
114	Dismantling of 11 Mtr. PCC/Joist Pole (Serviceable Pole) after digging the pit and taking out the pole, transportation and stacking the pole at a proper place in safe position within 3km /BA site store and refilling the pit with loose earth and ramming including removal and disposal of malba at proper location as per instruction of EIC. Returning of Pole to the TPCODL store is in the scope of BA.	20000	EA										
115	Dismantling of 11kV Pin Insulator with Pin including loading, transportation,	20000	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	unloading and staking at a proper place in safe position/BA site store. Returning the items to the TPCODL Store is in the scope of BA												
116	Dismantling of 11kV Disc Insulator with Hardware including loading, transportation, unloading and staking at a proper place in safe position/BA site store. Returning the items to the TPCODL Store is in the scope of BA	20000	EA										
117	Dismantling of Danger Board including removal of all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store	10000	EA										
118	Dismantling of the G.I.Wire 7/8 SWG as per standard practice of TP Central Orissa Distribution Ltd. including recoiling loading, transportation, unloading and staking at a proper	10000	Kg										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	place in safe position/BA site store												
119	Dismantling of the G.I.Wire 7/10 SWG as per standard practice of TP Central Orissa Distribution Ltd. including recoiling loading, transportation, unloading and staking at a proper place in safe position/BA site store	10000	Kg										
120	Dismantling of the G.I.Wire 4 SWG as per standard practice of TP Central Orissa Distribution Ltd. including recoiling loading, transportation, unloading and staking at a proper place in safe position/BA site store	10000	Kg										
121	Dismantling/Removal of all hardware fittings & Insulator etc. from HT Single Pole including loading, transportation, unloading and staking of dismantled material at a proper place in safe position/BA site store (price per Pole)	10000	EA										
122	Dismantling of Anti Climbing Device including removal of	4000	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store												
123	Dismantling of 9kV 5kA L A including removal of all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store	3600	EA										
124	Dismantling of LT Distribution Box suitable for 3-Phase Distribution Transformer including their safe removal. Scope of work also includes removal of all the Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store. Returning to TPCODL store is in BA scope.	2500	EA										
125	Dismantling of 11 kV Three Phase DD Fuse Unit (price per set) including removal of all Electric/Earth connections, loading,	3408	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	transportation, unloading and staking at a proper place in safe position/BA site store												
126	Dismantling of ACB-400A including removal of all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store	1464	EA										
127	Dismantling of ACSR DOG conductor from overhead line, recoiling, loading, transportation, unloading and staking at a proper place in safe position/BA site store	1000	M										
128	Dismantling of ACSR Rabbit conductor from overhead line, recoiling, loading, transportation, unloading and staking at a proper place in safe position/BA site store	1000	M										
129	Dismantling of ACSR Racocon conductor from overhead line, recoiling, loading, transportation, unloading and staking at a	1000	M										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	proper place in safe position/BA site store												
130	Dismantling of HT AL Bus bar mounted on 11kV insulator with re-openable insulation cover including removal of all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store	1000	EA										
131	Dismantling/Removal of all hardware fittings & Insulator etc. from Triple Pole Structure including loading, transportation, unloading and staking of dismantled material at a proper place in safe position/BA site store (price per TP Structure)	1000	EA										
132	Dismantling of Fencing structure and loading, transportation, unloading and staking at a proper place in safe position/BA site store	1000	Kg										
133	Dismantling of existing 11/0.4kV, 630kVA Three Phase Distribution Transformer including	640	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	removal of HT/LT leads, earth connections and unloading by crane if required. Scope of work also includes loading, transportation, unloading and staking at a proper place in safe position/BA site store												
134	Dismantling/Removal of all hardware fittings & Insulator etc. from Four Pole Structure including loading, transportation, unloading and staking of dismantled material at a proper place in safe position/BA site store	500	EA										
135	Dismantling of existing Street Light fixture and loading, transportation, unloading and staking at a proper place in safe position/BA site store	500	EA										
136	Dismantling of 11 Mtr. PCC/JoistPole(Broken Pole) after digging the pit and taking out the pole, refilling the pit with loose earth and ramming. Scope also include crushing of broken Pole and removal & disposal	100	EA										



					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs/Unit)	GST (Rs/Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs/Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	of malba at proper location as per instruction of EIC												
137	Dismantling of existing 11/0.4kV, 250kVA Three Phase Distribution Transformer including removal of HT/LT leads, earth connections and unloading by crane if required. Scope of work also includes loading, transportation, unloading and staking at a proper place in safe position/BA site store	450	EA										
138	Dismantling of existing 11/0.4kV, 990/1000kVA Three Phase Distribution Transformer including removal of HT/LT leads, earth connections and unloading by crane if required. Scope of work also includes loading, transportation, unloading and staking at a proper place in safe position/BA site store	46	EA										
139	Dismantling of 10/8 Way Moulded Bus Bar Box including removal of all	1	EA										

					SUPPLY				ERECTION				
S.No	Item Description	Quantity (A)	Unit	HSN /SAC Code	Unit Ex-Work Price (Rs./Unit)	Freight & Insurance Charges (Rs./Unit)	GST (Rs./Unit)	Unit Supply Rate including (Rs.) (B)	Unit Erection Charge (Rs./Unit)	GST (Rs./Unit)	Unit Erection Price including GST (C)	All Inclusive Unit rate (D=B+C)	Total All Inclusive Value (Rs.) (AxD)
	Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store												
140	Dismantling of 11 kV GO/AB Switch including removal of all Electric/Earth connections, loading, transportation, unloading and staking at a proper place in safe position/BA site store	1136	EA										
141	Dismantling of Steel Structure and Nuts and Bolt including loading, transportation, unloading and staking of dismantled material at a proper place in safe position/BA site store	113600	KG										
<b>TOTAL (All Inclusive Value)</b>													

Signature & Seal of the Bidder

**NOTE:**

- The bidders are advised to quote prices strictly in the format attached.
- The bidder must fill each and every column of the format attached. **Mentioning “extra/inclusive” in any of the column may lead for rejection of the price bid.**
- No cutting/ overwriting in the prices is permissible.
- The unit price to be indicated in col. No. 6 should be exclusive of taxes & duties which are to be indicated in separate columns meant for the purpose.

- The bids will be evaluated commercially on over BOQ basis (all-inclusive lowest cost) for the complete tender as calculated in Schedule of Items
- The prices shall be FOR TPCODL Locations.

CONFIDENTIAL

**ANNEXURE II**  
**Technical Specifications**

**Attached:** Technical Specifications & reference drawing

S.No.	DESCRIPTION
1	11KV V CROSS ARM materials
2	Design Basis For RS Joist Pole Fdn.-11KV Line
3	RS JOIST FOUNDATION DETAILS - 11KV LINE
4	Design Basis For RS Joist Pole Fdn.-33KV Line
5	RS JOIST FOUNDATION DETAILS - 33KV LINE
6	GTP ABSWITCH 200A
7	11 KV AB SWITCH Drawing
8	Conductor Specification size 55,80,100,148MM <sup>2</sup> AAAC
9	Conductor Specification size 232MM <sup>2</sup> AAAC
10	10. GTP of 33KV AB SWITCH
11	33 KV 400 AMPS AB SWITCH Drawing
12	11KV Danger Boards Drawing
13	33KV Danger Boards Drawing
14	33kV 400Amps HG Fuse(Horizontal Type)
15	33KV HG FUSE Drawing
16	STP PG CLAMP
17	11KV PIN POLYMER
18	ENG-GEN-90 STP for Bird Cap for 9KV LA
19	ENG-LV-11-02-MCCB with Distribution box
20	3C 400 SQ MM 11KV XLPE
21	Specifications for LT PALM CONNECTORS_TPCL not to be used
22	Specifications for K TYPE FUSE LINK_TPCL
23	Specification of LV Cable Glands



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

NIT No.: TPCODL/P&S/56/2020-21

S.No.	DESCRIPTION
24	Specification of 11 kV 200 Amps and 400 Amps Polymeric GO Switches
25	Specification for 11kV Polymer Ball and socket disc insulator_TPCL
26	Specification of 9kV 10kA Lightning Arrester
27	Specification for different sizes of aluminium lugs_TPCL
28	ENG-C-35 Specification for DANGER PLATE specs revised
29	Specification for LT Air Circuit Breaker- Microprocessor Based
30	Specification for Anchor rod_TPCL
31	Stay Set Casting
32	Specifications for Stay wire 7-8 SWG_TPCL
33	Approved Make List



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

NIT No.: TPCODL/P&S/56/2020-21

**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

### Schedule of Commercial Specifications

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

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

**Seal of the Bidder:**

**Signature:**

**Name:**



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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE V**

**Checklist of all the documents to be submitted with the Bid**

Bidder has to mandatorily fill in the checklist mentioned below:

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

**Seal of the Bidder:**

**Signature:**

**Name**





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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE VI**

**ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT**

*(To be signed and stamped by the bidder)*

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

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

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



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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE VII**  
**SCOPE OF WORK**

**Scope of Work:**

1. Construction and Augmentation of 11 kV / 33 kV line, Installation of DT's of different capacity (1000/630/250 kVA), Auto reclosure, sectionalizer, RMU's and other related Distribution work as per Annexure-1 at all over TPCODL area
2. Necessary statutory clearance from CEI of Orissa & 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.
3. 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.
4. Prior erecting any extra items for these scheme- rates should be approved from competent authority.
5. The Bidder should have own Safety equipment like Neon Tester, Portable Earth, Earthing discharge rod, hard barricading, PPEs etc. along with Calibration certificates of all equipments.
6. Successful Bidder will ensure safety and Quality of work by ensuring deployment of competent man-power at site for whole duration and they have to submit the safety report and quality report to TPCODL E-I-C if required.
7. **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. In case taking over by TPCODL is delayed because of reasons not attributable to BA, taking over certificate will be issued by TPCODL & Retention money will be released. It would be considered to be deemed taking over by TPCODL after fully compliance by bidder to all applicable successful testing & compliance to Inspections carried out to the satisfaction of TPCODL Projects & further taking over is pending due to reasons attributable to TPCODL beyond one-month time. However, Retention amount shall be cleared after 03 months at the option of bidder after successful Pre commissioning & EI clearance subject to fulfilling of other terms of Tender (i.e Submission of EPBG etc.) & submission of undertaking from bidder to provide fullest support in future at the time of commissioning.
8. Permissions from road owning agencies & statutory clearances shall be taken by TPCODL, however full support shall be provided by bidder to achieve it.
9. There will be no price escalation given to bidder after issue the RO even if there is delay in the project due to ROW permission.
10. 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.



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

NIT No.: TPCODL/P&S/56/2020-21

11. Providing 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.
12. Normal De-watering will be in bidder scope, TPCODL will not give additional cost for this activity, but if there will be huge de-watering or level of water is huge than prices for this activity will be decided mutually. In this case successful bidder has to provide the details back up for this activity.
13. 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.
14. 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.
15. Sign writing of equipments / poles where erection of such equipments is also in bidder scope shall be in bidder scope. No additional price shall be given to BA.
16. 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.
17. Watch & Ward, de-watering (normal) shall be in bidder scope.
18. 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 if all the requirements are not complied during the submission of the same.
19. The successful bidder has to follow the Contract safety management (CSM) as per GCC. The penalty will be imposing to bidder for any safety violence as per CSM matrix.
20. 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.
21. All required and applicable type tests has to be performed by supplier
22. All Bidders are requested to see the detail scope of work in long text of tender BOQ and also visit the site as per details mentioned in above schedule.



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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE VIII**  
**GENERAL CONDITIONS OF CONTRACT**

**Attached:** General Conditions of Contract for Composite Orders

CONFIDENTIAL



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

NIT No.: TPCODL/P&S/56/2020-21

### **ANNEXURE IX**

### **SAFETY POLICY AND SAFETY TERMS AND CONDITIONS**

#### **Definitions**

**Order Manager:** Order Manager is the TPCODL representative, who has the ownership of the given job under the signed contract.

**Service Provider/Contractor/Vendor:** An individual or an organization that provides services to TPCODL under a signed contract.

**Site Safety Management Plan:** It is the safety plan agreed between Contractor / Service provider and TPCODL. It will contain the entire job specific safety requirement and will be signed by the service provider.

**High Risk Job:** Any job which has significant health and safety risk associated to it. The list of high risk jobs has been identified at TPCODL level.

**Emergency:** A serious, unexpected, business discontinuity and often dangerous situation resulting into loss of revenue / property and requiring immediate action.

CONFIDENTIAL



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

NIT No.: TPCODL/P&S/56/2020-21

## 1. Safety Policy



### HEALTH AND SAFETY POLICY

Tata Power is committed to provide safe and healthy working environment for the prevention of work related injuries and ill-health. Safety is one of our core values. We strive to be a leader in safety excellence in the global power and energy business. In pursuit of this, we are committed to the following:

- Maintain and continually improve our management systems to eliminate hazards and reduce health & safety risks to all our stakeholders.
- Incorporate appropriate health & safety criteria into business decisions for selection of plant and technology, performance appraisal of individuals and appointments in key positions.
- Comply and endeavour to exceed all applicable health & safety legal and other requirements
- Integrate health & safety procedures and best practices into every operational activity with assigned line-functional responsibilities at all levels.
- Involve our employees and business associates in maintaining a safe and healthy work environment through consultation and participation
- Inculcate safety culture by visible leadership and empowerment.
- Ensure required competency to enable our employees and business associates for working safely.
- Promptly report incidents, investigate, share crucial learnings and prevent recurrences.
- Influence our business associates in enhancing their health and safety standards and align with Tata Power's health & safety codes and practices.
- Set safety & health metrics as indicators of excellence, monitor progress and continually improve health and safety performance.

We shall ensure the availability of appropriate resources at all times to fully implement and communicate this policy to all stakeholders by suitable means and periodically review its relevance in continuously changing business environment.

(Praveer Sinha)  
CEO & Managing Director

Date: 11<sup>th</sup> March, 2019  
**TATA POWER**  
Lighting up Lives!







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

NIT No.: TPCODL/P&S/56/2020-21

## 2. Safety Organization & Responsibilities

### 2.1 Contractor Site Management and Supervision

Each Contractor will be responsible for fulfilling all statutory and safety requirements as per the laws of the land and not limited to Factory Act, Electricity Act, Electricity Rules and Regulations, Shop and Establishment Act etc.

Each Contractor shall provide at least one competent full time safety supervisor for workforce of less than 100 numbers. When workforce ranges from 100 to 1000, the contractor has to provide at least one qualified safety officer and safety supervisors (reporting to the safety officer) in the ratio 1:100. For every 1000 addition in workforce, the contractor has to add 1 safety officer. The TPCODL Project Safety Manager will review and approve the appointment of all safety supervisors. Contractor/Subcontractor safety supervisors/officers will work with Tata Power Safety Managers and align themselves with Tata Power safety requirements.

Each Contractors'/Subcontractors' Site Manager is responsible, and will be held accountable, for the safety of their sub-contractors and workforce and for ensuring that all equipment, materials, tools and procedures remain in safety compliance at job site, including:

- Holding officer/supervisors accountable for safety and actively promote safe work performance.
- Participate in and cooperate with all safety program requirements to be implemented in order to meet Tata Power safety objectives.
- Ensure timely reporting of safety incidents, near misses, unsafe acts and conditions.
- Identify the training needs of its employees and maintain all safety training documents.
- Provide safety performance report at an agreed frequency.
- Stopping of unsafe work (acts and/or conditions) immediately, until corrective action be taken.

### 2.2 Contractor Supervisors and General Staff

Contractors' site supervisors and general staff members in charge of job site functions such as field engineering, warehousing, purchasing, cost and scheduling, etc. are responsible for the safe performance of the work of those they supervise. They must set an example for their fellow employees by being familiar with applicable sections of the Site Safety program and ensuring that all site activities are performed with SAFETY as the primary objective.

Each site supervisor is responsible and will be held accountable for identifying, analyzing and eliminating or controlling all hazards through implementation of an aggressive, pro-active Health, Safety and Environmental Program from project inception through project completion. Each supervisor will proactively participate in the SHE program by observing, correcting unsafe acts, and recording these observations.

### 2.3 Contractor Workforce

Contractor workforce must make safety a part of their job by following safety rules and regulations and by using all safeguards and safety equipment. They must take an active part in the Site Safety program



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

NIT No.: TPCODL/P&S/56/2020-21

to ensure their own safety and injury-free employment as well as being alert to unsafe practices of their fellow employees.

Every member of the workforce is expected to report for work without influence of any Drug/Alcohol. All employees are expected to report any hazardous conditions practices and behaviors in their work areas and correct where ever possible. Workforce is responsible for active participation in safety and health programs, suggestion systems, trainings and in immediate reporting of all injuries, any unsafe practices, conditions or incidents to their supervisors.

#### 2.4 Vendor/Contractor

Vendors/Contractor shall at all times comply with, and ensure that their workforce comply with all site safety rules and regulations. Specifically, with applicable provisions of the Tata Power Site Safety Management Plan, and all statutory safety rules and regulations.

### 3. Site Safety Rules and Procedures

The work in the safest possible manner can only happen when it has been carefully planned and all applicable procedures are followed. The Tata Power Safety Procedures are derived from Tata Power best practices and the applicable Government acts regulations. In each case, the most stringent regulation is used.

Following is the list of Tata Power's critical Safety Rules and Procedures. Contractor shall refer to approved Rules and Procedures for detailed requirements and ensure conformance.

#### 3.1 Lock Out and Tag Out Procedure

This procedure is intended to be used for the protection of Personnel while servicing or performing maintenance on equipment / pipeline / vessel / process systems. This is a general procedure that shall be used as the minimum requirements for isolation of equipment, pipelines, machines, system from all possible sources of hazardous energy and / or material such as Steam, Hot Water, Compressed Air, any other process fluid / chemical energy/Mechanical energy or Electrical energy. For complete procedure kindly refer Procedure Document No. TPSMS/CSP/LOTO/001 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.2 Excavation Safety (Shoring and Sloping) Procedure

This procedure is developed to cover the safe practices required for shoring and sloping in excavation and trenching jobs. This procedure is developed to establish mandatory requirements for practices to protect personnel, property and equipment from hazards associated with above activities. For complete procedure kindly refer Procedure Document No TPSMS/CSP/EXS/002 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.3 Confined Space Entry Procedure

This procedure outlines the steps required to perform the confined space entry and to protect personnel from the hazards of entering and conducting operations in confined spaces. For complete procedure





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

NIT No.: TPCODL/P&S/56/2020-21

kindly refer Procedure Document No –TPSMS/CSP/CSE/003 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.4 Working at Height Procedure

This procedure describes the rules and procedures to protect employees from the hazards of working at heights.

This procedure is developed to cover the safe practices required for Working at Heights. This procedure is developed to establish mandatory requirements for practices to protect personnel from hazards associated in this area. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/WAH/004 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.5 Heavy Equipment Movement Safety Procedure

Heavy equipment lifting and movement is an activity involving loading, unloading, storage and movement from one place to another including lifting and erection or repairing of equipment with cranes or hoists. Material, machinery and equipment handling operations are being carried out by large capacity cranes and hoists, which make the job safer and faster. This procedure addresses the hazards and precautions associated with such equipment and their use. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/HEMS/005 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.6 Mobile Crane Safety Procedure

Mobile cranes are responsible for many incidents, injuries. Falling loads from mobile cranes pose a severe hazard to operators and nearby workers and property. Many types of cranes, hoists, and rigging devices are used for lifting and moving materials. To maintain safe, appropriate standards has to be adhered to and only qualified and licensed individuals shall operate these devices. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/MCS/006 REV 01.

#### 3.7 Scaffold Safety Procedure

This procedure is developed to provide information on the safe erection, use, dismantling and maintenance of access scaffolding in the workplace. It is developed to establish mandatory requirements for practices to protect personnel from hazards associated with erection, use and dismantling of scaffolds. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/SCAF/007 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.8 Electrical Safety Procedure

The objective of these standards is to specify minimum mandatory requirements and advisory guidance for identifying and controlling hazards to ensure 'Zero Harm' with regard to operation maintenance and testing of electrical equipment. For complete procedure kindly refer Procedure Document No-TPSMS/CSP/ELEC/010 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

#### 3.9 Job Safety Analysis (JSA) Procedure



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

NIT No.: TPCODL/P&S/56/2020-21

This objective of this procedure is to have a task based risk assessment process in place that identifies, evaluates and controls the risks associated with work activities, and as a result, prevents those involved in the task or those potentially affected by the task, from being harmed. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/JSA/009 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.10 Fire Safety Management Procedure

Objective of This standard is to specify the minimum mandatory requirements and advisory guidelines to ensure prevention of fire related incidents and managing / controlling their impacts if they do occur. For complete procedure kindly refer Procedure Document No- TPSMS/CSP/FSM/011 REV 01

### 3.11 Permit To Work Procedure

Given the inherent hazards of the power generation and distribution industry, a significant number of TATA POWER operations and installations are critical. Work Permit (WP) System is an essential element in controlling the workplace risks in an effective manner. For complete procedure kindly refer Procedure Document No –TPSMS/CSP/PTW/008 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.12 Lift (Elevator) Safety Procedure

To provide safe operating procedure for taking control of lift car before entering and existing the pit of OTIS make elevators. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/LIFT/001 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.13 Working on conveyor belt Procedure

This procedure is developed to cover the safe practices required for Working on live equipment and to protect personnel from hazards associated with it. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CONV/002 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.14 Handling Hazardous Materials Procedure

This Procedure is developed to provide procedure for recycling and / or safe disposal of used / waste batteries in compliance with all legislation. For complete procedure kindly refer Procedure Document No-TPSMS/GSP/HAZM/003 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.15 Material Handling and Storage Procedure

The purpose of this document is to provide procedures to assist the safe handling of materials (manual handling and mechanical handling). For complete procedure kindly refer Procedure Document No – TPSMS/GSP/MATL/004 REV 01 available on official website of Tata Power ([www.tatapower.com](http://www.tatapower.com))

### 3.16 Contractor Safety Management Procedure



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

NIT No.: TPCODL/P&S/56/2020-21

The purpose of this document is to engage with contractors in a way to create safe work environment for everyone working for Tata Power. For complete procedure kindly refer Procedure Document No – TPSMS/GSP/CSM/015 REV 01 available on official website of Tata Power (www.tatapower.com)

The above procedures will be updated periodically and the updated version of the procedures as well as any additional critical procedure will be available on official website of Tata Power (www.tatapower.com) for your reference.

#### **4. Training and Capability Building**

Safety Training and capability building of workforce is a major component of safety management program. All training required must be provided and documented as specified by Tata Power and Indian Regulations. Tata Power Safety Manager will audit contractors training and related documentation to assure its adequacy.

##### **4.1 Tata Power Site Safety Orientation**

All Tata Power contractor and subcontractor workforce is required to attend Tata Power Site Safety Orientation Training to receive a Safety Training Card, which is required to obtain a Gate Pass to the site, prior to entry.

This Safety Orientation Course will be for duration of minimum half day. The information provided during the orientation will include, but is not limited to following:

- Job rules, personal safety and conduct
- Hazards reporting
- Reporting of injuries
- Emergency procedures
- Safety Activities and Program including disciplinary measure and incentives.
- Critical safety procedure relevant to the job

##### **4.2 Capability Building**

Appropriate training such as L1, L2 & L3 is given to ensure that a jobholder, either supervisor or worker, is competent to do his/her job safely. The skill training is provided through TPSDI and other agencies authorized by Tata Power on the list of 15 procedures mentioned under safety procedure.

Contractor shall ensure that concerned workmen are provided with adequate training before he/she is allowed to execute the work.

An evaluation test will be conducted after the completion of the training. Those workmen employee who meet the minimum required competency will be provided with Gold Card which is valid for 3 years, post which the workmen has to reappear for the assessment. If the workman is not able to qualify the assessment, he/she will be given 3 additional attempts to clear in 3 month timeframe failing which he/she will not be allowed to work on high risk jobs.



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

NIT No.: TPCODL/P&S/56/2020-21

### 5. Pre-Employment and Periodic Medical check up

Contractor shall arrange to conduct a pre-employment and periodic medical check-up for its entire workforce by Tata Power medical officer or Tata Power authorized medical officer. The contractor shall be able to produce the certificate prior to the employment. The contractor shall also organize to conduct periodical medical checkup (six monthly) for the following category of employees:

- Drivers (Check for Vision & Hearing)
- Equipment Operators (Check for Vision & Hearing)
- Workforce working at Height (Check for Vision, Hearing, Vertigo & Height Phobia)
- Workforce Handling the hazardous substances (Coal, ash and chemicals)
- Workforce in high decibel area (> 90 Decibel, Check for Hearing)
- Workforce, working in specific areas requiring specific medical attention should conduct the medical test as laid down in the respective Site Safety Management Plan.

### 6. Safety Performance Evaluation and Penalties

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 based on "Safety Performance score" attached in CSM-F-3 of CSM procedure. The amount is based on following table

Contract Value	Retention Amount (%)
Upto 10 Lakhs	2.5
10 – 50 lakhs	2
0.5 to 10 Cr	1.5
>10 Cr	1

- Safety performance Score will be monitored by the Order Manager every month.
- 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.
- 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.
- In case of fatality, limb loss or loss of property, vendor has to 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.
- 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.
- 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 is 100%.

- 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.
- Order Manager, divisional chief and SBU head have the authority to terminate the contract in case of three consecutive serious violations.

**7. Safety Performance Evaluation - CSM-F-3**

S. No.	Lead Indicators	Unit Of measurement	Target	Weightage
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 for Critical Equipments, lifting Tools & Tackles and hand tools used at site	%	80	5
4	Condition of tools, tackles and equipments	%	100	15
<b>Lag Indicators</b>				
1	Number of Fatalities	No.	0	30
2	Number of Lost work day case (LWDC)	No.	0	10
3	Man-days Lost	No.	0	10

In addition to above evaluation criteria, for specific violations penalty shall be imposed on the contractors under following circumstances:





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

NIT No.: TPCODL/P&S/56/2020-21

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 Earthing 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 Three-wheeler at the work site.	5	5000/-
16.	Starting the job without Tool Box 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 equipments.	5	5000/-
21.	Using damaged slings.	5	5000/-
22.	Unstable scaffolding/non standard 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 life line not used for working at height	5	5000/-
27.	No rubber mat in DB room	4	2000/-
28.	Water found accumulated in DB 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 D.B Room./ welding areas.	4	2000/-
32.	Loose material falling into excavated pit	4	2000/-
33.	Water logging into excavated pit	4	2000/-
34.	No / inadequate Barricade	4	2000/-



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

NIT No.: TPCODL/P&S/56/2020-21

Sr No	Description of violation	Severity	Penalty /
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 HVM/Mobile Crane operator does not having a valid HVM 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 body 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 etc.	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 passengers cars.	3	500/
56.	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/ starch 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/





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

NIT No.: TPCODL/P&S/56/2020-21

Sr No	Description of violation	Severity	Penalty /
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.	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 provide 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 Work Place	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.	Non functional Head light/ tail light 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/-





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

NIT No.: TPCODL/P&S/56/2020-21

Sr No	Description of violation	Severity	Penalty /
95.	Without Flash back arrestor on Industrial Acetylene & Oxygen cylinders.	5	5000/-
96.	Spillage of hazardous material/chemicals during transportation	4	2000/-
97.	Electrical equipment without Earthing/ ELCB/ Double Insulation Cable.	5	5000/-
98.	Lifting Tools & Tackles used without/ expired Test Certificates.	5	5000/-
99.	Housekeeping repeatedly not maintained		
100.	<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 1 <sup>st</sup> or 2 <sup>nd</sup> warning to be decided by Project Manager depending on the severity)		Rs.10000/- and above
104.	Repeat Violation of same nature	5	5X Violation

CONFIDENTIAL



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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE X**  
**TATA CODE OF CONDUCT**

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

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

The Contractor is requested to bring any concerns regarding this to the notice of our Chief Procurement & Stores e-mail ID: [pkjain@tatapower.com](mailto:pkjain@tatapower.com).

CONFIDENTIAL



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

NIT No.: TPCODL/P&S/56/2020-21

**ANNEXURE XI**  
**ENVIRONMENT & SUSTAINABILITY POLICY**



**CORPORATE ENVIRONMENT POLICY**

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

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

(Praveer Sinha)  
CEO & Managing Director

Date: 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

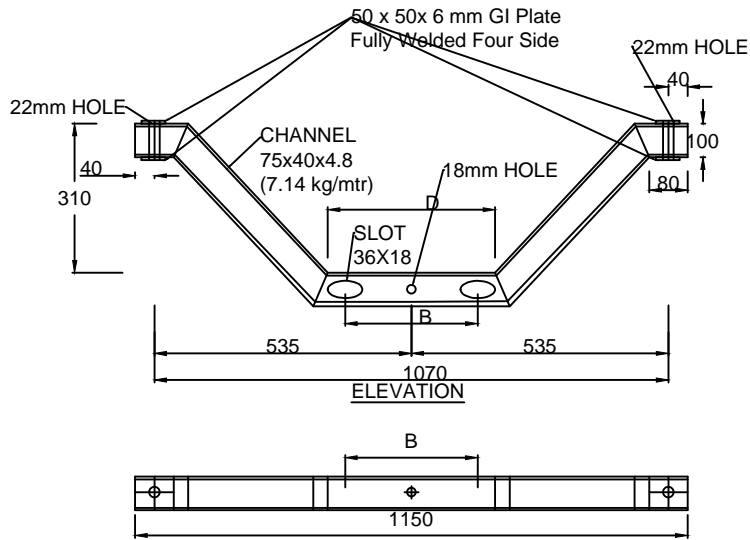
Date: 15<sup>th</sup> June, 2018

**TATA POWER**  
Lighting up Lives!



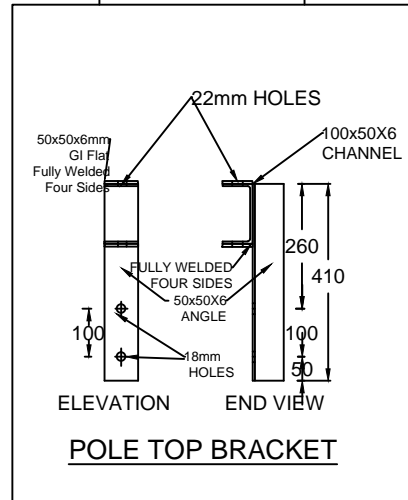
**ANNEXURE II -  
TECHNICAL SPECIFICATIONS  
AND DRAWINGS**

# 11 KV V-CROSS ARMS, TOP BRACKET & BACK CLAMP

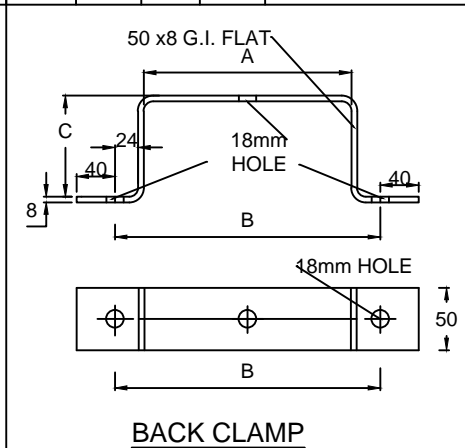


**11 KV V-CROSS ARM**

LENGTH OF	LOAD(KG)	A	B	C	D	BOTTOM LINE OF X-ARM FROM TOP OF THE POLE IN mm
9mtr. PSC Pole	300	215	279	85	352	1100
10mtr. PSC Pole	300	225	289	95	352	1100
150x150mm JOIST		155	220	140	352	1100



**POLE TOP BRACKET**



**BACK CLAMP**

## WEIGHT OF MATERIALS

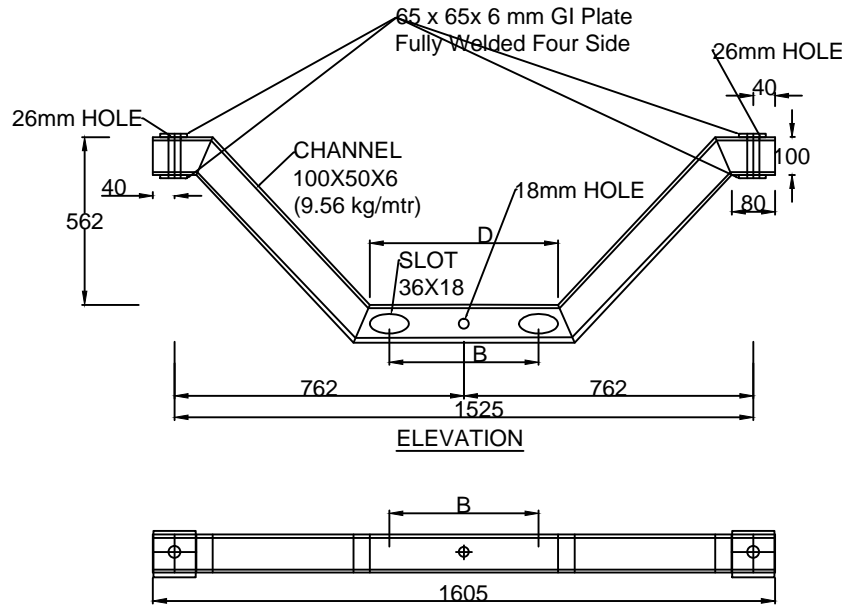
SL	ITEM	CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT (IN KG)	
1	11KV V-CROSS ARM	75 x 40 x 4.8	1425.0000	1.0000	7.1400	10.1745	
		50 x 6	50.0000	4.0000	2.3550	0.4710	
							10.6455
2	BACK CLAMP						
		FOR 9mtr. Pole	50 x 8	529	1.0000	3.1400	1.6611
		FOR 10mtr. Pole	50 x 8	559	1.0000	3.1400	1.7553
	FOR 150mm JOIST	50 x 8	579	1.0000	3.1400	1.8181	
3	TOP BRACKET	50 x 50 x 6	410.0000	1.0000	4.5000	1.8450	
		100 x 50 x 6	50.0000	1.0000	9.5600	0.4780	
		50 x 6	50.0000	2.0000	2.3550	0.2355	
							2.5585

N.B. : ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD . (610 gm/m<sup>2</sup>)

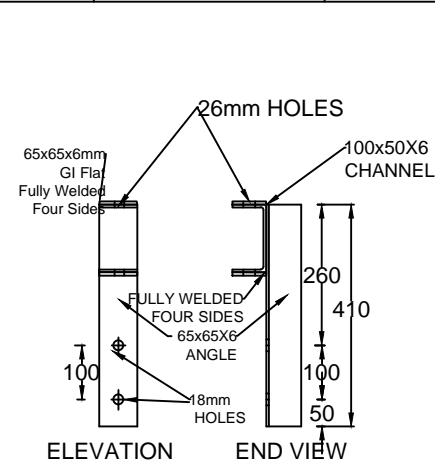
ALL DIMENSIONS ARE IN MM.

# 33 KV V-CROSS ARMS, TOP BRACKET & BACK CLAMP

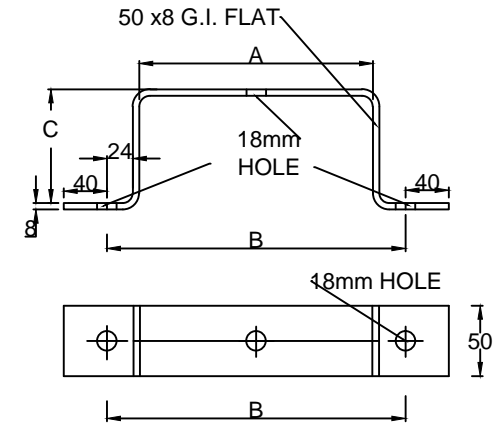


**33 KV V-CROSS ARM**

LENGTH OF	LOAD(KG)	A	B	C	D	BUTOM LINE OF X-ARM FROM TOP OF THE POLE IN mm
10mtr. PSC Pole	300	230	294	100	361	1500
10mtr. PSC Pole	400	265	329	100	361	1500
150x150mm JOIST		155	220	140	361	1500



**POLE TOP BRACKET**



**BACK CLAMP**

## WEIGHT OF MATERIALS

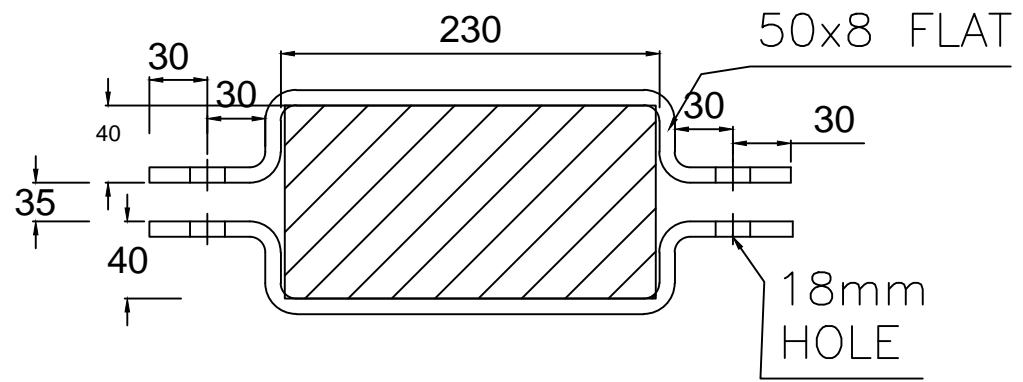
SL	ITEM	CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT (IN KG)	
1	33KV V-CROSS ARM	100 x 50 x 6	2160.0000	1.0000	9.5600	20.6496	
		65 x 6	65.0000	4.0000	3.0600	0.7956	
							21.4452
2	BACK CLAMP						
		For 10m 330Kg	50 x 8	574	1.0000	3.1400	1.8024
		For 10m 400Kg	50 x 8	609	1.0000	3.1400	1.9123
		For 150MM JOIST	50 x 8	579	1.0000	3.1400	1.8181
3	TOP BRACKET						
		65 x 65 x 6	410.0000	1.0000	5.8000	2.3780	
		100 x 50 x 6	65.0000	1.0000	9.5600	0.6214	
		65 x 6	65.0000	2.0000	3.0600	0.3978	
						3.3972	

N.B. : ALL FABRICATED ITEMS SHOULD BE

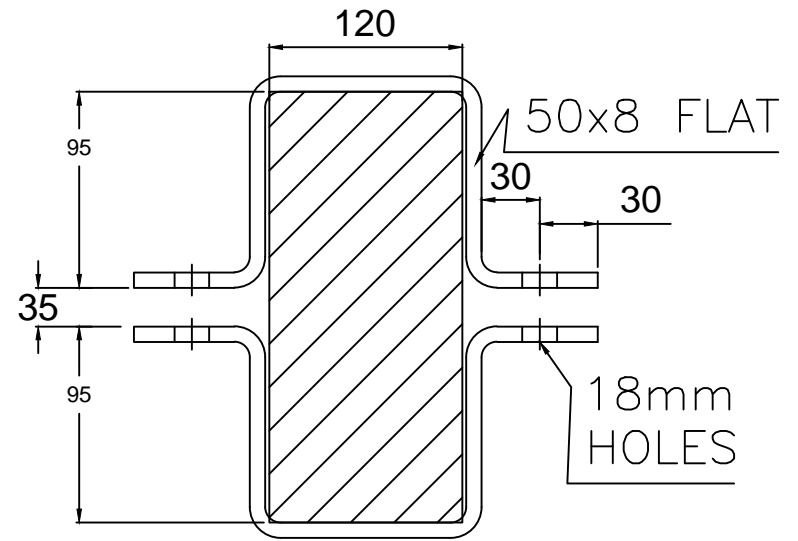
1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD . (610 gm/m<sup>2</sup>)

ALL DIMENSIONS ARE IN MM.

STAY SET CLAMP( FOR 10 mtr. 330KG PSC POLE )  
AT A HEIGHT OF 1800mm FROM TOP OF THE POLE



STAY SET CLAMP ( TYPE A )



STAY SET CLAMP ( TYPE B )

WEIGHT OF MATERIALS							
SL	ITEM		CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT ( IN KG )
1	STAY SET CLAMP FOR 10 MTR 330KG PSC POLE	TYPE A	50 x 8	446.0000	2.0000	3.1400	2.8009
		TYPE B	50 x 8	446.0000	2.0000	3.1400	2.8009

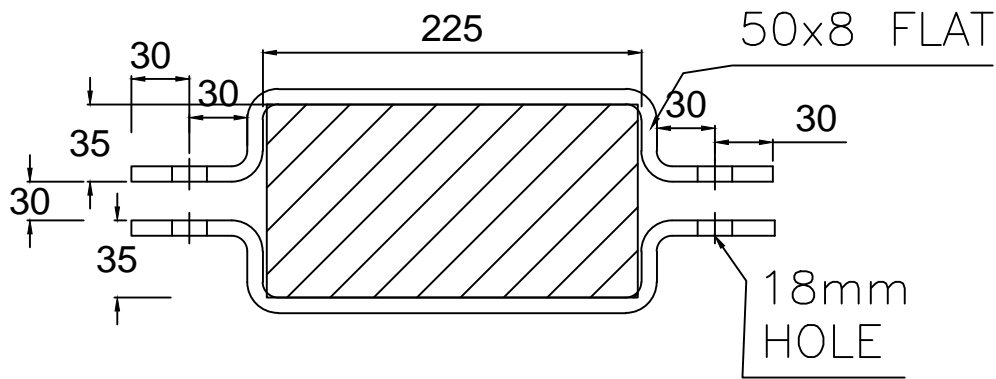
N.B. : ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD  
(610 gm/m<sup>2</sup> )

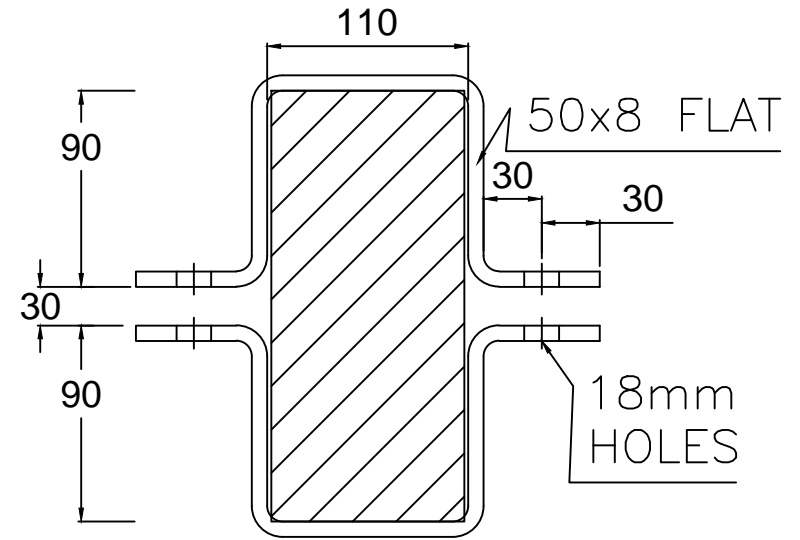
ALL DIMENSIONS ARE IN MM.



STAY SET CLAMP( FOR 9 mtr. 300KG PSC POLE )  
AT A HEIGHT OF 1500mm FROM TOP OF THE POLE



STAY SET CLAMP ( TYPE A )



STAY SET CLAMP ( TYPE B )

**WEIGHT OF MATERIALS**

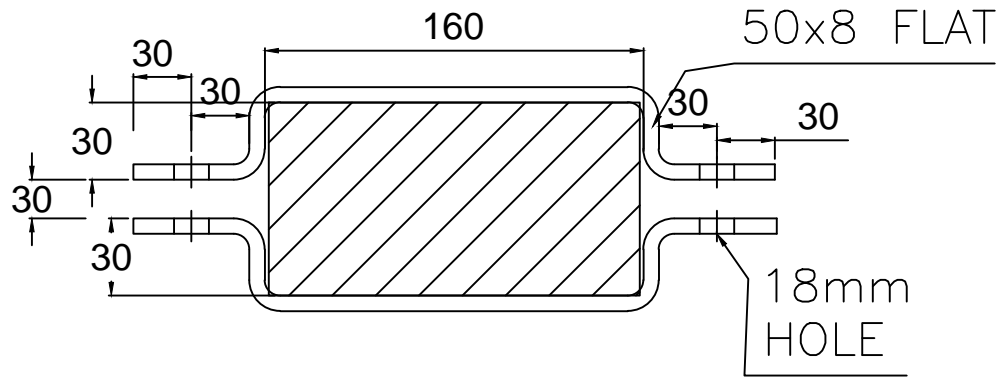
SL	ITEM		CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT (IN KG)
1	STAY SET CLAMP FOR 9 MTR 300KG PSC POLE	TYPE A	50 x 8	431.0000	2.0000	3.1400	2.7067
		TYPE B	50 x 8	426.0000	2.0000	3.1400	2.6753

N.B. : ALL FABRICATED ITEMS SHOULD BE

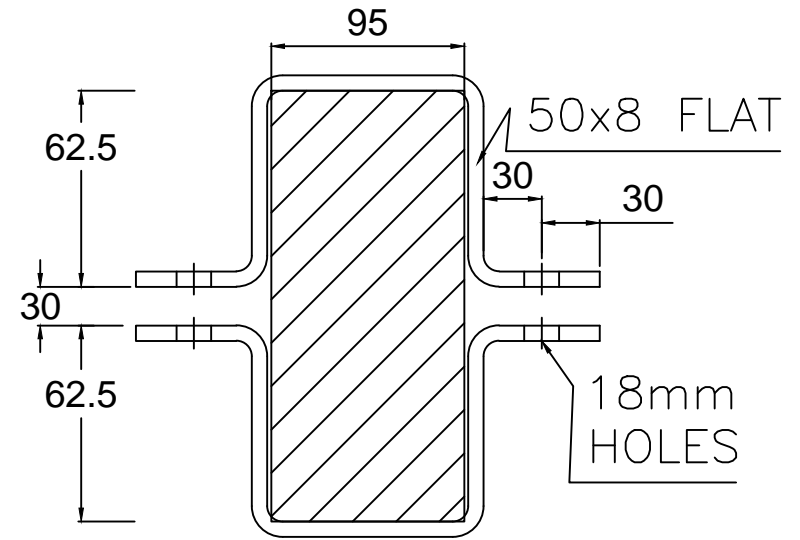
1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD  
(610 gm/m<sup>2</sup>)

ALL DIMENSIONS ARE IN MM.

STAY SET CLAMP( FOR 8 mtr. 200KG PSC POLE )  
AT A HEIGHT OF 600mm FROM TOP OF THE POLE



STAY SET CLAMP ( TYPE A )



STAY SET CLAMP ( TYPE B )

**WEIGHT OF MATERIALS**

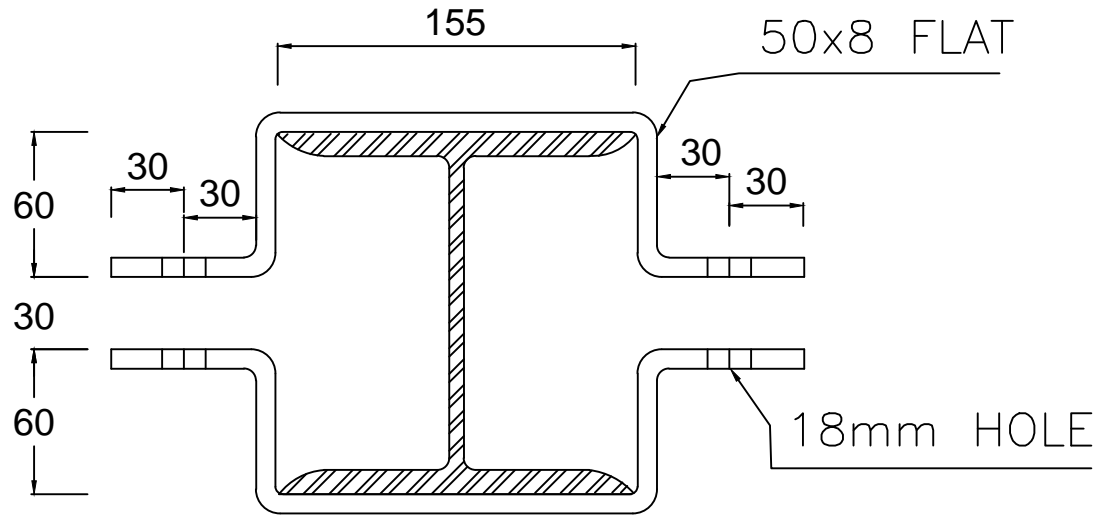
SL	ITEM		CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT ( IN KG )
1	STAY SET CLAMP FOR 8 MTR 200KG PSC POLE	TYPE A	50 x 8	356.0000	2.0000	3.1400	2.2357
		TYPE B	50 x 8	356.0000	2.0000	3.1400	2.2357

N.B. : ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD (610 gm/m<sup>2</sup>)

ALL DIMENSIONS ARE IN MM.

# STAY SET CLAMP( FOR 150 x 150 MM GI JOIST POLE )



## WEIGHT OF MATERIALS

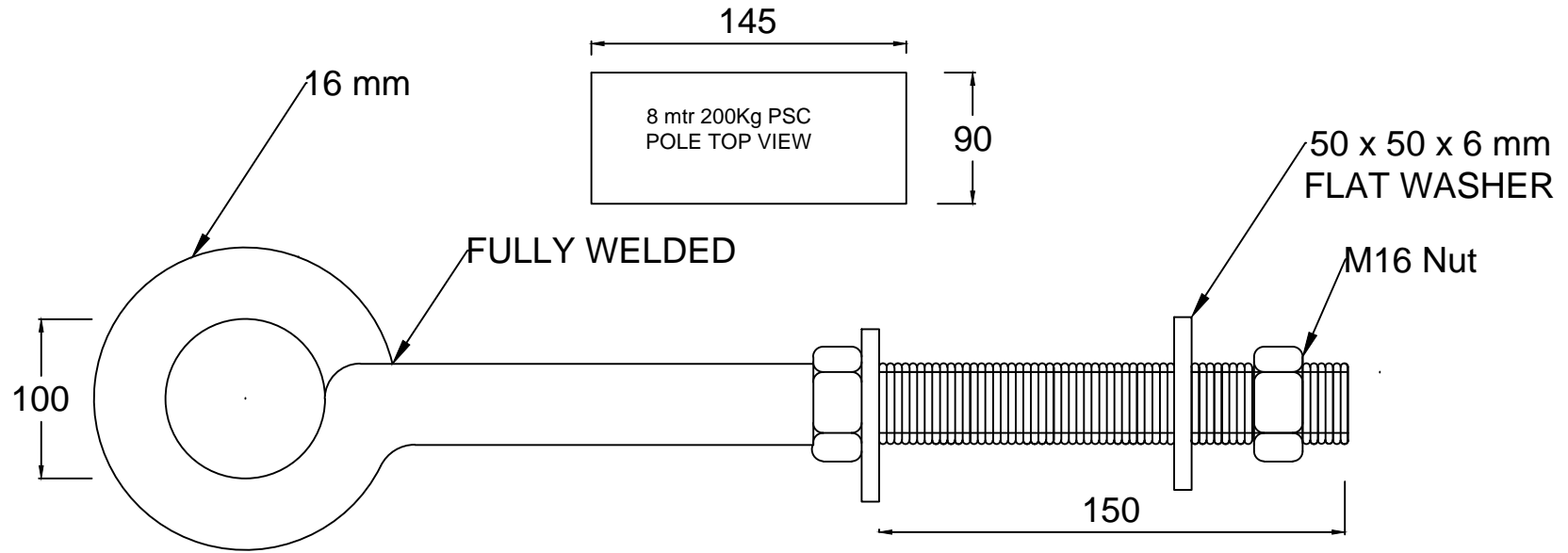
SL	ITEM	CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT ( IN KG )
1	STAY SET CLAMP FOR 150 x 150 mm GI JOIST POLE	50 x 8	411.0000	2.0000	3.1400	2.5811

N.B. : ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD  
(610 gm/m<sup>2</sup>)

ALL DIMENSIONS ARE IN MM.

# LT DEAD END I HOOK FOR 8MTR 200KG PSC POLE



## DESCRIPTION OF ITEMS

SL	ITEM	CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT (IN KG)
1	EYE HOOK	16 mm (HDG Steel)	600.0000	2.0000	1.5800	1.8960
2	FLAT WASHER	50 x 6	50.0000	2.0000	2.3550	0.2355
3	NUT	M16 (HDG Steel)		2.0000	0.0360	0.0720
				TOTAL		2.2035

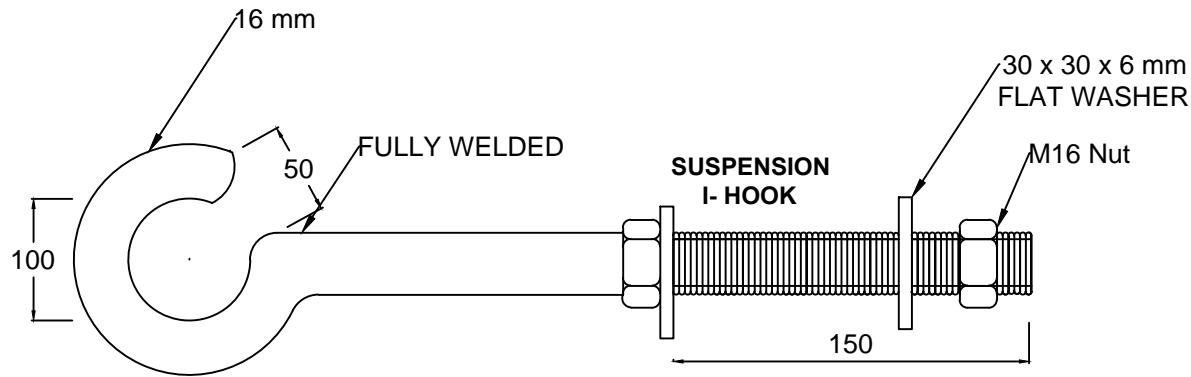
N.B. :

a) ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA , CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD (610 gm/m<sup>2</sup> )
3. ULTIMATE TENSILE STRENGTH 25KN

b) ALL DIMENSIONS ARE IN MM.

## LT SUSPENSION I HOOK WITH CROSS ARM FOR 8MTR 200KG PSC POLE

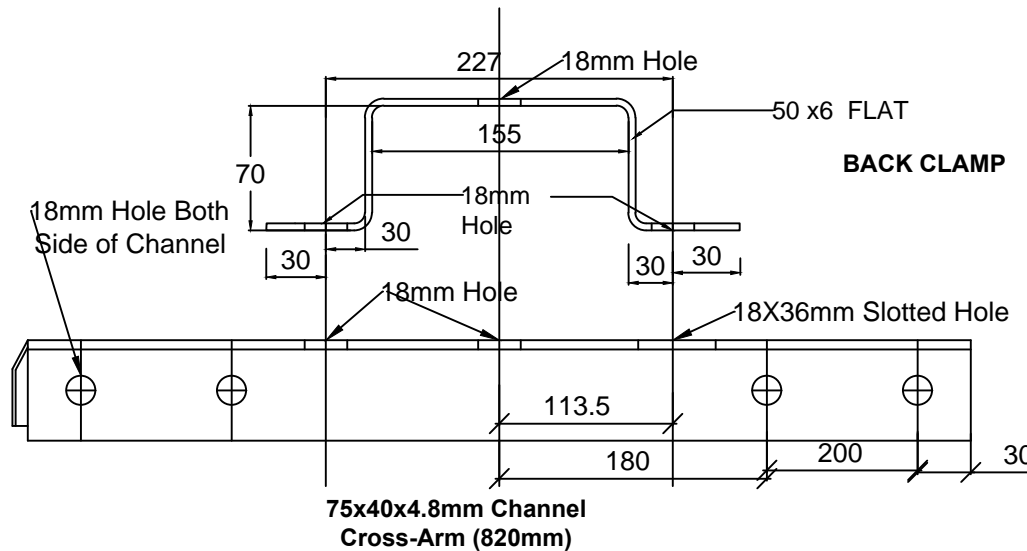


N.B. :

a) ALL FABRICATED ITEMS SHOULD BE

1. STEEL: GRADE Fe 410 WA ,CONFIRMING TO IS:808, 2062
2. HOT DIP GALVANIZED AS PER IS: 2633, 2629 STANDARD (610 gm/m<sup>2</sup> )
3. ULTIMATE TENSILE STRENGTH 25KN

b) ALL DIMENSIONS ARE IN MM.



### DESCRIPTION OF ITEMS

SL	ITEM	CROSS SECTION	LENGTH (IN MM)	NO OF PC	UNIT WT (KG/MTR)	TOTAL WEIGHT ( IN KG )
1	EYE HOOK	16 mm (HDG Steel)	560.0000	2	1.5800	1.7696
2	FLAT WASHER	30 x 6	30.0000	2	1.4000	0.0840
3	NUT	M16 (HDG Steel)		2	0.0360	0.0720
4	BACK CLAMP	50x6	427.0000	1	2.3600	1.0077
5	CROSS ARM	75x40x4.8	820.0000	1	3.7800	3.0996
				TOTAL		6.0329

## DESIGN BASIS - RS JOIST POLE FDN. FOR 11KV LINE

### Basic Load data:

Over all Length of Pole	11.00	M
Maximum wind span in working condition in Meter (L)	80.00	M
Wind Zone	HIGH	

### WIND LOAD CALCULATION

WIND LOAD CALCULATION :

CI. NO- 5.3 , IS 875 ( Part- 3) :1987

Wind Zone		5	
Terrain Category		1	
Basic Wind Speed	$V_b =$	50	m/s
Risk Coefficient	$K_1 =$	1.08	
Terrain Factor	$K_2 =$	1.09	
Topography Factor	$K_3 =$	1	
Design Wind Speed	$V_d =$	$V_b \times K_1 \times K_2 \times K_3$	58.86 m/s
Design Wind Pressure.	$P_d =$	$0.6 \times V_d^2$	208 Kg/m <sup>2</sup>

Design wind pressure (Pb) 207.87 KG/M<sup>2</sup>

### For LT AB Cable

No. of Cables (n)	3	Ea	
Area of cable	80	MM <sup>2</sup>	10.10
Dia. of LT AB Cable (dc)	10.00	MM	
Weight of Conductor (Wc)	0.22	KG/M	
Depth of Planting (dp)	1.85	M	1.83
Height of pole from Ground level (Hg)	9.15	M	
Distance of applied load from top	0.60	M	
Lever arm for pole	8.55	M	
lever arm for cable	8.0	M	

### Properties of Pole

Breadth of Pole	16.00	CM
Unit Weight of Pole	35.00	KG/M
Exposed area of pole above ground level	1.46	M <sup>2</sup>

### BM In Transverse Direction

*Bending moment due to wind load on cables/conductors*

Load due to wind on each conductor ( $F_{wc} = 2/3 \times P_b \times L \times d_c$ )	332.5919616	KG
Moment at Gr. Level due W.L on cond. ( $F_{wc} \times H_c$ )	2644.11	KG-M

*Bending moment due wind load on pole*

Wind load on Pole ( $F_{wp} = P_b \times A_t$ )	304.32	KG-M
Moment due W.L on pole ( $F_{wp} \times H_g / 2$ )	1392.27	KG-M

*Bending moment due to cable/conductor's eccentric loading*

Distance from pole to cable or conductor being considered (l)	1.20	M
Bending moment ( $BM_c = W_c \times L \times l \times n$ )	21.02	KG-M

**Total transverse moment (Mt) 4057.40 KG-M**

<b>M</b>	<b>40.6</b>	<b>KN/M</b>
<b>Fv</b>	<b>4.4</b>	<b>KN</b>
<b>Fh</b>	<b>6.4</b>	<b>KN</b>

### TABLE FOR INSTALLATION

RS JOIST TYPE	L (MM)	B (MM)	D (MM)
RS Joist 150x150x6 mm	11000	1800	1900
RS Joist 160x148x4.5mm	10000	1800	1900
RS Joist 116x100x4.5mm	9000	1500	1600

### TABLE FOR LINE PARAMETERS

LINE TYPE	SPAN (M)	CONDUCTOR (SQMM.)
11KV	60-80	3 Nos. - 80/55

**NOTE:-**

- THIS DWG. SHALL BE READ IN CONJUNCTION WITH TERMS & CONDITIONS OF THE CONTRACT, TECHNICAL SPECIFICATIONS & SCHEDULE OF ITEMS.
  - DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
  - ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METER U.N.O.
  - FINISH GRADE LEVEL (F.G.L) EL(+/-)0.000 WITH RESPECT TO EXISTING GROUND/ROAD LEVEL.
  - IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ELECTRICAL DRAWING AND ARCHITECTURAL DRAWINGS, THE CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
  - ALL STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED CONFORMING TO IS 4759 & IS 2633.
  - ALL MATERIALS USED & WORKMANSHIP SHALL CONFORM TO TECHNICAL SPECIFICATION AND SATISFACTION OF ENGINEER-IN-CHARGE.
  - UNLESS NOTED OTHERWISE, PCC SHALL BE (1:4:8) 75MM THICK AND 75MM PROJECTED BEYOND THE FACE OF RCC.
  - ALL REINFORCING STEEL WILL BE OF TESTED QUALITY CONFORMING TO IS:1786-1985
  - ALL RCC WORK SHALL BE CARRIED OUT AS PER IS:456-2000 (LATEST)
  - USED CONC. GRADE :- M20  
GRADE OF REINF. STEEL :- FE 500D U.N.O.
  - LAP LENGTH OF REINFORCEMENT BAR SHALL NOT BE LESS THAN 50 TIMES THE DIAMETER OF BAR.
  - CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS.
- | STRUCTURAL ELEMENT | TOP | BOTTOM | SIDE |
|--------------------|-----|--------|------|
| a) FOOTING         | 50  | 50     | 50   |
| b) COLUMN          | -   | -      | 40   |
- RS JOIST SHALL BE WELDED WITH 6MM FILLET WELD TO THE BASE PLATE.
  - THIS DRAWING IS APPLICABLE FOR INSTALLATION OF POLE AS LINE POLE.

NET SAFE BEARING CAPACITY	5 T/SQM
BASIC WIND SPEED AS PER IS 875 (PART-3)	180 KM/HR

**ABBREVIATIONS:-**

- EL = ELEVATION
- G.L. = GROUND LEVEL
- T.O.C = TOP OF CONCRETE
- THK. = THICK
- TYP. = TYPICAL
- C = CENTER LINE
- T.O.R = TOP OF RAFT
- CJ = CONSTRUCTION JOINT

**PROJECT**

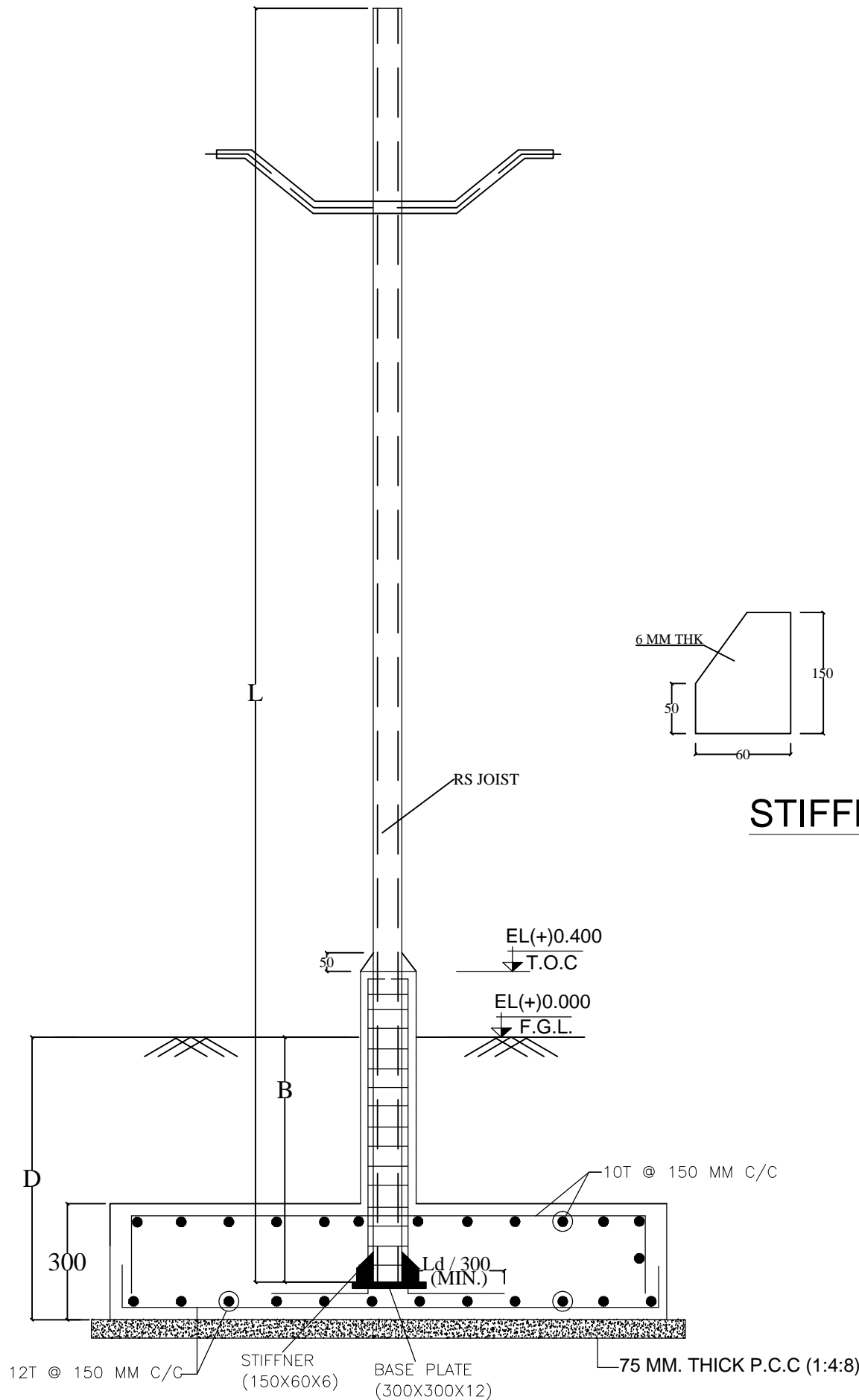
INSTALLATION OF RS JOIST  
AT TPCODL - ODISHA

**SAFETY:-**

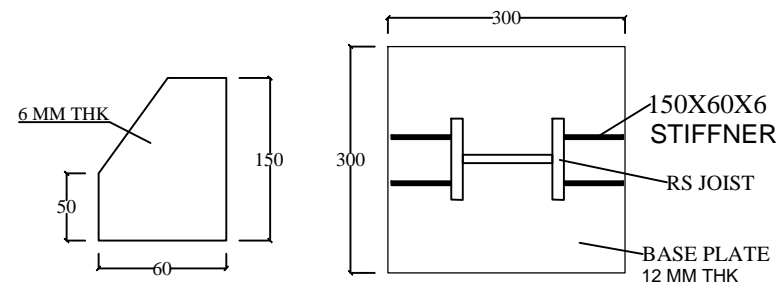
- All safety precautions i.e. usage of PPE's etc. need to be taken care during the installation/construction.
- Barricades shall be used if found necessary.
- Warning board to be provided if necessary for safety measures.

25.05.2020	00	Issued for construction purpose				
DATE	REV. NO.	REMARKS	DGN.	REV.	APPD.	ISSUED.

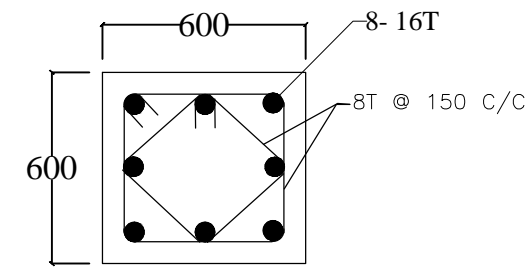
DESIGN(DGN.)	PR/CS	TITLE:-			
DRAWN(DRN.)	CS	FOUNDATION DETAILS FOR RS JOIST FOR 11KV LINE			
REVIEWED(REV.)	PR				
APPROVED(APPD.)	DS	SHEET	DRAWING NO.	REV.	
SCALE	N.T.S.	1 OF 1	TPD-ODS-202-C-002	00	



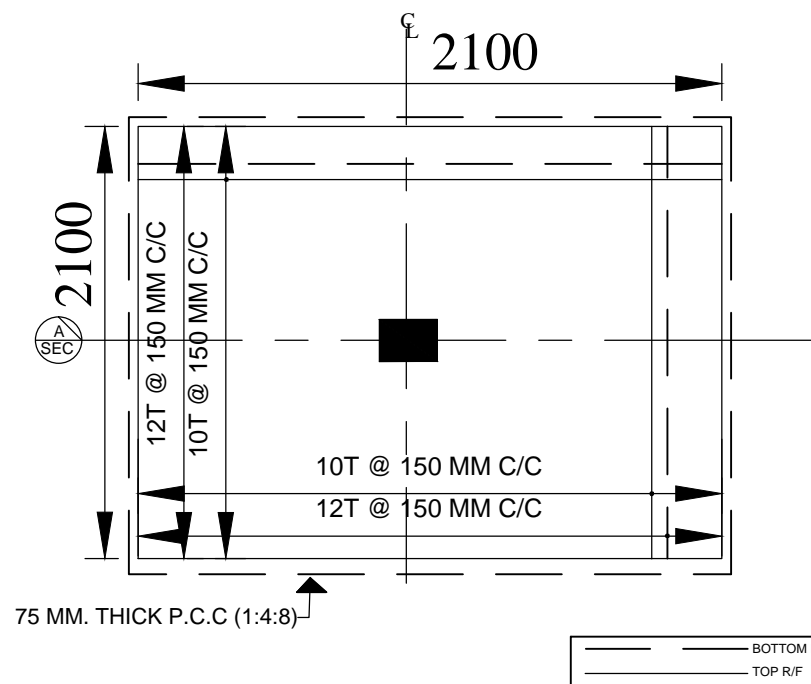
**SECTION -A (TYP)**



**STIFFNER DETAIL**



**COLUMN DETAIL**



**PLAN VIEW**

## DESIGN BASIS - RS JOIST POLE FDN. FOR 33KV LINE

### Basic Load data:

Over all Length of Pole	13.00	M
Maximum wind span in working condition in Meter (L)	100.00	M
Wind Zone	HIGH	

### WIND LOAD CALCULATION

WIND LOAD CALCULATION :

CI. NO- 5.3 , IS 875 ( Part- 3 ) :1987

Wind Zone		5	
Terrain Category		1	
Basic Wind Speed	$V_b =$	50	m/s
Risk Coefficient	$K_1 =$	1.08	
Terrain Factor	$K_2 =$	1.09	
Topography Factor	$K_3 =$	1	
Design Wind Speed	$V_d =$	$V_b \times K_1 \times K_2 \times K_3$	58.86 m/s
Design Wind Pressure.	$P_d =$	$0.6 \times V_d^2$	208 Kg/m <sup>2</sup>

Design wind pressure (Pb) 207.87 KG/M<sup>2</sup>

### For LT AB Cable

No. of Cables (n)	3	Ea	
Area of cable	232	MM <sup>2</sup>	17.19
Dia. of LT AB Cable (dc)	18.00	MM	
Weight of Conductor (Wc)	0.64	KG/M	
Depth of Planting (dp)	2.20	M	2.17
Height of pole from Ground level (Hg)	10.80	M	
Distance of applied load from top	0.60	M	
Lever arm for pole	10.20	M	
lever arm for cable	9.6	M	

### Properties of Pole

Breadth of Pole	16.00	CM
Unit Weight of Pole	42.00	KG/M
Exposed area of pole above ground level	1.73	M <sup>2</sup>

### BM In Transverse Direction

*Bending moment due to wind load on cables/conductors*

Load due to wind on each conductor ( $F_{wc} = 2/3 \times P_b \times L \times d_c$ )	748.3319136	KG
Moment at Gr. Level due W.L on cond. ( $F_{wc} \times H_c$ )	7183.99	KG-M

*Bending moment due wind load on pole*

Wind load on Pole ( $F_{wp} = P_b \times A_t$ )	359.20	KG-M
Moment due W.L on pole ( $F_{wp} \times H_g / 2$ )	1939.68	KG-M

*Bending moment due to cable/conductor's eccentric loading*

Distance from pole to cable or conductor being considered (l)	1.20	M
Bending moment ( $BM_c = W_c \times L \times l \times n$ )	76.44	KG-M

**Total transverse moment (Mt) 9200.10 KG-M**

<b>M</b>	<b>92.0</b>	<b>KN/M</b>
<b>Fv</b>	<b>7.4</b>	<b>KN</b>
<b>Fh</b>	<b>11.1</b>	<b>KN</b>



### TABLE FOR INSTALLATION

RS JOIST TYPE	L (MM)	B (MM)	D (MM)
RS Joist 150x150x6 mm	13000	2200	2300
RS Joist 160x152x6 mm	13000	2200	2300
RS Joist 160x160x6 mm	13000	2200	2300
RS Joist 160x160x6 mm	11000	1800	1900
RS Joist 150x150x6 mm	11000	1800	1900

### TABLE FOR LINE PARAMETERS

LINE TYPE	SPAN (M)	CONDUCTOR (SQMM.)
33KV	60-100	3 Nos. - 232/100

**NOTE:-**

- THIS DWG. SHALL BE READ IN CONJUNCTION WITH TERMS & CONDITIONS OF THE CONTRACT, TECHNICAL SPECIFICATIONS & SCHEDULE OF ITEMS.
- DO NOT SCALE. FOLLOW WRITTEN DIMENSIONS ONLY.
- ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN METER U.N.O.
- FINISH GRADE LEVEL (F.G.L) EL(+/-)0.000 WITH RESPECT TO EXISTING GROUND/ROAD LEVEL.
- IN CASE OF ANY DISCREPANCY IN DIMENSION AND LEVEL BETWEEN ELECTRICAL DRAWING AND ARCHITECTURAL DRAWINGS, THE CONTRACTOR SHALL SEEK THE CLARIFICATION BEFORE PROCEEDING.
- ALL STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED CONFORMING TO IS 4759 & IS 2633.
- ALL MATERIALS USED & WORKMANSHIP SHALL CONFORM TO TECHNICAL SPECIFICATION AND SATISFACTION OF ENGINEER-IN-CHARGE.
- UNLESS NOTED OTHERWISE, PCC SHALL BE (1:4:8) 75MM THICK AND 75MM PROJECTED BEYOND THE FACE OF RCC.
- ALL REINFORCING STEEL WILL BE OF TESTED QUALITY CONFORMING TO IS:1786-1985
- ALL RCC WORK SHALL BE CARRIED OUT AS PER IS:456-2000 (LATEST)
- USED CONC. GRADE :- M20  
GRADE OF REINF. STEEL :- FE 500D U.N.O.
- LAP LENGTH OF REINFORCEMENT BAR SHALL NOT BE LESS THAN 50 TIMES THE DIAMETER OF BAR.
- CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS.  

STRUCTURAL ELEMENT	TOP	BOTTOM	SIDE
a) FOOTING	50	50	50
b) COLUMN	-	-	40
- RS JOIST SHALL BE WELDED WITH 6MM FILLET WELD TO THE BASE PLATE.
- THIS DRAWING IS APPLICABLE FOR INSTALLATION OF POLE AS LINE POLE.

NET SAFE BEARING CAPACITY	5 T/SQM
BASIC WIND SPEED AS PER IS 875 (PART-3)	180 KM/HR

**ABBREVIATIONS:-**

- EL = ELEVATION
- G.L. = GROUND LEVEL
- T.O.C = TOP OF CONCRETE
- THK. = THICK
- TYP. = TYPICAL
- C = CENTER LINE
- T.O.R = TOP OF RAFT
- CJ = CONSTRUCTION JOINT

**PROJECT**

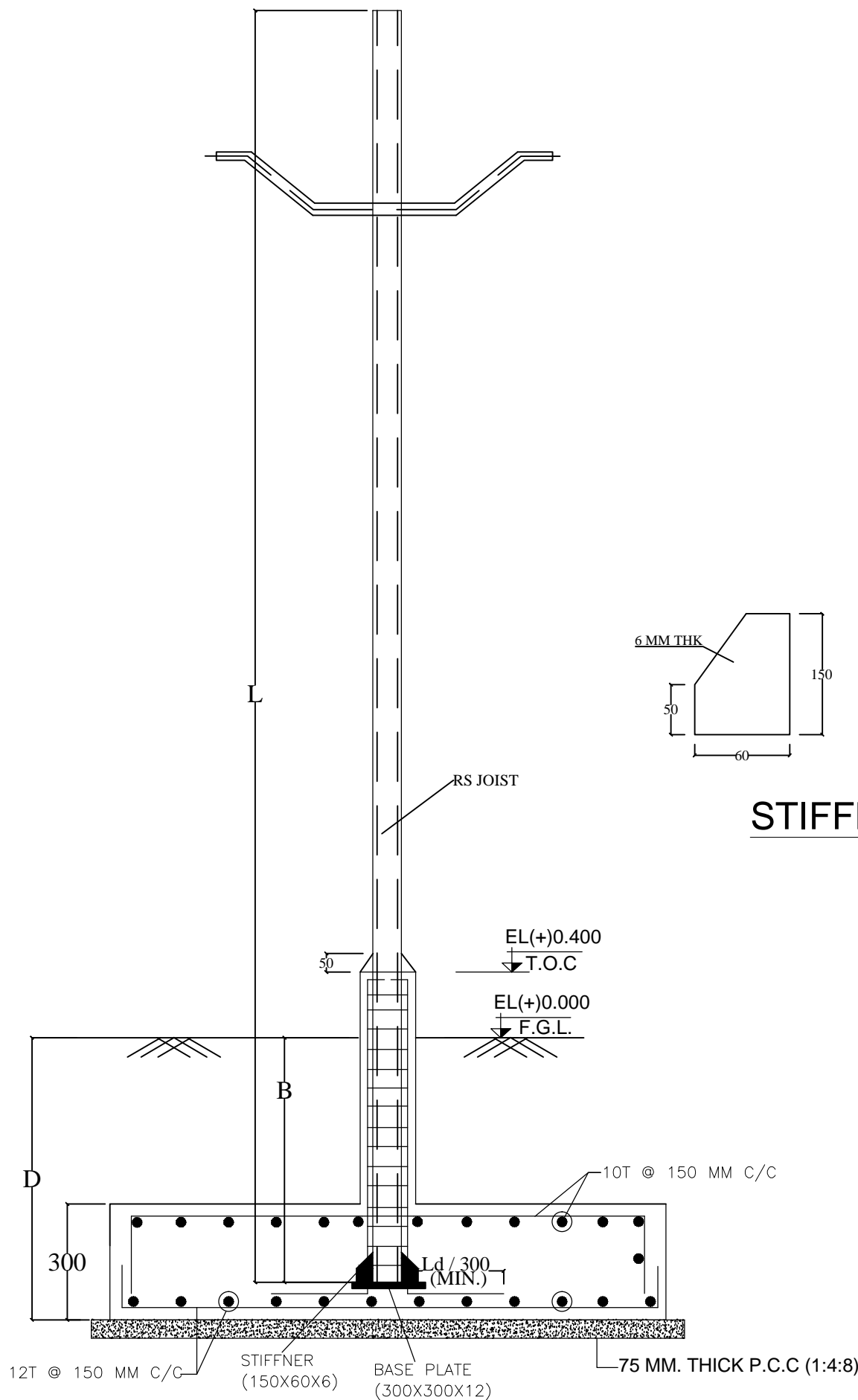
INSTALLATION OF RS JOIST  
AT TPCODL - ODISHA

**SAFETY:-**

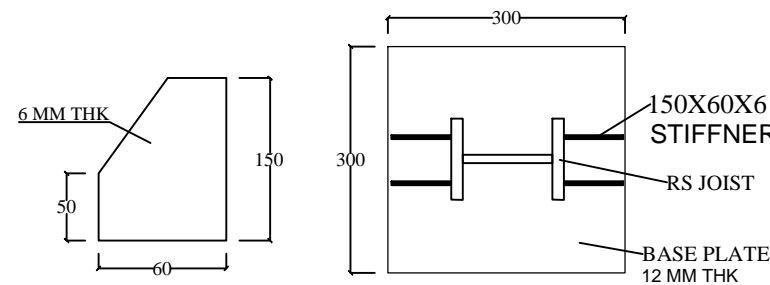
- All safety precautions i.e. usage of PPE's etc. need to be taken care during the installation/construction.
- Barricades shall be used if found necessary.
- Warning board to be provided if necessary for safety measures.

DATE	REV. NO.	REMARKS	DGN.	REV.	APPD.	ISSUED.
27.05.2020	00	Issued for construction purpose				

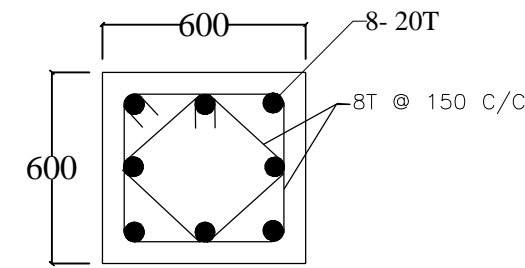
DESIGN(DGN.)	PR/CS	TITLE:-			
DRAWN(DRN.)	CS	FOUNDATION DETAILS FOR RS JOIST			
REVIEWED(REV.)	PR	FOR 33KV LINE			
APPROVED(APPD.)	DS	SHEET	DRAWING NO.	REV.	
SCALE	N.T.S.	1 OF 1	TPD-ODS-202-C-001	00	



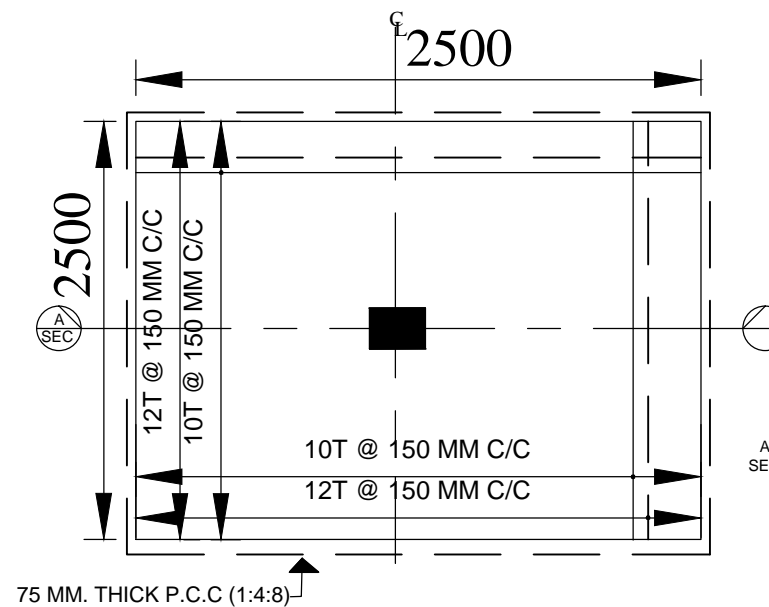
**SECTION -A (TYP)**



**STIFFNER DETAIL**



**COLUMN DETAIL**



**PLAN VIEW**

**A.B. Switches ( 11 KV , 200 A , 3 Pole , 50 Hz ) ( SINGLE  
BREAK) – (IS- 9920-Latest Amnd.)**

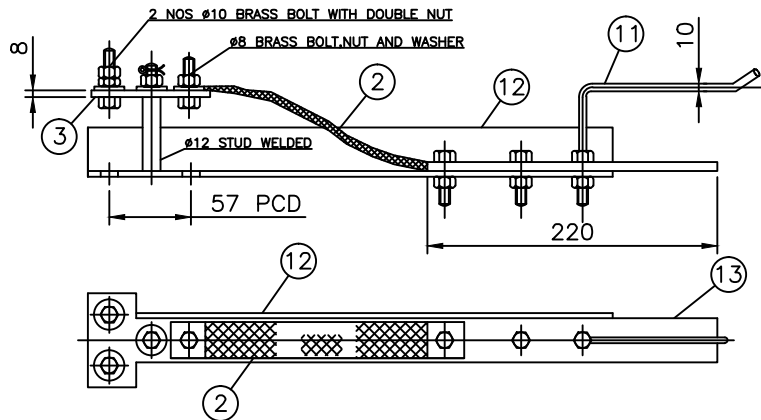
Guaranteed Technical Particulars ( GTP)

Sl. No.	Particulars	Desired value
		11KV, 200 A, 3Pole
1	Maker's Name and country or origin	To be specified by the bidder
2	Type of Switch	Rotating Type
3	Suitable for mounting	Horizontal only
4	Number of supporting post insulator per Phase	2 Nos , 12 KV Post Insulator per phase as per ISS-2544 / 1973
5	Post Insulator.	
a	Maker's name & country of origin	To be specified (as per CPRI Test Report)
b	Type of cementing	Original cemented only & as per ISS - 2544 / 1973 & relevant IEC
c	One minute power frequency with stand voltage Dry	35 KV RMS
d	One minute power frequency withstand voltage Wet	35 KV RMS
e	Visible discharge voltage	9 KV RMS
f	Dry Flashover Voltage	55 KV r m s
g	Power frequency puncture with stand voltage	1.3 times of actual dry flash over Voltage
h	Creepage distance	320 mm minimum (ISS-2544/1973 & relevant IEC)
6	Impulse with stand voltage for positive and negative polarity (1.2 / 50) micro second wave)	
a	Across the isolating distance	85 KV (Peak )
b	To earth & between poles	75 KV (Peak)
7	One minute power frequency with stand voltage	
a	Across the isolating distance	32 KV (RMS)
b	To earth and between poles	28 KV (RMS)
8	Rated normal current and rated frequency	200 Amps , 50 Hz
9	Rated short circuit making capacity	25 KA ( Peak )
10	Rated short time current	10 KA ( RMS )
11	Rated peak withstand current	40 KA ( Peak )
12	Rated mainly active load breaking capacity	200 Amp (RMS)
13	Rated Transformer off load breaking capacity	6.3 Amp (RMS)
14	Rated line charging breaking capacity	2.5 Amps ( RMS)
15	Rated Cable Charging Breaking Capacity	10 Amp, (rms)
16	Minimum clearance between adjacent phases	

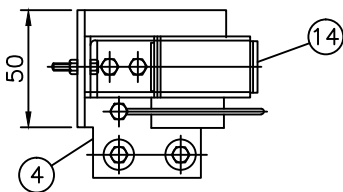
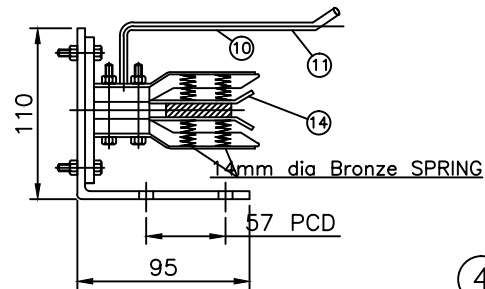
Sl. No.	Particulars	Desired value
		11KV, 200 A, 3Pole
a	Switch Closed ( centre to centre)	760 mm
b	Switch opened (center / edge of blade)	380 mm
17	Temperature rise ( Shall not exceed the maximum limit as specified below at an ambient temperature not exceeding in 40 <sup>0</sup> C	
a	Copper contacts in air	65 <sup>0</sup> C
b	Terminal of switch intended to be connected to external conductor by bolts	50 <sup>0</sup> C
18	Vertical Clearance from top of Insulator cap to mounting channel	254 mm (minimum)
19	Type of contact	a) Self aligned, high pressure jaw type fixed contacts of electrolytic copper of size 65 mm x 35 mm x 6 mm duly silver plated. Each contact should be revetted with three nos. Copper rivets with a bunch ( minimum 3 mm thick) consisting of copper foils, each may vary from 0.15 mm to 0.25 mm. These total thickness of copper foils per jaw should be 6 mm. Jaw assemblies are to be bolted through stainless steel bolts and nuts with stainless steel flat and spring washer.
		b) Solid rectangular blade type moving contact of electrolytic copper size 220 mm x 35 mm x 6 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.
		c) Pressure spring to be used in jaw contacts shall be phosphorous bronze having 8 nos of turn x 28 mm height x 14.4 mm diameter with 14 SWG wire (minimum four nos springs shall be used)

Sl. No.	Particulars	Desired value		
		11KV, 200 A, 3Pole		
20	Terminal Connector	Terminal connectors for both movable and fixed should be of copper flats of same size similar to that of moving contact blades ( minimum 95 % copper composition) . The fixed connector shall of size 65 mm x 35 x 6 mm and the size of movable connector shall be size 65 x 35 x 6 mm with machine finishing duly silver plated with 2 nos. of 12 mm brass bolts , nuts , plain washers & brass spring washers should be provided along with 2 nos solder less bimetallic sockets for each connector suitable sockets for each connector suitable up to 55 Sq.mm conductor		
21	Moving Contact	Movable contact is to be supported by galvanised angle of 45 x 45 x 5 mm in each phase and the moving contact are to be bolted through 2 nos stainless steel bolts and nuts with suitable stainless steel flat and spring washers.		
22	Galvanization	a) Iron parts shall be dip galvanized 610gm/m <sup>2</sup> as per IS – 2633 / 1972 (b) The pipe shall be galvanized as per IS – 4736 / 1968.		
23	Details of Phase	(a) Coupling Rod :- 25 mm nominal bore G.I. pipe medium guage ( b ) Operating Rod :- 32 mm nominal bore G.I. pipe medium gauge single length 6 mtrs		
	Nominal Bore ( GI Pipe )	O.D.	Diameter	
		Thickness		
		Max	Min	Thick
a	25 mm	34.2 mm	33.3 mm	3.25 mm
b	32 mm	42.9 mm	42 mm	3.25 mm
c	Arcing Horn	8 mm dia G.I. Rod with spring assisted operation		
d	Force of fixed contact spring	50 lbs to 75 lbs		
e	Copper braided flexible topes	320 mm length of flexible electrolytic copper tape or braided chord (with tin coated) having minimum weight 450 gms per meter and both ends shall be crimped with copper sockets through brass bolts and nuts with brass flat washers. Two nos of suitable copper sockets shall be used at both the ends. The minimum no. of flexible wires should be 1536 of 36 SWG for each flexible chord		
f	Quick break device	Lever mechanism		
g	Bearings	4 nos. self lubricated bearing to be provided with grease nipple including 4 th bearing being a thrust bearing		
h	Locking arrangement	Pad Locker & Key arrangement at both ‘ ON ‘ & ‘OFF’ position		

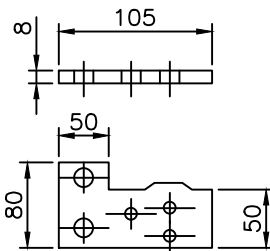
Sl. No.	Particulars	Desired value
		11KV, 200 A, 3Pole
i	Earth Terminal	To be provided at Base Channels
j	“T” bolt	The “T” bolt shall be longer with 75 mm thread.
24	Supporting Channels. Mounting Hole 230mm C-C. Channel Length 480mm	75x40x6 mm M.S. Channel hot deep Galvanised(610gm/m <sup>2</sup> )
25	Weight of each pole complete ( Kg )	To be specified by the Bidder



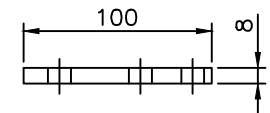
MOVING CONTACT ASSLY.



FIXED CONTACT ASSLY.



4 CONNECTOR (FIXED)



3 CONNECTOR (MOVING)

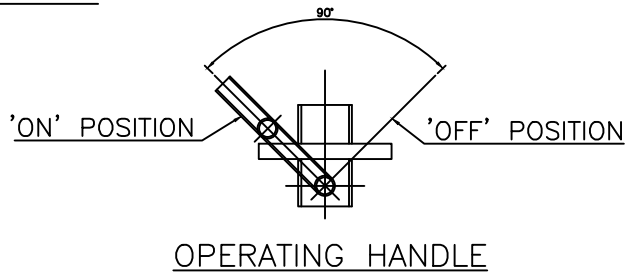
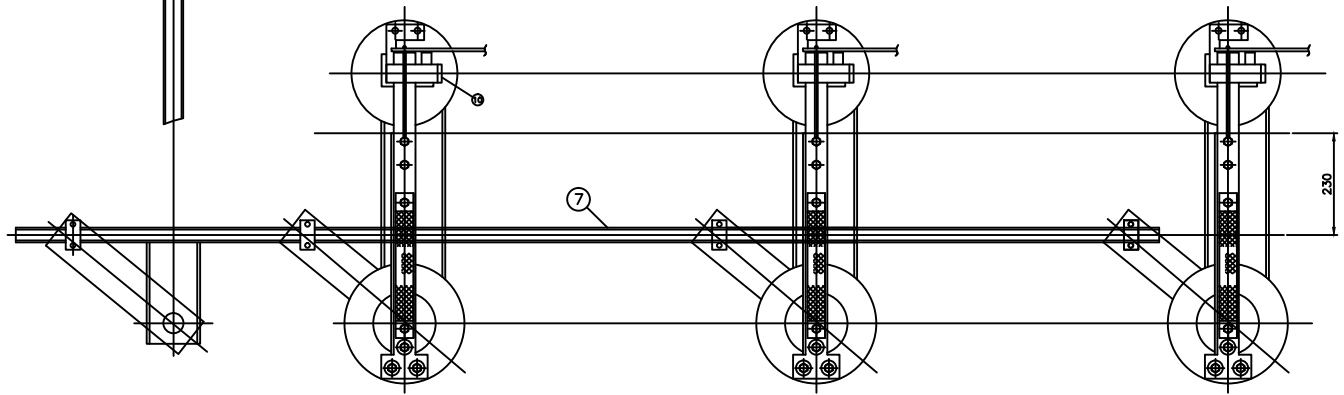
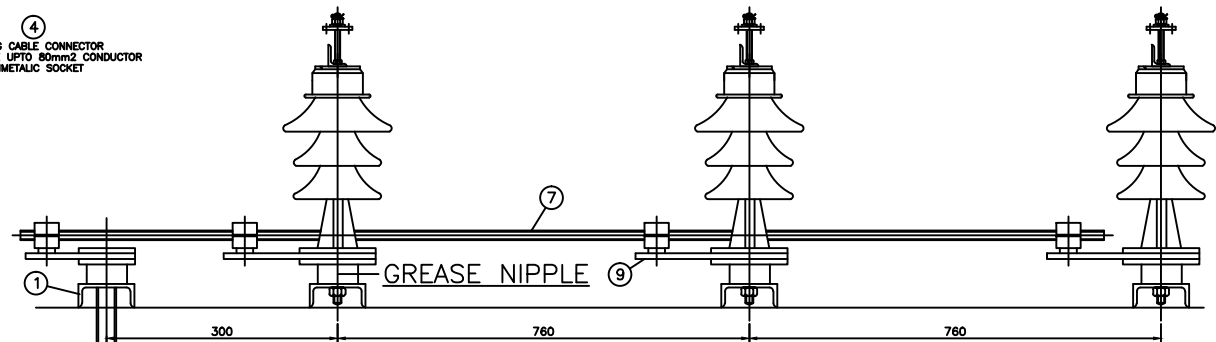
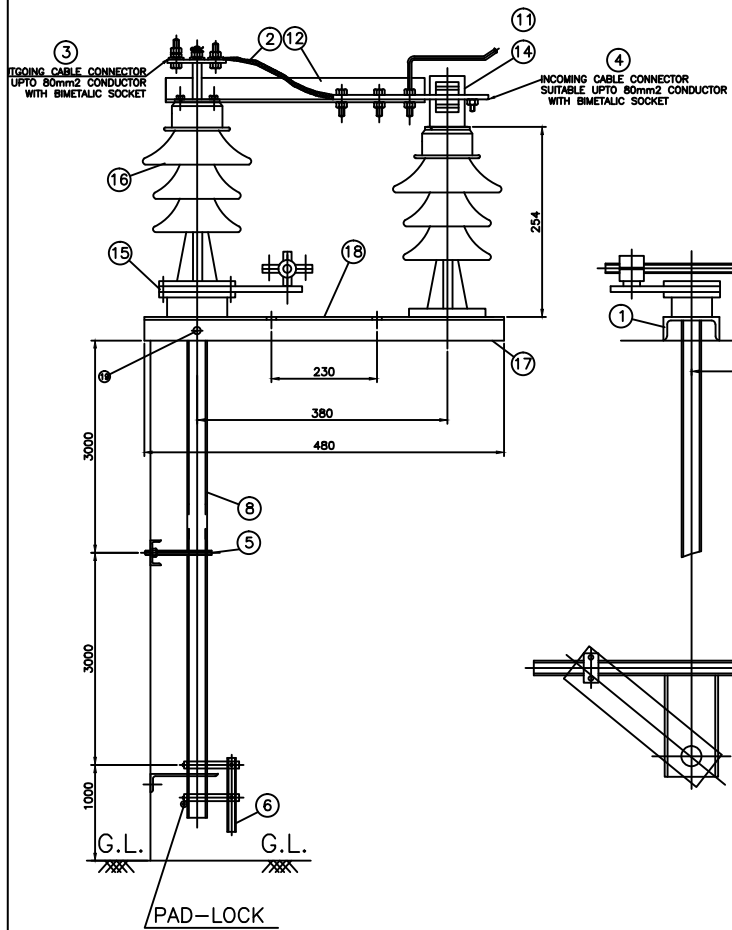
NOTES :-

01. ALL DIMENSIONS ARE IN mm.
02. TOLERANCE  $\pm 5\%$
03. ALL FERROUS PARTS SHALL BE HOT-DIP GALVANISED
04. ALL NON-FERROUS PARTS SHALL BE HEAVILY SILVER-PLATED.

BILL OF MATERIALS

SL.NO.	DESCRIPTION	QTY.	MATERIAL
19	EARTH TERMINAL	3	NUT & BOLT
18	NAME PLATE	3	ALUMINIUM
17	BASE CHANNEL 75x40x6mm 480mm long	3	M.S. GALVD.
16	POST INSULATOR 11KV 254mm HT. 320 C.D.	6	PORCELAIN
15	BEARING ASSEMBLY	3	M.S. GALVD.
14	FIXED CONTACT 80x50x8mm LONG	3	HD-EC-Cu
13	MOVING CONTACT 220x50x8mm	3	HD-EC-Cu
12	MOVING CONTACT SUPPORT 50x50x6mm	3	M.S. ANGLE
11	ARCING HORN $\phi 10$ mm	3/3	M.S. GALVD.
10	CONTACT LEVER	3/3	M.S. GALVD.
09	PHASE OPERATING LEVER (BAT)	3	M.S. GALVD.
08	OPERATING DOWN PIPE 32NB 'B' CLASS x 6MTR. LG	1	G.I. PIPE
07	PHASE COUPLING PIPE 25NB 'B' CLASS x 2500mm LG	1	G.I. PIPE
06	OPERATING HANDLE 32NB x 450mm LG	1	G.I. PIPE
05	INTERMEDIATE "I" BOLT	1	M.S. GALVD.
04	CONNECTOR (FIXED) 80x50x8mm	3	BRASS/GM
03	CONNECTOR (MOVING) 80x50x8mm	3	BRASS/GM
02	BRAIDED TAPE 320x25x5mm	3	TINNED COPPER
01	FOURTH BEARING	1	M.S. GALVD.

DEG	S.DEY	02.04.13	SPARE DETAILS OF 11 KV 3 PHASE SINGLE BREAK ROTATING TYPE A.B. SWITCH
DRN	P.ROY	04.04.13	
CHD			
APPD			
SCALE : N.T.S.			



G.A. OF 11 KV 400 AMPS  
3 PHASE A.B. SWITCH

GUARANTED TECHNICAL PARTICULARS OF AAA CONDUCTOR						
			Rabbit 7/3.15	" RACCOON" (7 / 3.81mm)	" DOG" (7 / 4.26mm)	" COYOTE" (19 / 3.15mm)
SI. No.	Description	Unit	Particulars			
1	Make					
a)	Aluminium Alloy rod		HINDALCO/BALCO/ VEDANTA/SAAPI			
b)	Conductor		Name of Company			
2	Type	No/mm	7 / 3.15	7 / 3.81	7 / 4.26	19 / 3.15
3	Particulars of Raw material					
a)	Si	%	0.50 - 0.90	0.50 - 0.90	0.50 - 0.90	0.50 - 0.90
b)	Mg	%	0.60 0.90	0.60 0.90	0.60 0.90	0.60 0.90
c)	FE	%	0.50 max	0.50 max	0.50 max	0.50 max
d)	Cu	%	0.10 max	0.10 max	0.10 max	0.10 max
e)	Mn	%	0.03 max	0.03 max	0.03 max	0.03 max
f)	Cr.	%	0.03 max	0.03 max	0.03 max	0.03 max
g)	Zn	%	0.10 max	0.10 max	0.10 max	0.10 max
h)	B	%	0.06 max	0.06 max	0.06 max	0.06 max
i)	Other Elements (Each)	%	0.03 max	0.03 max	0.03 max	0.03 max
j)	Other Elements (Total)	%	0.10 max	0.10 max	0.10 max	0.10 max
k)	Alluminium	%	Remainder	Remainder	Remainder	Remainder
4	Alluminium Strands after stranding					
i	Diameter (mm)					
a)	Normal	mm	3.15	3.81	4.26	3.15
b)	Maximum	mm	3.18	3.85	4.3	3.18
c)	Minimum	mm	3.12	3.77	4.22	3.12
ii	Cross Section Area of Nominal dia wire	Sq. mm	7.793	11.4	14.25	7.79
iii	Minumum Breaking Load of Each Strand After Stranding	KN	2.29	3.34	4.18	2.29
iv	Minimum elongation % on gauge length of 200 mm( After Strand)	%	4	4	4	4
v	Maximum DC Resistance of 1 m length (Ohm) at 20°	Ohm	0.00429	0.002938	0.002345	0.004290
vi	Approx. Total Wt. of Each Strand.	Kg./km	21.04	30.78	38.48	21.04
5	AAAC Stranded conductor					
5.1	Nominal Sectional Area	sq.mm	55	80	100	148
5.2	Overall Diameter	mm	9.45	11.43	12.78	15.75
5.3	Approximate Wt. of the Conductor	Kg./km	149.2	218.26	272.86	406.91
5.4	Minimum Ultimate Breaking Load of Conductor	KN	16.03	23.41	29.26	43.5
5.5	Lay ratio of conductor ((Min. / Max.)		10 / 14	10 / 14	10 / 14	Inner (10 / 14) Outer (10 / 16)
5.6	Calculated Max. resistance of conductor at 20° C	Ohm/ Km.	0.621	0.425	0.3390	0.2290
6	Standard length of conductor (meter)	Mtr.	5000	2000	2000	2000
6.1	Continuous max. current carrying capacity in still air at 40° Cambient temperature	Amp		290	285	425
6.2	Temperature rise for above current			35° C over the ambient		
6.3	Tolerance on standard length of Conductor (%)	%		±5		
6.4	Direction of lay for outside layer			Right Hand		
7	Modulus of Elasticity	Kg./ Cm <sup>2</sup>	0.6324 x 10 <sup>6</sup>	0.6324 x 10 <sup>6</sup>	0.6324 x 10 <sup>6</sup>	0.6324 x 10 <sup>6</sup>
8	Applicable Standard		IS 398 (Part-4) :1994			
9	Other particulars , if any		Nil	Nil	Nil	Nil
10	Joints- There shall be no joints in any wire of a stranded conductor containing continuation.					
11	Co-efficient of liner expansion per deg. C	°C	23*10 <sup>-6</sup>	23*10 <sup>-6</sup>	23*10 <sup>-6</sup>	23*10 <sup>-6</sup>
12	Density	Kg/ dm <sup>3</sup>	2.7			
13	Resistivity of Wire	Ohm mm <sup>2</sup> / m	0.0328			



**GUARANTEED TECHNICAL PARTICULARS OF 232mm<sup>2</sup> ACSR CONDUCTOR**

Sl. No.	Description	Unit	" ACSR PANTHER 232 mm <sup>2</sup> (30.7/ 3.00mm)	
			Particulars	
1	Particulars of Raw materials			
1.1	Alluminium			
a)	Minimum purity of Aluminium	%		99.6
b)	Maximum copper content	%		0.04
1.2	Steel wire / Rods			
a)	Carbon content	%		0.50 -0.85
b)	Maganese Content	%		0.50 - 1.10
c)	Phosphorus content (maximum)	%		0.035
d)	Sulphur content (maximum)	%		0.045
e)	Silicon content (maximum)	%		0.10 - 0.35
1.3	Zinc			
a)	Minimum purity of zinc	%		99.95
2	Alluminium strands after stranding			
2.1	Diameter			
a)	Nominal	mm		3.00
b)	Maximum	mm		3.03
c)	Minimum			2.97
2.2	Minimum breaking load of strand	kN		1.17 (Before stranding) 1.11 (After stranding)
2.3	Maximum resistance of 1m length of strand at 20° C	Ohm		0.004079
3	Steel strands after stranding			
3.1 a)	Nominal	mm		3.00
b)	Maximum	mm		3.06
c)	Minimum	kN		2.94
3.2	Minimum breaking load of strand			9.29 (Before stranding) 8.83 (After stranding)
3.3	Galvanizing			Before stranding    After stranding
a)	Minimum wight of Zinc coating per sqmm of uncoated wire surface	gm	240	228
b)	Minimum number of one minute dips that the galvanised strand can withstand in the standard preece test	No	3 of 1 min	2 of 1 min+1 of 1/2 min
c)	Minimum no. of twists in a gauge length equal to 100 times dia of wire which the strand can withstand in the torsion test (after stranding)		Before stranding 18	After stranding 16
3.4	Wight of steel strand			
a)	Single strand	Kg./Km		55.13
b)	Composite strand	Kg./Km		388
4	ACSR Conductor			
4.1	No of Strand with size			
a)	Aluminium	No.xmm		30x3.00
b)	Steel	No.xmm		7/3.00
4.2	Nominal Sectional area of Aluminium	sq.mm		200
4.3 a)	Sectional area of aluminium	sq.mm		212.1
b)	Sectional area of aluminium strand	sq.mm		49.4
c)	Sectional area of conductor	sq.mm		261.5
4.4	Overall Diameter of Conductor	mm		21.00
4.5	UTS of Conductor	kN		89.67
4.6	Modulus of Elasticity expansion of Conductor	GN/m <sup>2</sup>		80
4.7	Co-efficient of liner expansion of Conductor	per °C		17.8x10 <sup>-6</sup>
4.8	Lay Ratio	Max/Min		
a)	Outer Steel Layer			28/13
b)	12 Wires Aluminium Layer			16-Oct
c)	18 Wires Aluminium Layer			14-Oct
4.9	DC resistance of conductor at 20° (Max.)	(Ohm/ Km		0.1375
5	Stranded length of conductor	M		2000
5.1	Tolerance on standard length of conductor	%		±5
5.2	Direction of lay for outside layer			Right Hand
5.3	Linear Mass of conductor			
a)	Standard	Kg./Km		974
b)	Minimum	Kg./Km		947
c)	Maximum	Kg./Km		1001
6	Drum is as per specification	Yes/No		As per Drum drawing enclosed
7	No of cold pressure but welding equipment available at works	No		7 (Seven)
8	<b>Applicable standard</b>			<b>IS 398 (Part-2) :1996</b>
a)	Joint : No Joints permitted in the aluminium wire in the outer most layer of ACSR Conductor			
b)	Resistivity	Ohm sqmm./ Mtr		0.028264
c)	Density (at 20 °C	Gm/ Cu.mtr	2.703 (Aluminium)	7.80 (Steel)
d)	Const. Mass Temp ... of resistance per 20 °C		0.004 (Aluminium)	

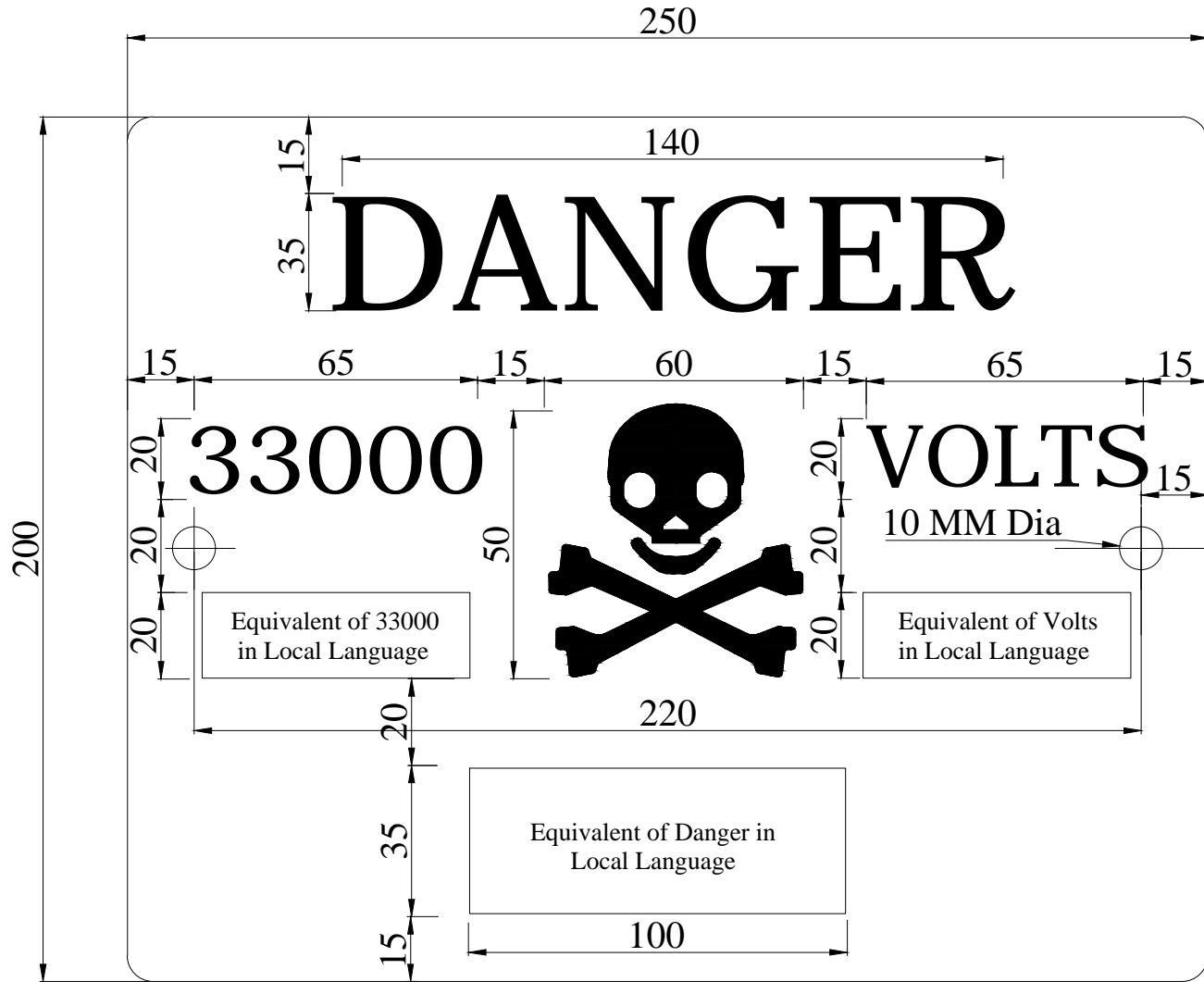
**A.B. Switches ( 33 KV , & 400A, 3 Pole , 50 Hz ) ( SINGLE BREAK) – (IS- 9920-Latest Amnd.)**  
**Guaranteed Technical Particulars ( GTP)**

Sl. No.	Particulars	Desired value
		<b>33KV, 400 A, 3Pole</b>
1	Maker's Name and country or origin	To be specified by the bidder
2	Type of Switch	Rotating Type
3	Suitable for mounting	Horizontal only
4	Number of supporting post insulator per Phase	4 Nos , 22 KV Post Insulator per phase as per ISS-2544 / 1973
5	Post Insulator.	
a	Maker's name & country of origin	To be specified (as per CPRI Test Report)
b	Type of cementing	Original cemented only & as per ISS - 2544 / 1973 & relevant IEC
c	One minute power frequency with stand voltage Dry	95 KV RMS
d	One minute power frequency withstand voltage Wet	75 KV RMS
e	Visible discharge voltage	27 KV RMS
f	Dry Flashover Voltage	95 KV r m s
g	Power frequency puncture with stand voltage	1.3 times of actual dry flash over Voltage
h	Creepage distance (Each Post Insul.)	430mm(min)
6	Impulse with stand voltage for positive and negative polarity (1.2 / 50) micro second wave)	
a	Across the isolating distance	195 KV (Peak )
b	To earth & between poles	170 KV (Peak)
7	One minute power frequency with stand voltage	
a	Across the isolating distance	80 KV (RMS)
b	To earth and between poles	70 KV (RMS)
8	Rated normal current and rated frequency	400 Amps , 50 Hz
9	Rated short circuit making capacity	25 KA ( Peak )
10	Rated short time current	16 KA ( RMS )
11	Rated peak withstand current	40 KA ( Peak )
12	Rated mainly active load breaking capacity	400 Amp (RMS)
13	Rated Transformer off load breaking capacity	6.3 Amp (RMS)
14	Rated line charging breaking capacity	6.3 Amps ( RMS)
15	Rated Cable Charging Breaking Capacity	16 Amp, (rms)
16	Minimum clearance between adjacent phases	
a	Switch Closed ( centre to centre)	1200 mm
b	Switch opened (center / edge of blade)	640 mm

Sl. No.	Particulars	Desired value
		33KV, 400 A, 3Pole
17	Temperature rise ( Shall not exceed the maximum limit as specified below at an ambient temperature not exceeding in 40 <sup>0</sup> C	
a	Copper contacts in air	65 <sup>0</sup> C
b	Terminal of switch intended to be connected to external conductor by bolts	50 <sup>0</sup> C
18	Vertical Clearance from top of Insulator cap to mounting channel	508 mm (minimum)
19	Type of contact	a) Self aligned, high pressure jaw type fixed contacts of electrolytic copper of size 80 mm x 50 mm x 8 mm duly silver plated. Each contact should be revetted with three nos. Copper rivets with a bunch ( minimum 3 mm thick) consisting of copper foils, each may vary from 0.15 mm to 0.25 mm. These total thickness of copper foils per jaw should be 8 mm. Jaw assemblies are to be bolted through stainless steel bolts and nuts with stainless steel flat and spring washer.
		b) Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 50 mm x 8mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.
		c) Pressure spring to be used in jaw contacts shall be phosphorous bronze having 8 nos. of turn x 28 mm height x 14.4 mm diameter with 14 SWG wire (minimum Six nos. springs shall be used)
20	Terminal Connector	Terminal connectors for both movable and fixed should be of copper flats of same size similar to that of moving contact blades ( minimum 95 % copper composition) . The fixed connector shall of size 80 mm x 50 x 8 mm and the size of movable connector shall be size 80 mm x 50 x 8 mm with machine finishing duly silver plated with 2 nos. of 14 mm brass bolts , nuts , plain washers & brass spring washers should be provided along with 2 nos solder less bimetallic sockets for each connector suitable sockets for each connector suitable up to 232 Sq.mm conductor
21	Moving Contact	Movable contact is to be supported by galvanised angle of 50 x 50 x 6 mm in each phase and the moving contact are to be bolted through 2 nos stainless steel bolts and nuts with suitable stainless steel flat and spring washers.
22	Galvanization	a) Iron parts shall be dip galvanized 610gm/m <sup>2</sup> as per IS – 2633 / 1972 (b) The pipe shall be galvanized as per IS – 4736 / 1968.
23	Details of Phase	(a) Coupling Rod :- 25 mm nominal bore G.I. pipe medium guage ( b ) Operating Rod :- 32 mm nominal bore G.I. pipe medium guage single length 6 mtrs

Sl. No.	Particulars	Desired value		
		33KV, 400 A, 3Pole		
	Nominal Bore ( GI Pipe )	O.D.	Diameter	Thickness
		Max	Min	Thick
a	25 mm	34.2 mm	33.3 mm	3.25 mm
b	32 mm	42.9 mm	42 mm	3.25 mm
c	Arcing Horn	10 mm dia G.I. Rod with spring assisted operation		
d	Force of fixed contact spring	50 lbs to 75 lbs		
e	Copper braided flexible topes	450 mm length of flexible electrolytic copper tape or braided chord (with tin coated) having minimum weight 450 gms per meter and both ends shall be crimped with copper sockets through brass bolts and nuts with brass flat washers. Two nos of suitable copper sockets shall be used at both the ends. The minimum no. of flexible wires should be 1536 of 36 SWG for each flexible chord		
f	Quick break device	Lever mechanism		
g	Bearings	4 nos. self lubricated bearing to be provided with grease nipple including 4 th bearing being a thrust bearing		
h	Locking arrangement	Pad Locker & Key arrangement at both ' ON ' & 'OFF' position		
i	Earth Terminal	To be provided at Base Channels		
j	"I" bolt	The "I" bolt shall be longer with 75 mm thread.		
24	Supporting Channels. Mounting Hole 370mm C-C. Channel length 760mm.	100x50x6mm M.S. Channel hot deep Galvanised(610gm/m2 )		
25	Weight of each pole complete ( Kg )	To be specified by the Bidder		

# 33 KV DANGER BOARD

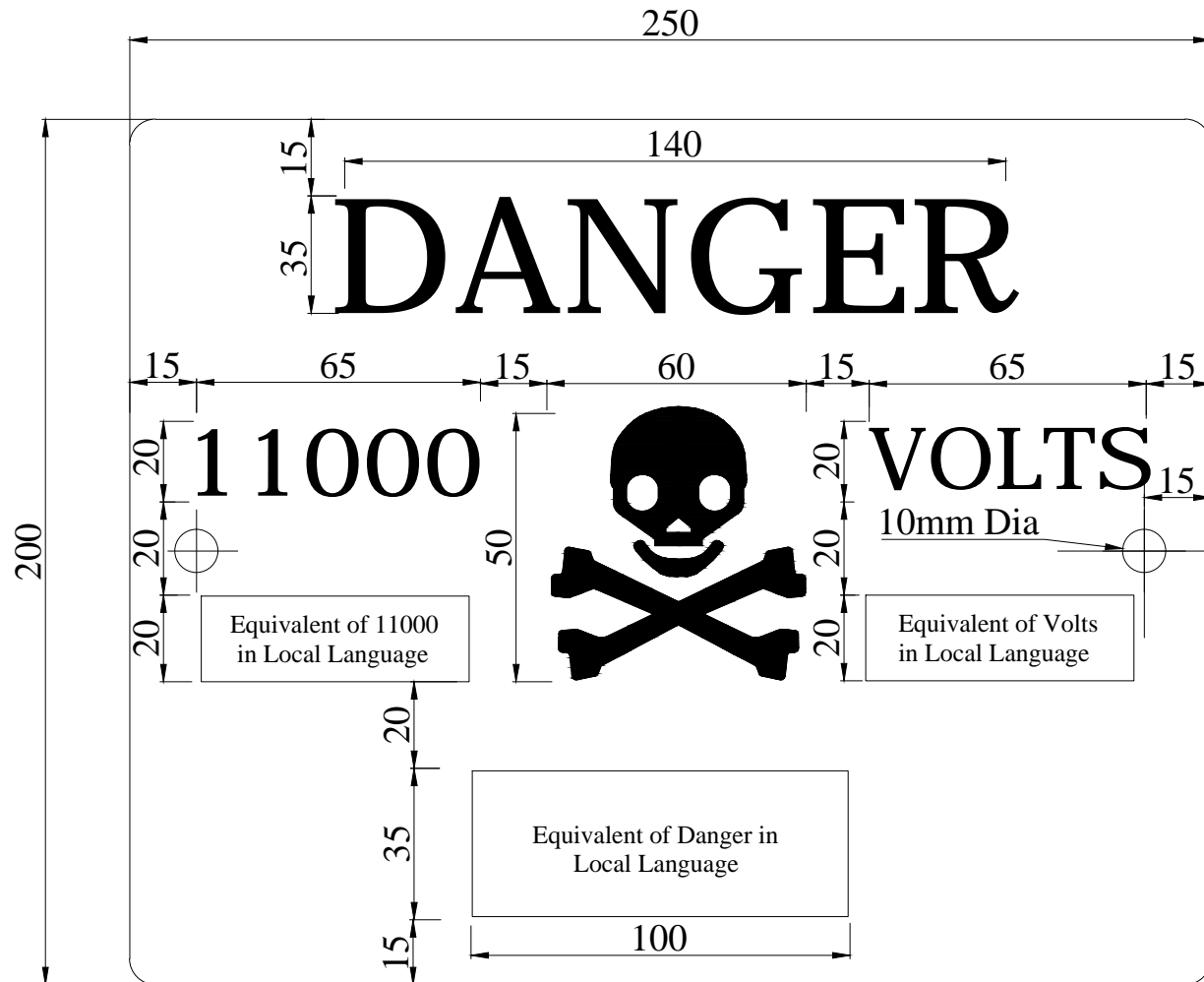


250 x 200 x2

## Technical Data :-

1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER,FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS :As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA

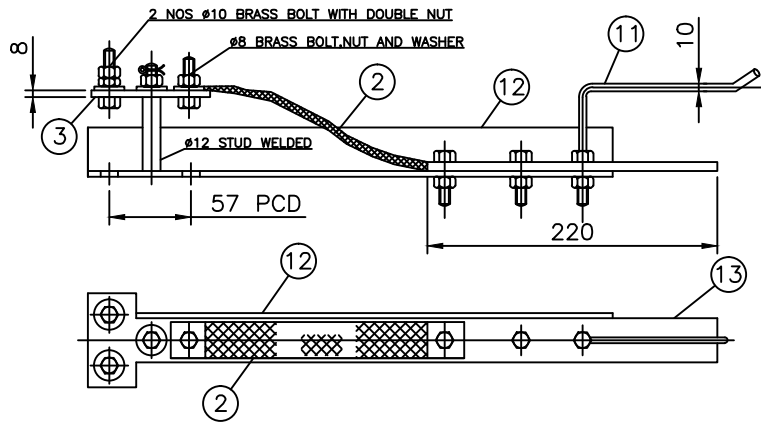
# 11 KV DANGER BOARD



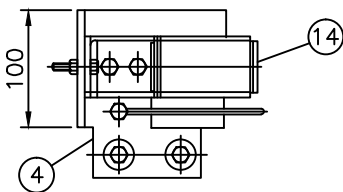
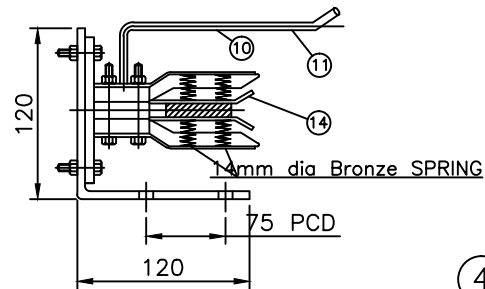
250 x 200 x 2

## Technical Data :-

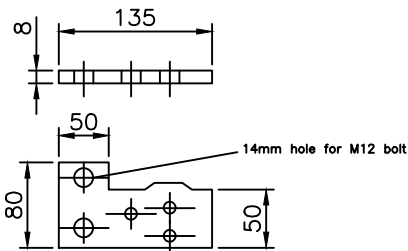
1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER, FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS : As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA



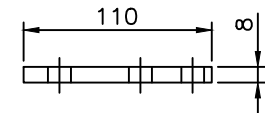
MOVING CONTACT ASSLY.



FIXED CONTACT ASSLY.



4 CONNECTOR (FIXED)



3 CONNECTOR (MOVING)

NOTES :-

01. ALL DIMENSIONS ARE IN mm.
02. TOLERANCE  $\pm 5\%$
03. ALL FERROUS PARTS SHALL BE HOT-DIP GALVANISED
04. ALL NON-FERROUS PARTS SHALL BE HEAVILY SILVER-PLATED.

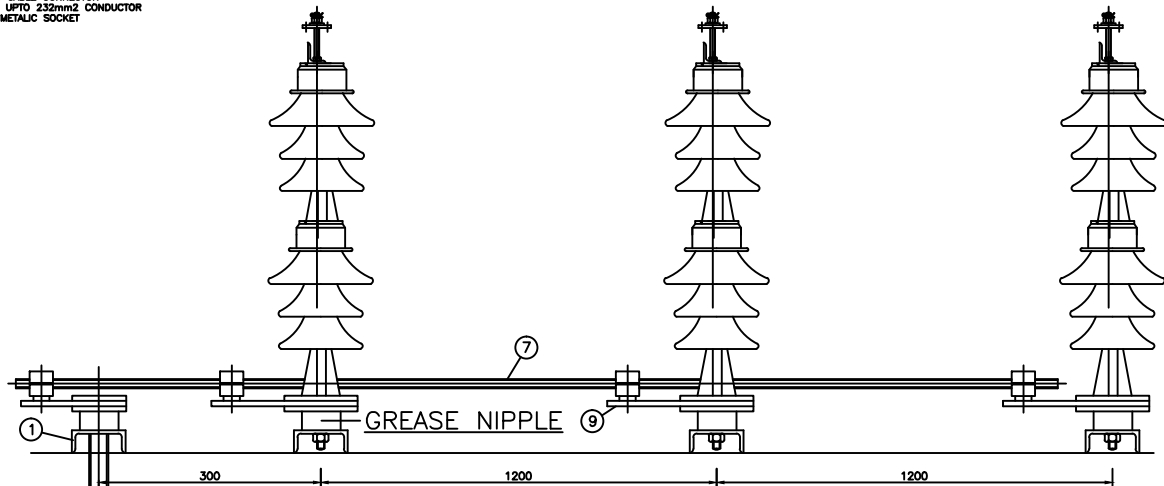
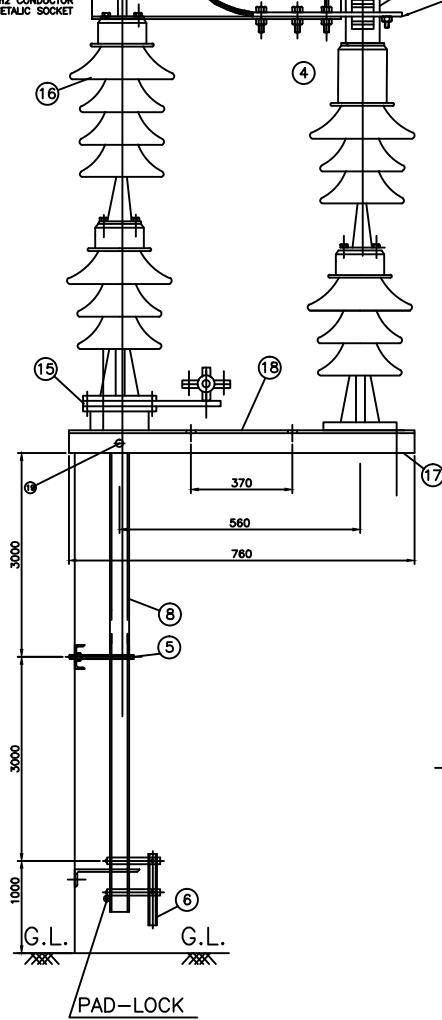
BILL OF MATERIALS

19	EARTH TERMINAL	3	NUT & BOLT
18	NAME PLATE	3	ALUMINIUM
17	BASE CHANNEL 100x50x6mm 760mm Long	3	M.S. GALVD.
16	POST INSULATOR 22KV 254mm HT. 430 C.D.	12	PORCELAIN
15	BEARING ASSEMBLY	3	M.S. GALVD.
14	FIXED CONTACT 80x50x8mm LONG	3	HD-EC-Cu
13	MOVING CONTACT 250x50x8mm	3	HD-EC-Cu
12	MOVING CONTACT SUPPORT 50x50x6mm	3	M.S. ANGLE
11	ARCING HORN $\phi 10$ mm	3/3	M.S. GALVD.
10	CONTACT LEVER	3/3	M.S. GALVD.
09	PHASE OPERATING LEVER (BAT)	3	M.S. GALVD.
08	OPERATING DOWN PIPE 32NB 'B' CLASS x 6MTR. LG	1	G.I. PIPE
07	PHASE COUPLING PIPE 25NB 'B' CLASS x 2500mm LG	1	G.I. PIPE
06	OPERATING HANDLE 32NB x 450mm LG	1	G.I. PIPE
05	INTERMEDIATE "I" BOLT	1	M.S. GALVD.
04	CONNECTOR (FIXED) 80x50x8mm	3	BRASS/GM
03	CONNECTOR (MOVING) 80x50x8mm	3	BRASS/GM
02	BRAIDED TAPE 450x35x8mm	3	TINNED COPPER
01	FOURTH BEARING	1	M.S. GALVD.
SL.NO.	DESCRIPTION	QTY.	MATERIAL

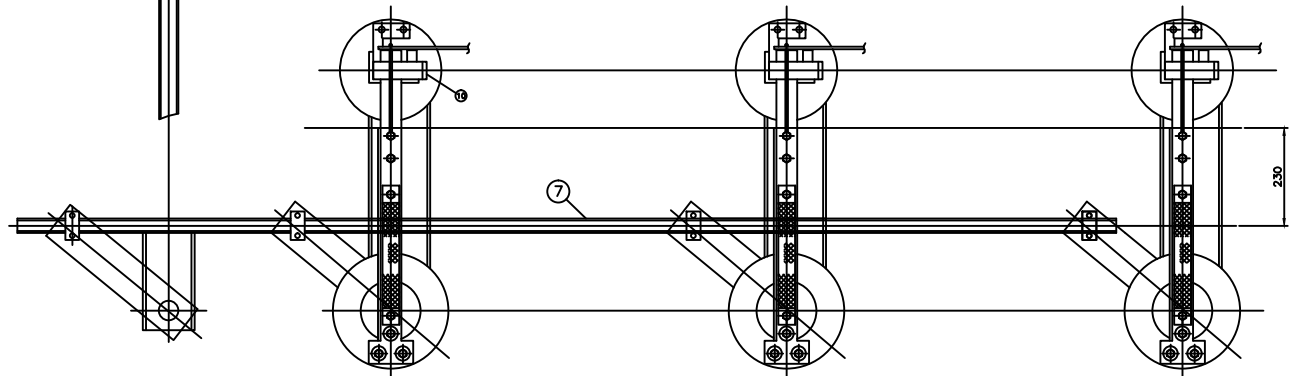
DEG	S.DEY	02.04.13	<b>SPARE DETAILS OF 33 KV 3 PHASE SINGLE BREAK ROTATING TYPE A.B. SWITCH</b>
DRN	P.ROY	04.04.13	
CHD			
APPD			
SCALE : N.T.S.			

③ OUTGOING CABLE CONNECTOR  
SUITABLE UPTO 80mm<sup>2</sup> CONDUCTOR  
WITH BIMETALIC SOCKET

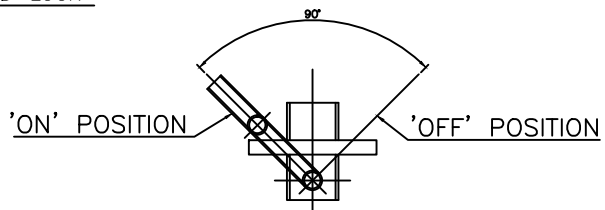
⑪ INCOMING CABLE CONNECTOR  
SUITABLE UPTO 232mm<sup>2</sup> CONDUCTOR  
WITH BIMETALIC SOCKET



ELEVATION



PLAN

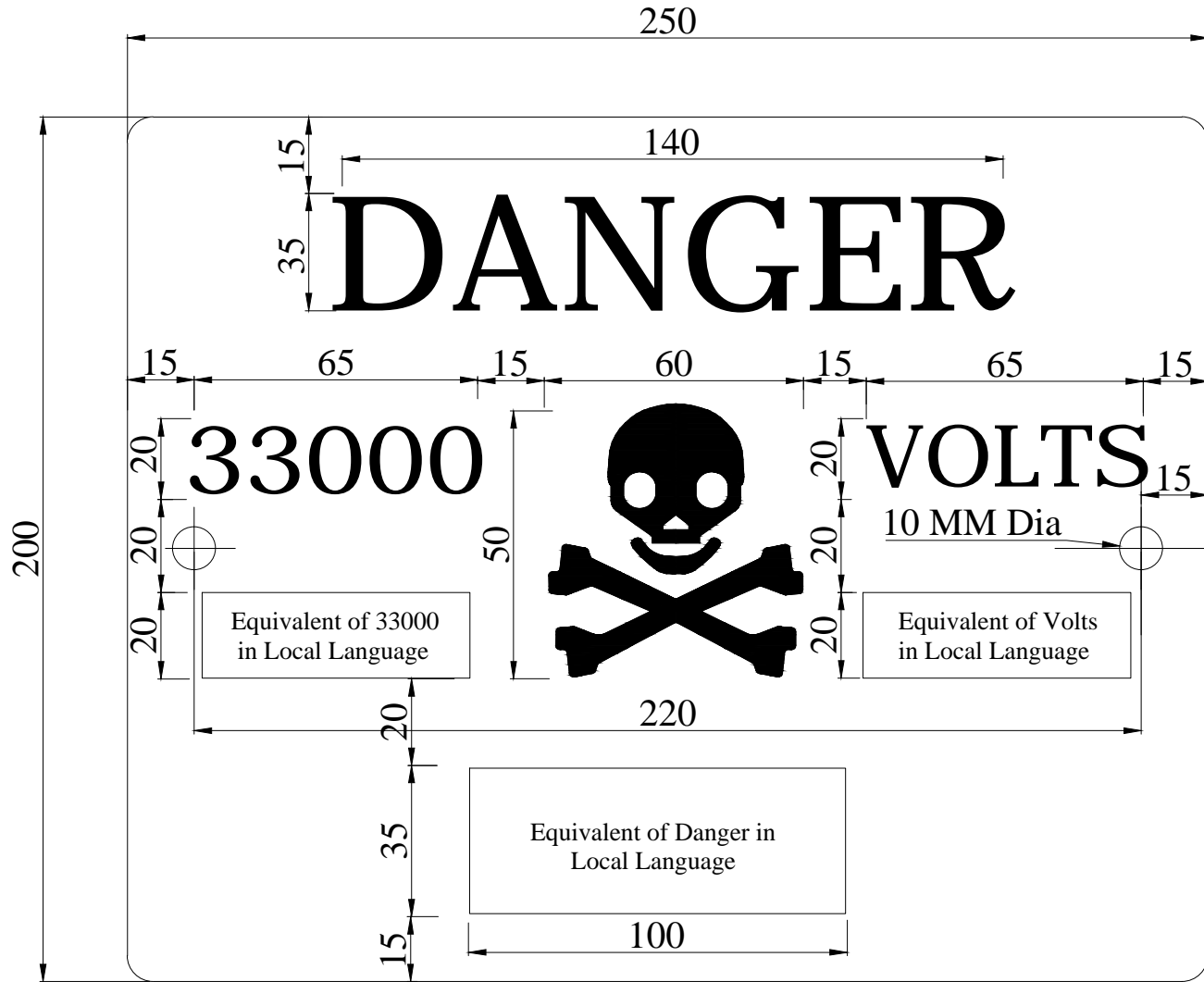


OPERATING HANDLE

G.A. OF 33 KV  
3 PHASE A.B. SWITCH



# 33 KV DANGER BOARD

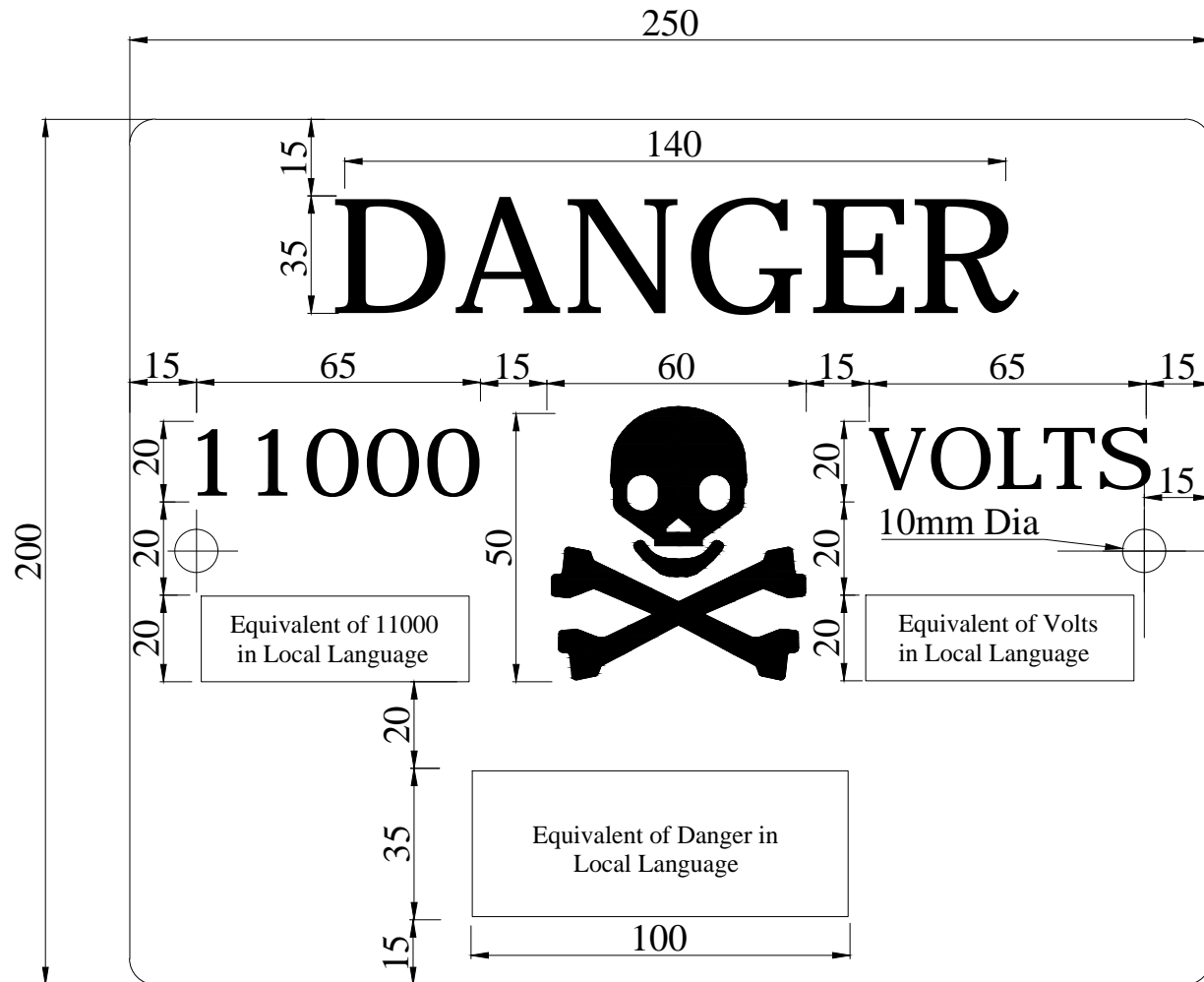


250 x 200 x2

## Technical Data :-

1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER, FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS :As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA

# 11 KV DANGER BOARD

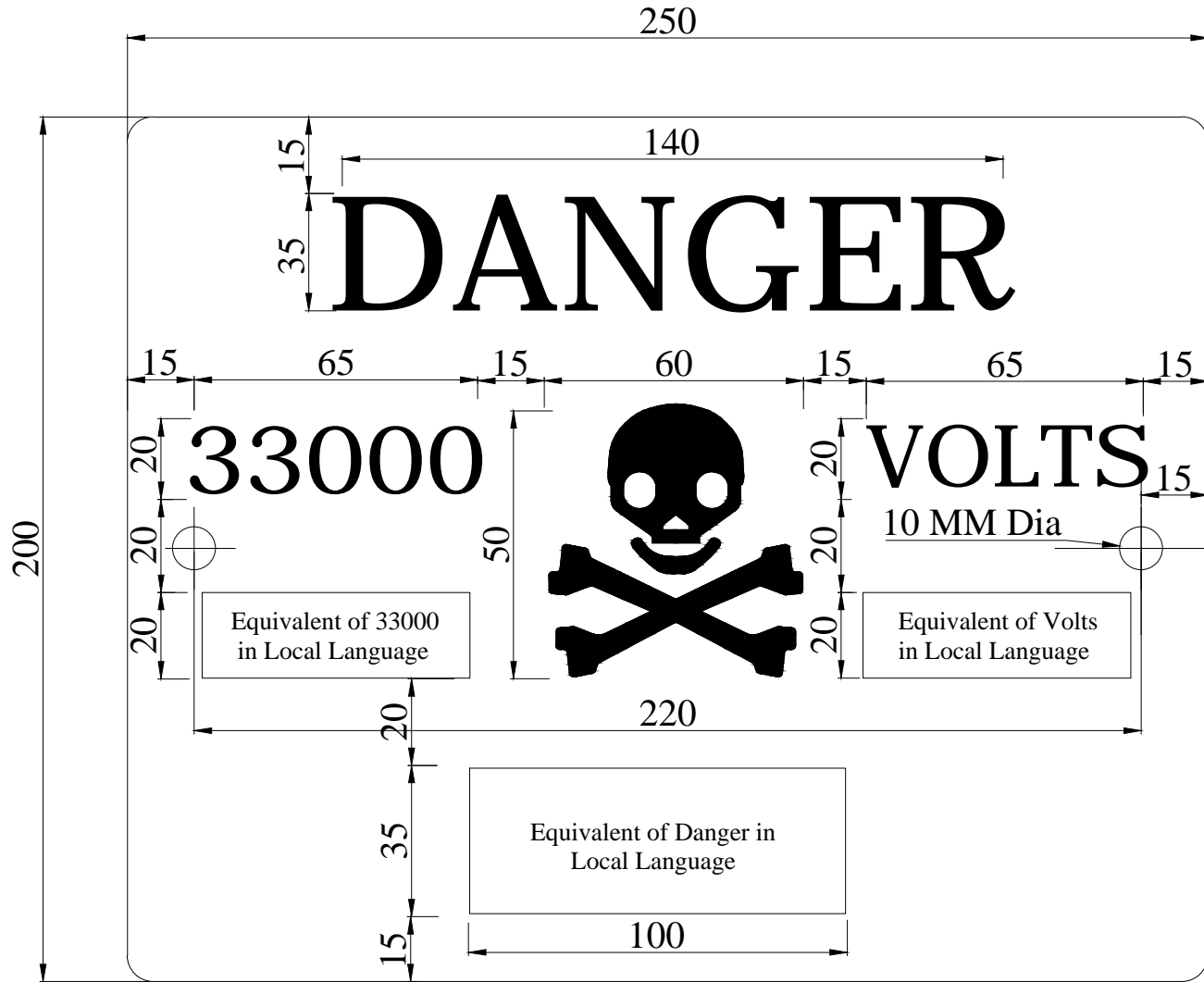


250 x 200 x 2

## Technical Data :-

1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER, FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS : As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA

# 33 KV DANGER BOARD

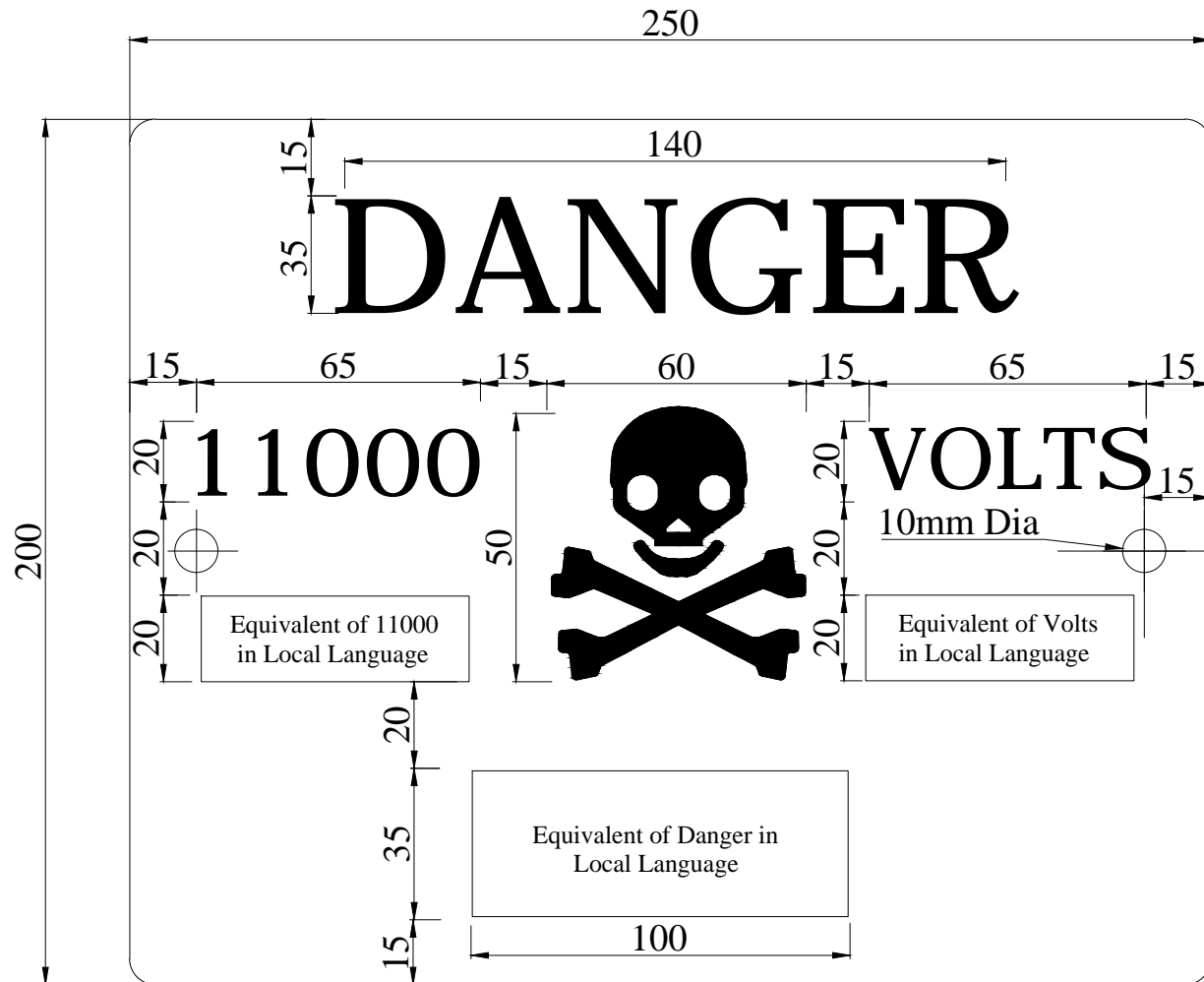


250 x 200 x2

## Technical Data :-

1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER,FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS :As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA

# 11 KV DANGER BOARD



250 x 200 x 2

## Technical Data :-

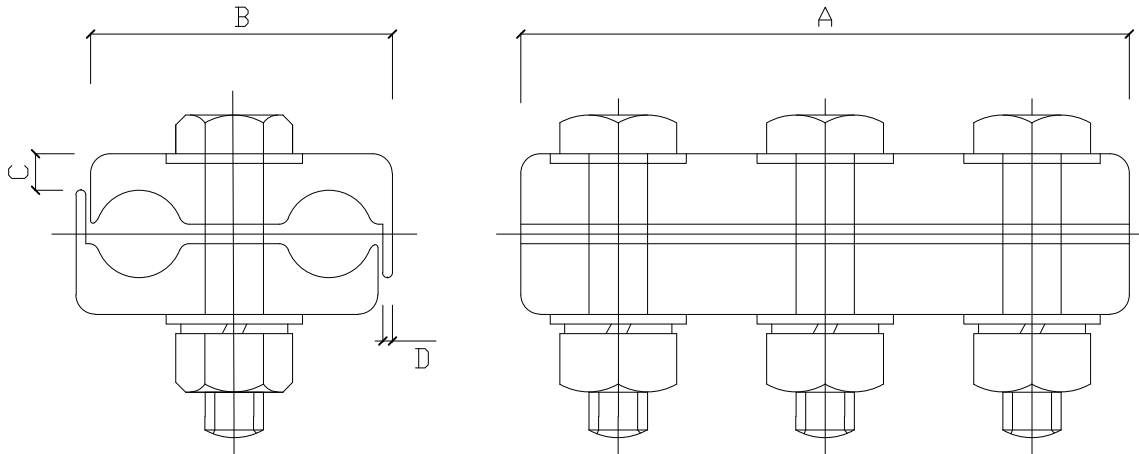
1. THE PLATE SHALL BE MADE FROM MILD STEEL AT LEAST 2mm THICK AND CONFIRMING TO IS: 2551.
2. COLOUR OF LETTER, FIGURE & CROSS BONES: LETTERS SHOULD BE WHITE IN COLOUR WITH RED BACKGROUND.
3. ALL DIMENSION ARE IN MM. THE DESIGN IS AS PER THE DRAWING SHOWN.
4. GENERAL TOLERANCE AS FOLLOWS : As per IS
5. THE CORNER OF THE PLATE SHOULD BE ROUNDED OFF
6. LOCAL LANGUAGE: ODIA

**GUARANTEED TECHNICAL PARTICULARS FOR 33KV 400 AMP, 3 POLE, H.G. FUSES**

**33kV 400Amps HG Fuse(Horizontal Type)**

Sl. No.	Particulars	Required values
1	2	3
1	Number of supporting post insulator per phase	4 Nos. 22kV / 24kV Post Insulator per phase as per ISS - 2544/1973
2	Post Insulator	
a)	Maker's name and country origin	To be specified by the tender
b)	Type of cementing	Original cemented only
c)	One minute power frequency withstand voltage dry	95kV r.m.s
d)	One minute power frequency withstand voltage wet	75kV r.m.s
e)	Visible discharge voltage	27kV r.m.s
f)	Dry Flashover Voltage	95KV
g)	Power Frequency puncture withstand voltage	1.3 times of actual dry flash voltage
h)	Impulse withstand voltage (switch in position)	170KV (Peak)
i)	Creepage distance	380mm CD minimum
3	Impulse withstand voltage for positive and negative polarity (1.2/50 micro second wave)	
a)	Across the Isolating distance	195KV (peak)
b)	To earth & between poles	170KV (peak)
4	One minute power frequency withstand voltage	
a)	Across the Isolating distance	100kV r.m.s
b)	To earth & between poles	75kV r.m.s
5	Rated normal current and rated frequency	400 Amps, 50Hz, 3 Pole
6	Operting Voltage	33kV
7	Vertical clearace from top insulator cap to mounting channel	508mm (Minimum)
8	Height of the riser for carrying the horns	250mm from the cap (top) of insulator.
9	Details of Arcing Horns	Copper rod having 8.32 mm dia Silver-plated provide with screwing arrangement for fixing user wire made of copper casting. (Total length 995mm). All the bolts, nuts and washers should be made out of brass.
10	Riser Unit (250mm total height)	a) The shape of connectors may be made of strainght copper. Flat size adequate enough to carry a current density not less than 1.5 Amp/mm <sup>2</sup> . 2 nos of 3/8" G.I Bolts, double nuts, plain and spring washers and 2 nos. solder less bimetallic sockets per each connector suitable up to 232mm <sup>2</sup> AAA Condcutor. b) 170mm height G.I Riser made of 25mm noinal bore medium gauge G.I Flat of 35 x 5 mm at both ends fixed with 12mm dia stainless steel, bolts and nuts with flat stanless steel spring washers. c) The connector shall have size of (80x50x8) mm made of copper casting (95% of copper composition) duly silver plated with two numbers of 12mm dia brass bolts and double nuts with brass washer. Type of contact and terminal connector- As per 11KV AB Switch.
11	Supporting Channels	100 x 50, 760mm long M.S Chaneel (Hot Dip galvanized 610gm/m <sup>2</sup> ) Mounting Hole:500mm C/C)
12	Galvanisation	All ferrous parts should be galvanized as per IS:2633/1972 & all non ferrous part should be duly electroplated with silver.
13	Wight of each pole (complete)	





**TECHNICAL DATA:-**

1. ALL DIMENSION ARE IN MM.
2. MATERIAL AL. ALLOY LM-6
3. BOLT & NUT AS PER IS: 1367 (Gr. -4.6 / 4)
4. ALL FOURRES PARTS ARE HOTDIP GALVANISED AS PER IS: 2633 & IS: 4826.
5. SPRING & FLAT WASHER ELECTRO GALVANIZED - 1573 SERVICE COND. III.
6. CLAMP AS PER IS : 5561.
7. GENERAL TOLERANCE:  $\pm 5 \%$ .

Conductor Name	Conductor Dia.	Conductor Dia.	Dimension In MM				No. of Bolt	Bolt Size
			A	B	C	D		
Zebra To Zebra	28.32	28.62	150	102	10	4.5	3	M16
Dog To Panther	14.16	21	135	73	10	4.5	3	M16
Raccoon To Panther	12.27	21	135	73	10	4.5	3	M16
Panther To Panther	21	21	135	76	10	4.5	3	M16
Panther To Wolf	21	18.13	135	73	10	4.5	3	M16
Dog To Dog	14.16	14.16	100	65	10	4.5	3	M12
Raccoon To Raccoon	12.27	12.27	100	58	10	4.5	3	M12
Rabbit To Rabbit	10.05	10.05	95	54	10	4.5	3	M12
Dog To Rabbit	14.16	10.05	100	65	10	4.5	3	M12
Squirrel To Weasel	6.33	7.77	70	45	10	4.5	2	M10

SL NO	DESCRIPTION	MATERIAL	QTY
1	FLAT WASHER	MILD STEEL H.D.G.	3
2	SPRING WASHER	SPRING STEEL ELECTRO GALV.	3
3	NUT & BOLT	MILD STEEL H.D.G.	3
4	PG CLAMP	AL. ALLOY	1

**PG CLAMP**

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Pin Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b> 01/06/2020	
<b>Rev. No</b>	00	<b>Page 1 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By</b>	<b>Issued By:</b>

### **CONTENTS**

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

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



<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 2 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

1	<b>SCOPE:</b>	This specification covers the technical requirements of design, manufacture, test at manufacturer's works, packing & forwarding, supply and unloading at store/ site of 11 KV Pin polymer insulator 10 KN used in 11 KV Overhead Transmission lines.
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) IEC: 61952: Insulators for overhead lines – Composite line post insulators for alternative current.</li> <li>c) IS: 2071/ IEC: 60060-1: Methods of High Voltage Testing.</li> <li>d) IS: 2486/ IEC: 60120: 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>e) IEC: 60575: Thermal Mechanical Performance test and mechanical performance test on string insulator units.</li> <li>f) IS: 13134/ IEC: 60815: Guide for the selection of insulators in respect of polluted condition.</li> <li>g) STRI guide 1.92/1: Hydrophobicity Classification Guide.</li> <li>h) IEC: 60437: Methods of RI Test of HV insulators.</li> <li>i) IS: 4759: Hot dip zinc coatings on structural steel &amp; other allied products.</li> <li>j) IS: 2629: Recommended Practice for Hot, Dip Galvanization for iron and steel.</li> <li>k) IS: 6745: Determination of Weight of Zinc Coating on Zinc coated iron and steel articles.</li> <li>l) IS: 2633: Testing of Uniformity of Coating of zinc coated articles.</li> <li>m) ASTM D 578-05: Standard specification for glass fiber strands.</li> </ul>
3	<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 (g being acceleration due to gravity)</li> <li>11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.</li> </ol>

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 3 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		<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 Pin Insulator
2	Standard according to which the insulators manufactured and tested		IEC 61952 and IEC 61109
3	Material of housing and weather sheds		High voltage grade
(a)	Material of Core (FRP rod)	kV	ECR BORRON FREE
(b)	Material of end fittings	Hz	SGI Cast/Forged Steel
(c)	Sealing compound for end fittings		Silicone Sealent
4	Colour of housing	KN	Grey
5	Electrical characteristics		
(a)	Type		B
(b)	Rated Voltage	kV	12
(c)	Service Voltage	kV	11
(d)	Rated Frequency	Hz	50
(e)	Visible discharge test voltage	kV	9
(f)	Wet power frequency withstand voltage	kV (rms)	35
(g)	Impulse withstand voltage	kV (peak)	75
(h)	Power frequency puncture withstand voltage	kV (rms)	105
(i)	Creepage distance in heavily polluted atmosphere	Mm	320
(j)	Minimum failing loads	kN	10

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
---	------------------------------	---

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 4 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		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 and shall exhibit both high electrical integrity and high resistance to acid corrosion. The matrix of the FRP rod shall be Hydrolysis resistant. The FRP rod shall be manufactured through Pultrusion process. The FRP rod shall be void free.
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 60815 with latest amendments. All surfaces shall be clean, smooth, without cuts, abrasions or projections. No part shall be subjected to excessive localized pressure. The insulator and metal parts shall be so designed and manufactured that it shall avoid local corona formation and not generate any radio interference beyond specified limit under the operating 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 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>METAL END FITTINGS</b>	End fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminum alloy. Metal end fitting shall be suitable for pin type hardware support of respective specified mechanical load and shall be hot dip galvanized in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique. The OD of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is molded over it. The material used in fittings shall be corrosion resistant. As the main duty of the end fittings is the transfer of mechanical loads to the core the fittings should be properly attached to the core by a coaxial or hexagonal compression process & should not damage the individual fibers or crack the core. The dimensions of end fittings of insulators shall be in accordance with the standard dimensions stated in IEC: 60120/ IS: 2486 - Part-II /1989. Outer portion of Pin should be Zinc sleeved with minimum 99.95% purity of Electrolytic high grade zinc. Bottom end metal fitting (Shank) of Pin insulator should be forged steel as per IS 2002/92. Bottom end fitting should be single unit without any joints. Nuts as per IS 1363 (P-III) and spring washer shall be as per IS 3063 with Latest amendments if any, Nuts and spring washer shall be hot dip galvanized. The design of the insulator shall be such that stresses due to expansion and contraction in

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 5 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		any part of the insulators shall not lead to deterioration. The Pin insulator shall not engage directly with hard metal.
6.0	<b>MARKING:</b>	<p>Each insulator shall be legibly and indelibly marked with "PO no. with date, "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>
7.0	<b>TESTS:</b>	<p>All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. Following tests for 11kV Pin Polymer insulator should be done as per relevant standards:</p> <p><b>Tests on Silicone Rubber:</b></p> <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> <p><b>Tests on FRP Rods:</b></p> <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> <p><b>Tests on End Fittings:</b></p> <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> <p><b>Test of Complete polymer insulators:</b></p>

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 6 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</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>• Galvanisation 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> <p><b>Design Tests:</b> 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> <p><b>Acceptance Tests</b> For Composite Insulators</p> <ul style="list-style-type: none"> <li>• Verification of dimensions</li> <li>• Visual examination</li> </ul>
--	--	---

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 7 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		<ul style="list-style-type: none"> <li>• Verification of the locking system or the tightness of the interface between end fitting and insulator housing</li> <li>• Galvanizing test</li> <li>• Verification of the specified mechanical load</li> <li>• Bending load test</li> <li>• Dry power frequency withstand voltage test</li> <li>• Analysis of material properties of housing material</li> <li>• Analysis of material properties of core material</li> </ul> <p><b>Routine Tests</b></p> <ul style="list-style-type: none"> <li>• Visual Examination</li> <li>• Mechanical load test as per IEC 61109 &amp; IEC 62231</li> </ul>
8.0	<b>TYPE TEST CERTIFICATES:</b>	The Bidder shall furnish the type test certificates of the 11 KV Pin 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 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>	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 <ul 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> </ul>
10.0	<b>INSPECTION AFTER RECEIPT AT STORES:</b>	The material received at TPCL 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>	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

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 8 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

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

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

<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 9 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

- e) Type test Certificates  
f) 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	Installation Instructions		√	√
5	Instructions for use		√	√
6	Transport/shipping dimension drawing		√	√
7	QA & QC Plan	√	√	√
8	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

**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 Pin	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 BORRON	
5	Material of end fittings	SIGI Cast/ Forged	
6	Sealing compound for end fittings	Silicone Sealent	
	Colour of housing	Grey	
	Electrical characteristics		
	Nominal System voltage	33kV	
	Rated voltage	12V	

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



<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 10 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

	Service voltage	11kV	
	Rated frequency	50Hz	
	Visible discharge test voltage	9kV	
	Wet power frequency with stand voltage	35kV (rms)	
	Impulse with stand voltage	75kV (rms)	
	Power frequency puncture with stand voltage	105kV (rms)	
	Creepage distance in heavily polluted	320mm	
	Minimum Failing loads	10kN	

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

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

Seal of the Company:

Signature

Designation

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

	<b>TATA POWER COMAPNY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>Specification of 11kV Pin Polymer Insulator</b>		
<b>Doc. No</b>	ENG-HV-39	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 11 of 11</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>



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

	<b>TPCODL, BHUBANESHWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR BIRD CAP FOR 9KV 5KA SURGE ARRESTER</b>		
<b>Doc. No</b>		<b>Eff. Date: 01/06/2020</b>	
<b>Rev. No</b>	00	<b>Page 1 of 3</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

1.0	<b>Scope</b>	This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at site/store of Bird Cap for 9KV 5KA Surge Arrester for trouble free and efficient operation.																															
2.0	<b>APPLICABLE STANDARDS</b>	<p>The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with latest editions of the following Standards /IEC and shall confirm to the regulations of local statutory authorities.</p> <p>ISO 37 — Method of determination of tensile stress- strain. IS 2071 — Method of determination of HV test.  ASTM D 257- DC resistance.  ASTM D 570- Water absorption of plastic.  ASTM D 792- Density &amp; Specific gravity of plastic by displacement.</p>																															
3.0	<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 (g being acceleration due to gravity)</li> <li>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</li> </ol> <p>The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p>																															
4.0	<b>GENERAL TECHNICAL REQUIREMENTS:</b>	<table border="1"> <thead> <tr> <th>S.No.</th> <th>PARTICULARS</th> <th>REQUIREMENT</th> </tr> </thead> <tbody> <tr> <td>1)</td> <td>Application</td> <td>Outdoor, to prevent flashover of wild life (birds/squirrel etc.) from direct contact with LA</td> </tr> <tr> <td>2)</td> <td>Rated Voltage</td> <td>11kV</td> </tr> <tr> <td>3)</td> <td>Service Voltage</td> <td>12kV</td> </tr> <tr> <td>4)</td> <td>Material</td> <td>Ethylene Vinyl Acetate (EVA)</td> </tr> <tr> <td>5)</td> <td>Tensile strength (min)</td> <td>10Mpa</td> </tr> <tr> <td>6)</td> <td>Ultimate Elongation (min)</td> <td>300%</td> </tr> <tr> <td>7)</td> <td>Di electric Strength (min)</td> <td>15kV/mm</td> </tr> <tr> <td>8)</td> <td>Thermal Endurance</td> <td>105 deg C</td> </tr> <tr> <td>9)</td> <td>Low Temperature Flexibility</td> <td>- 40 deg Celsius for 4 hours</td> </tr> </tbody> </table>	S.No.	PARTICULARS	REQUIREMENT	1)	Application	Outdoor, to prevent flashover of wild life (birds/squirrel etc.) from direct contact with LA	2)	Rated Voltage	11kV	3)	Service Voltage	12kV	4)	Material	Ethylene Vinyl Acetate (EVA)	5)	Tensile strength (min)	10Mpa	6)	Ultimate Elongation (min)	300%	7)	Di electric Strength (min)	15kV/mm	8)	Thermal Endurance	105 deg C	9)	Low Temperature Flexibility	- 40 deg Celsius for 4 hours	
S.No.	PARTICULARS	REQUIREMENT																															
1)	Application	Outdoor, to prevent flashover of wild life (birds/squirrel etc.) from direct contact with LA																															
2)	Rated Voltage	11kV																															
3)	Service Voltage	12kV																															
4)	Material	Ethylene Vinyl Acetate (EVA)																															
5)	Tensile strength (min)	10Mpa																															
6)	Ultimate Elongation (min)	300%																															
7)	Di electric Strength (min)	15kV/mm																															
8)	Thermal Endurance	105 deg C																															
9)	Low Temperature Flexibility	- 40 deg Celsius for 4 hours																															

Initiator		Approval	
-----------	--	----------	--

<b>TATA POWER COMPANY LIMITED, BHUBANESHWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR BIRD CAP FOR 9KV 5KA SURGE ARRESTER</b>		
<b>Doc. No</b>		<b>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 2 of 3</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		10)	Thermal/accelerated ageing	120 deg C for 168 Hours
		11)	Flammability Test	No flame conveyance (self-fire extinguishing property)
		12)	Water absorption	0.1% max at 23 deg C
		13)	Resistance Bird Guano	Uric acid for 168 hours at 60 deg C- No change in tensile strength or ultimate elongation
		14)	Comparative Tracking Index	CTI 600
		15)	UV resistance Test	Complied with UV resistance & suitable for Outdoor application
		16)	Volume resistivity	1X10 <sup>15</sup> Ohm -cm (min)
		17)	Density	1.2 1.4 g/cc (max).
		18)	Tracking & erosion resistance test	No flame failure/ tracking ( as per ASTM D 2303 standard)
		19)	Leakage current	<2 mA.
		20)	Power frequency voltage withstand test	28 KV for 1 min
5.0	<b>General construction</b>	The Bird cap must have adequate mechanical strength, the material offered shall of first class quality, workmanship, well finished & of approved design. Bird cap must be of high insulation material with excellent tracking & erosion resistant, UV resistant, water repellent properties. This insulating cover must have high Creepage, easy installation, light in weight & reusable type.		
6.0	<b>WARRANTY</b>	Warranty of the Bird cap shall be 2 years from the date of purchase. If any defects found on product within warranty period the BA is liable to replace the product free of cost		
7.0	<b>TESTS</b>	All the tests shall be conducted by CPRI/ERDA/NABL accredited laboratory. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. Below test has to be done as per relevant standard.		
7.1	<b>TYPE TESTS</b>	a) Tensile strength. b) Ultimate Elongation. c) Di electric strength test at Power frequency. d) Comparative tracking index. e) Thermal endurance test. f) UV test. g) Flammability Test. h) Volume resistivity. i) Accelerated ageing test. j) Density. k) Tracking resistance. l) Water absorption test. m) Leakage current test.		

Initiator		Approval	
-----------	--	----------	--

<b>TATA POWER COMPANY LIMITED, BHUBANESHWAR</b>	
<b>TECHNICAL SPECIFICATION</b>	
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR BIRD CAP FOR 9KV 5KA SURGE ARRESTER</b>
<b>Doc. No</b>	<b>Eff. Date:</b>
<b>Rev. No</b>	00 <b>Page 3 of 3</b>
<b>Prepared by:</b>	<b>Reviewed By:</b> <b>Approved By:</b> <b>Issued By:</b>

7.2	<b>ROUTINE &amp; ACCEPTANCE TEST</b>	<ul style="list-style-type: none"> <li>a) Dielectric strength test at power frequency.</li> <li>b) Leakage current test.</li> <li>c) Flammability Test.</li> <li>d) Volume Resistivity.</li> </ul>						
8.0	<b>TYPE TEST CERTIFICATE</b>	The Bidder shall furnish the type test certificates for the tests which is required as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA or any other International Laboratory as per the relevant standards. Type tests shall have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In 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, Bhubaneswar.						
9.0	<b>PRE-DISPATCH INSPECTION</b>	<p>Equipment shall be subject to inspection by a duly authorized representative of the TPCL, Bhubaneswar. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Supplier shall grant free access to the places of manufacture to TPCL's representatives at all times when the work is in progress. Inspection by the TPCL, Bhubaneswar or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCL, Bhubaneswar. 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 TPCL, Bhubaneswar</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 Challen</li> <li>h) Other Documents (as applicable)</li> </ul>						
10.0	<b>INSPECTION AFTER RECEIPT AT STORE</b>	The material received at TPCL, Bhubaneswar Store will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.						
11.0	<b>SCHEDULE OF DEVIATIONS</b>	<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="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 15%;">S.No.</th> <th style="width: 15%;">Clause No.</th> <th style="width: 70%;">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><b>Seal of the Company:</b></p> <p><b>Designation</b> <span style="float: right;"><b>Signature</b></span></p>	S.No.	Clause No.	Details of deviation with justifications			
S.No.	Clause No.	Details of deviation with justifications						

Initiator		Approval	
-----------	--	----------	--

	<b>TPCODL, ODISHA</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>		
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	00	<b>Page 1 of 12</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

## CONTENTS

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

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 2 of 12</b>

**1. SCOPE:**

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing; forwarding, supply and unloading at store/ site of Single and Three phase MCCBs with Distribution box of the ratings as mentioned in the specification below. The MCCBs shall be complete with all accessories for efficient and trouble free operation.

**2. APPLICABLE STANDARDS:**

The equipment covered by this specification shall confirm to the requirements stated in latest editions of relevant applicable Indian/IEC Standards and shall conform to the regulations of local statutory authorities.

- a) IS 13947-1-1993 / IEC 60947-1-1988 : Specification for LV Switchgear & Control gear - General Rules
- b) IS 13947-2-1993 / IEC 60947-2-1989 : Specification for LV Switchgear & Control gear - Circuit Breakers
- c) IEC 60529 -1989 : Degree of Protection provided by Enclosures
- d) IS 8623 (Pt.2)-1993 / IEC 60439/2-1987 : Specification L.V. switchgear & control gear assemblies – Particular requirements for bus bar trunking systems (bus ways)
- e) IS 2551 - 1982 : Danger Notice Plates
- f) IEC 60664 : Insulation co-ordination within low voltage systems including clearances & creepage distances for equipment
- g) IEC 61140 : Installations through door of Class-II Switchboards / Enclosures  
General requirements for enclosures for accessories for household and similar fixed electrical installation.
- h) IS 14772-2000

**3. CLIMATIC 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 (g being acceleration due to gravity)
- 13. 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

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>		
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>	
<b>Revision No.</b>	00	<b>Page 3 of 12</b>	

**4. GENERAL TECHNICAL REQUIREMENTS :**

S no.	DESCRIPTION	REQUIREMENT			
1	Type of MCCB	Fixed type Manually Operated (mounted in outdoor type Distribution Box)			
2	Type of Releases	Thermal magnetic or Fully magnetic			
3	Rating (A)	40, 63 & 100A	40, 63 & 100A	160, 250 & 400 A	500 & 630 A
4	Over Load Release setting	Fixed	0.8-1 In	0.8-1 In	0.8-1 In
5	No. of Poles	Single	Three	Three	Three
6	Rated Voltage	230V	415V	415V	415V
7	Rated ultimate short circuit breaking capacity (Icu)	10kA rms	25 kA rms	35kA rms	50kA rms
8	Rated service short circuit breaking capacity (Ics)	50% of Icu	100% of Icu	100% of Icu	100% of Icu
9	Utilization Category	A			
10	Rated Insulation Voltage	690 V			
11	Rated Impulse withstand voltage	8 Kvp			
12	Material of Busbar	Aluminium			
13	Max. current Density of busbar	1.00 A/mm <sup>2</sup> - should be compliant to Rated Breaking Capacity of MCCB			
14	Max. Permissible temp. rise	80°C at terminals with an ambient temperature not exceeding 40°C			
15	Min. Clearance b/w phases	25 mm			
16	Min. Clearance b/w phase to earth	20 mm			
17	Degree of Protection of enclosure	IP 55			

**5. GENERAL CONSTRUCTION**

**5.1 ENCLOSURE OF DISTRIBUTION BOX**

The MCCB shall be housed in an enclosure made of 2mm thick sheet steel and shall be dust and vermin proof. The enclosure shall be provided with robust construction & an overall canopy on top for smooth draining of rain water. The enclosure shall be suitable for outdoor installation with IP-55 Degree of Protection. The MCCB mounted inside the enclosure shall be provided with extended insulated Aluminum links for tapping off multiple outgoing connections, designed for use on 230V, 1-phase and 415V, 3-phase, 4wire, 50Hz supply system. The pockets of aluminum links shall be sealed properly to avoid ingress of the moisture.

The enclosure shall have single door arrangement with concealed hinges so that door is not easily removable to avoid pilferage. It shall be so designed that when it is opened and other protective means, if any are removed, all parts requiring access for installation and maintenance, as prescribed by the manufacturer, are readily accessible. Sufficient space shall be provided inside the enclosure for the accommodation of external conductors from their point of entry into the enclosure to the terminals to ensure adequate connection. All parts shall be manufactured in accordance with latest relevant IS / IEC Standards. In case of equipment with conductive enclosures, means shall be

Initiator		HOG (Engineering)	
-----------	--	-------------------	--



**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 4 of 12</b>

provided if necessary to ensure electrical continuity between exposed conductive parts of the equipment and the metal sheathing of connecting conductors. The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations. Enclosures shall be so designed as to allow the covers to be opened with the use of tools, but means shall be provided to prevent loss of the fastening devices.

Doors of all MCCB enclosure shall have one panel type lock & one padlock at the front of the door. Single Master key shall be provided for all door locks. For mounting the enclosure, the mounting clamps shall be on top & side of the enclosure and shall be of minimum thickness of 5mm. All the hardware used shall be hot dipped Galvanized or Electro-Zinc plated.

For 3-Phase MCCB boxes the phase sequence shall be B-Y-R-N from the left, when viewed from the front of the MCCB box. However, for 1-Phase boxes (which are to be mounted back to back with the transformer), the configuration shall be Ph-N from the left, when viewed from the front of the MCCB. The mounting arrangement of MCCB shall such that for a given rating of MCCB, same rating MCCB of any TPC approved manufacturer can be installed / replaced easily at site without making any changes in bus bar arrangement.

All the bus-bars shall be of Electrolytic grade Aluminum duly sleeved with heat shrinkable PVC sleeves with 1.1kV insulation. Bus bar sizes shall be chosen by considering all the safety factors and area reduced due to hole cut on the bus. The hole sizes on the bus bar shall be provided in line with the lug sizes used in TPC system by maintaining appropriate clearance between all lugs for proper cable termination. The outgoing three phase bus bars with neutral shall be horizontally aligned & suitable for providing adequate connections. The distance from gland plate to bottom bus bar (neutral) shall be indicated in the drawing. Non hygroscopic, non-combustible type Bus bar insulators of material such as SMC/DMC shall be used. A minimum 2 Nos. of Bus bars insulators (At both ends of phase & neutral bus) shall be used in all the MCCB boxes so that the bus bars shall be rigidly mounted. Panel Builder shall furnish a type-test certificate from CPRI/ERDA in support of Bus-bars system of MCCB Distribution Box, having short-circuit withstand capacity equal to respective MCCB short-ckt. Breaking capacity used in that Distribution Box. A Cable box shall be provided at the back side of the MCCB box for incoming cable connection.

**5.2 MCCBs :**

MCCBs shall comply to latest standards of IS-13947-2 / IEC-60947-2. These MCCBs shall have high Mechanical & Electrical Endurance. All 3-pole MCCBs shall be suitable for 'ISOLATION' with positive contact indication for safety of Operating Personnel. Each current path and operating contact system of 3-pole MCCBs shall be of encapsulated design with double break contacts on incoming and outgoing side of the current path. These MCCBs shall be of Current Limiting design to reduce impact of thermal stresses on Cables and down the line Electrical Distribution system, while opening on high fault currents.

All MCCBs shall have well defined and identified ON, OFF, & Trip Positions marked on front face of the MCCB in accordance with Indian and International standards. MCCBs shall have a 'Push to Trip' test button on front face to test healthiness of Trip unit. Phase Barriers shall be provided on all 3-pole MCCBs to prevent travel of arc between phases during any short circuit fault, for maximum insulation between phases at power terminals and to maximize creepage distance between phases. MCCBs shall also be provided with suitable spreaders for easy termination of Aluminium bus bar links on them so as to save MCCBs from any damage. Phase Barriers & Spreaders shall be original part of approved MCCB makes. Test report to be provided of material used for phase barriers and spreader from MCCB supplier. Local similar phase barriers & spreaders shall not be accepted for superior connections between MCCB terminal with Distribution Box bus bars.

**5.3 GLAND PLATES :**

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 5 of 12</b>

Detachable CRCA sheet steel gland plates of 3mm thickness shall be provided for accommodating I/C & O/G cables. Rubber seal for all the holes shall be provided separately. The gland plate for each MCCB DB shall be provided with holes (knock out type) suitable for the brass glands in accordance with XLPE insulated, armoured cables for I/C & O/G mentioned in the table below. Details of the no. of holes that should be drilled in the gland plate for particular ratings of MCCB Distribution Box along with incoming and outgoing cables sizes are as given below and shall be adhered to by the supplier of the MCCB DBs.

<b>Knockout type openings required in MCCB Box</b>												
S.no.	TRF. Rating	MCCB Rating	Incoming Cables		Outgoing cables/Service lines to consumers from MCCB					Total no. of openings in incoming base plate	Total no. of openings in outgoing base plate	
			4Cx150 sq mm	4Cx300 sq mm	2Cx16 sq mm (1ph Only)	2Cx25 sq mm (1ph Only)	4Cx25 sq mm	4Cx95 sq mm	4Cx150 sq mm	3-Phase	1-Phase	3-Phase
1	10kVA - SP	40A, 10kA - SP	Directly mounted on Trf.		4	0	0	0	0	Directly mounted on Trf.	4	0
2	16kVA - SP	63A, 10kA - SP	Directly mounted on Trf.		4	0	0	0	0	Directly mounted on Trf.	4	0
3	25kVA - SP	100A, 10kA - SP	Directly mounted on Trf.		4	2	0	0	0	Directly mounted on Trf.	6	0
4	25kVA - TP	40A, 35kA - TP	Directly mounted on Trf.		4	2	2	0	0	Directly mounted on Trf.	6	2
5	63kVA - TP	100A, 35kA - TP	1	0	0	0	3	2	0	1	0	5
6	100kVA - TP	160A, 35kA - TP	1	0	0	0	4	2	0	1	0	6
7	160kVA - TP	250A, 35kA - TP	0	1	0	0	2	3	0	1	0	5
8	250kVA - TP	400A, 35kA - TP	2	0	0	0	0	4	1	2	0	5
9	315kVA - TP	500A, 50kA - TP	0	2	0	0	0	3	2	2	0	5
10	400kVA - TP	630A, 50kA - TP	0	2	0	0	0	4	3	2	0	7

**5.4 TERMINALS & CONNECTIONS :**

Current carrying parts shall have the necessary mechanical strength and current carrying capacity for their intended use. All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength. Terminal connections shall be such that the conductors may be connected by means of screws bolts, spring washers or other equivalent means so as to ensure that the necessary contact pressure is maintained. Standard sizes of bolts, screws, pipe and other fittings shall be used and number of sizes to be kept minimum. Terminals shall be so constructed that the conductors can be clamped between suitable surfaces without any significant damage either to conductors or terminals. Terminals shall not allow the conductors to be displaced or be displaced themselves in a manner detrimental to the operation of equipment and the insulation voltage shall not be reduced below the rated values. Terminals for connection to external conductors shall be readily accessible during installation. The number of termination points on the bus bar shall be in accordance with the number of outgoing cables as stated in the table above.

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 6 of 12</b>

All mechanism shall be made of such material as to prevent corrosion due to sticking of dust. All connections and contacts shall be of ample cross-section and surface area for carrying continuously the specified current without undue heating and shall be secured rigidly & locked in position. The manufacturer shall state the type (rigid/ stranded/ flexible), the minimum and the maximum cross sections of conductors for which the terminal is suitable and, if applicable, the number of conductors simultaneously connectable to the terminal. The incoming cable shall be terminated at back side of the bottom of the MCCB distribution box and outgoing cable shall be terminated from front of the bottom of the box.

**5.5 INSULATION SUPPORT :**

The bidder shall use fire retardant material (not Bakelite) for Insulation and seal the gap near the bus-bars with sealing agent, to prevent the inrush of dust and moisture from the back side of enclosure. Phase barrier of the same material shall also be provided. If, in order to provide safety to the operating personnel, Bakelite separator shall be provided in front of Incoming bus-bars.

**5.6 PROTECTIVE MEASURES :**

The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance so that there is no possibility of the operator experiencing a shock during normal operation. All apparatus, connections and cabling shall be designed / arranged to minimize risks of fire and any damage which might cause in the event of fire. Bakelite impregnated / non impregnated should not be used internally or externally. All apparatus shall be so designed and constructed as to obviate the risks or short circuits of the live parts by lizards / rodents.

When the operating person is opening the door, at any circumstances he should not be able to access the live bus directly. Insulated barriers shall be provided on live incoming side terminals of MCCB, so as to ensure that no accidental contact is possible. Each MCCB box shall be provided with a Danger Plate of Aluminium sheet embossed / engraved or Screen Printed on Enclosure, with 415V AC and danger mark in English and Hindi also effectively secured..

**5.7 PROTECTIVE EARTHING :**

The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor. The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor. Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place. The MCCB Box shall be provided with an Aluminium Earth bus suitable for the Rated short circuit current of the breaker. Two nos. body earthing studs shall be provided on side of boxes for body earthing. Provision of one other stud shall be provided for neutral earthing in those boxes which are directly mounted on the transformer. Earthing bolt should be welded in the box and not to be fixed. Neutral earthing should be separated from body with separate studs. The earth terminals/ studs shall be of a suitable size to accommodate the earth conductor and shall be corrosion protected. The earth terminals shall be identified by means of the earthing sign marked in a legible and indelible manner on or adjacent terminals. The earthing studs shall be welded from inside the enclosure and shall be covered from top so as to prevent access for theft. The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed.

**5.8 PAINTING:**

The paint shall be applied on clean, dry surface under suitable atmospheric conditions by seven tank process followed by powder coating. The paint shade shall be RAL 7032 with thickness of the powder coating not less than 70 microns.

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 7 of 12</b>

**6. NAMEPLATE & MARKINGS :**

All the components and operating devices of the MCCB and Distribution Box shall be provided with durable and legible nameplates OR Screen printed, containing all technical parameters. MCCB and Distribution Box name plate & markings shall be in accordance with IS-13947-2 / IEC-60947-2 along with the following information:

- i) Manufacturer's Name
- ii) Type designation & serial no.
- iii) Reference No. of the relevant standard
- iv) Utilization category
- v) Rated Operational Voltage
- vi) Rated current
- vii) Rated frequency
- viii) Rated service short circuit breaking capacity (Ics)
- ix) Rated ultimate short circuit breaking capacity (Icu)
- x) Line and load terminals
- xi) Neutral pole terminals in MCCB DB
- xii) Protective earth terminal markings on MCCB DB
- xiii) Indication of Open and Closed positions on MCCB
- xiv) Terminal Marking

The Name Plate on MCCB Distribution Box shall be embossed OR Screen Printed with PO NO., Date, "PROPERTY OF TPC", "MATERIAL CODE No.", and name of Manufacturer. A danger plate of appropriate size shall be provided on the enclosure OR Screen Printed. Apart from this, 'Suitable for \_\_\_\_\_ kVA Transformer shall be also printed in order to identify as to which rating of transformer the corresponding MCCB box is designed for. Also 'No current-call center no- 0674-2391110' shall be dully printed on the front of the MCCB box.

**7. TESTS :**

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS / IEC Standards. Routine / Acceptance tests may be witnessed by the purchaser / his authorized representative, if so desired. All the components as applicable shall be type tested as per the relevant standards. Following tests shall be necessarily conducted on the equipment in addition to the others specified in IS / IEC.

Type Tests for MCCBs :

- a) Tripping Limits & Characteristics
- b) Operational & Overload Performance Capability
- c) Short Circuit Breaking/Making capacities
- d) Dielectric Properties test

Type Tests for Enclosure :

- a) Temperature Rise Test
- b) Dielectric Properties test
- c) Degree of Protection of enclosure.

Routine Tests for MCCB:

- a) Mechanical & electrical Operation
- b) Calibration of Releases.
- c) Continuity of circuit.
- d) Dielectric withstand.

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 8 of 12</b>

Routine Tests for Enclosure:

- a) Dielectric tests
- b) Verification of clearances
- c) Dimensional Checks

**8. TYPE TESTS CERTIFICATES :**

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA accredited test Labs, 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. However, Type Test certificated which are older than 5 years from date of bid opening, may be accepted as a special case, provided there is no change in corresponding IS / IEC standards or MCCB design. 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 TPC.

**9. PRE-DISPATCH INSPECTION :**

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

Following documents shall be sent along with material

- a) Test reports
- b) MDCC issued by TPC
- 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 STORE :**

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

**11. GUARANTEE :**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of at least 12 months from the date of commissioning or 24 months from the date of supply of each Lot made under the contract whichever is earlier, (the time scale of 12/24 months could be enhanced subject to mutual agreements) Associates 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 Company, failing which the Company will be at liberty to get it replaced/rectified at Associate's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the Associate 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.

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>		
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>	
<b>Revision No.</b>	00	<b>Page 9 of 12</b>	

**12. PACKING :**

Bidder shall ensure that all equipment covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit.

**13. TENDER SAMPLE :**

Not applicable

**14. QUALITY CONTROL :**

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's/ Consultant's engineer 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 & TOOLS :**

Bidder shall provide a list of recommended spares with quantity and unit prices for 3 years of operation after commissioning. The bidder shall provide a list of complete set of accessories and tools required for erection & maintenance along with the installation procedure.

**18. DRAWINGS :**

Following drawings & Documents shall be prepared based on TPC specifications and statutory requirements and shall be submitted with the bid:

- a) Completely filled-in Guaranteed Technical Parameters.
- b) General description of the equipment and all components including brochures
- c) General arrangement drawings
- d) Single Line Diagram
- e) Bill of material
- f) Type Test Certificates
- g) Experience List
- h) Foundation fixing drawings.
- i) Manufacturing schedule and test schedule

Drawings/documents to be submitted after the award of the contract:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√
3	Dimensional drawings	√		√
4	Schematic Diagram	√		√

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>		
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>	
<b>Revision No.</b>	00	<b>Page 10 of 12</b>	

5	Bill of Material	√		√
6	Foundation Plan/ Mounting details	√		√
7	Manual/Catalogues/drawings for ACB		√	
8	Installation Instructions		√	√
9	Instruction for Use		√	√
10	Transport/ Shipping dimension drawing		√	√
11	QA & QC Plan	√	√	√
12	Routine, Acceptance and Type Test Certificates	√	√	√

Bidder 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 purchaser.

All the documents & drawings shall be in English language.

Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

CONTROLLED and APPROVED

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

**TPC**

<b>Document Title</b>	<b>Specification for MCCB with Distribution Box</b>	
<b>Document No.</b>	ENG-LV-11-02	<b>Eff. Date: 01.04.2020</b>
<b>Revision No.</b>	00	<b>Page 11 of 12</b>

**19. GUARANTEED TECHNICAL PARTICULARS**

<b>S.No.</b>	<b>Particulars</b>	<b>Units</b>	<b>As furnished by vendor</b>
<b>A</b>	<b>MCCBs</b>		
1	Type of MCCB		
2	Type of releases		
3	Make of MCCB offered	Nos.	
4	Rated Current	A	
5	Rated Operational Voltage	V AC	
6	Rated Insulation Voltage(Ui)	V	
7	No. of Poles	Nos.	
8	Utilization Category	A	
9	Rated Impulse- withstand voltage (U imp)	kV	
10	Rated Ultimate Short Ckt. Breaking capacity : Icu (kA rms)	kA	
11	Rated Service Short Ckt. Breaking capacity : Ics (kA rms) - 100 % of Icu	kA	
12	Overload release setting	%	
13	Typical Opening Time	m.sec	
14	Typical Closing Time	m.sec	
15	Electrical and Mechanical Operating cycles		
16	Spreaders & Phase Barriers	Yes	
<b>B</b>	<b>Distribution Box</b>		
17	Material of Bus bar		
18	Minimum Current Density of bus bar	A/mm <sup>2</sup>	
19	Max. permissible temperature rise		
20	Min. Clearance between phases	mm	
21	Min. Clearance between phase to earth	mm	
22	Terminal shrouds		
23	Degree of Protection for Enclosure	IP 55	
24	Overall Dimensions	mm	

Initiator		HOG (Engineering)	
-----------	--	-------------------	--



**TPC**

Document Title	<b>Specification for MCCB with Distribution Box</b>	
Document No.	ENG-LV-11-02	Eff. Date: 01.04.2020
Revision No.	00	Page 12 of 12

**20. SCHEDULES OF DEVIATIONS:**

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.

**SCHEDULE OF DEVIATIONS**

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

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

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

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

Seal of the Company:

Signature

Designation

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

## GURANTED TECHNICAL PARTICULARS FOR 11KV 3CORE XLPE CABLE ARMoured

Sl. No	Particulars	Specification		
1	<b>Name of the Manufacturer</b>			
2	<b>Cable size (No x Sq.mm)</b>	<b>3x185</b>	<b>3x300</b>	<b>3x400</b>
3	<b>Type of Cable</b>	A2XFY		
4	<b>Voltage grade (KV)</b>	6.35/11 (E)		
5.1	Maximum conductor temperature under normal operating conditions.( <sup>o</sup> C)	90		
5.2	Maximum conductor temperature at the termination of short circuit.( <sup>o</sup> C)	250		
6.1	Permissible Voltage Variation.	±10%		
6.2	Permissible Frequency Variation.	±5%		
6.3	Combined Voltage & Frequency Variation.	±10%		
7	<b>Conductor</b>			
7.1	Material of conductor	H4 GRADE ALUMINIUM as per class 2 of IS-8130/84 Latest		
7.2	Max. DC Resistance of conductor at 20 deg. C. (Ohm/Km)	0.164	0.1	0.0778
7.3	Shape	Standard compacted Circular		
8	<b>Conductor Screening</b>			
8.1	Material	Extruded Semi-Conducting Compound		
8.2	Nominal thickness (mm)	0.3	0.3	0.3
9	<b>Insulation:</b>			
9.1	Material	XLPE as per IS-7098(Pt-1)/88 Latest		
9.2	Nominal thickness (mm)	3.6		
10	<b>Insulation Screening</b>			
(a)	<b>Non-Metallic</b>			
a.1	Material	Extruded Semi-Conducting Compound		
a.2	Nominal Thickness (mm)	0.3		
(b)	<b>Metallic</b>			
b.1	Material	Copper Tape		
b.2	Nominal Thickness (mm)	0.045		
11	<b>Inner Seath</b>			
11.1	Material	Wrapping of Plastic Tapes		
11.2	Minimum Thickness (mm)	0.7		
12	<b>Armouring</b>			
12.1	Material	Galvanized Steel		
12.2	Type of Armouring	Flat Strip		
12.3	Nominal Size of Armour (mm)	4x0.8		
13	<b>Outer Sheath:</b>			
13.1	Material	Extruded PVC Type ST2(Anti-rodent & Anti-termite) as per IS:5831/84		
13.2	Minimum thickness (mm)	2.36	2.68	2.84
14	<b>Electrical Parameters</b>			
14.1	Max AC resistance of conductor at 90 <sup>o</sup> C. (Ohm/Km)	0.211	0.13	0.102
14.2	Appx. Cable capacitance. (mfd/km)	0.36	0.44	0.49
14.3	Appx. cable reactance. (Ohm/Km)	0.0911	0.0855	0.0829
14.4	Impedance of cable. (Ohm/Km)	0.23	0.156	0.131
15	<b>Coninuous current Carrying Capacity:</b>			
15.1	Cable laid in Ground(At temp 30 <sup>o</sup> C) Amp	273	354	404
15.2	Cables installed in Air(At temp 40 <sup>o</sup> C) Amp	330	441	512
16	<b>Short Circuit rating of conductor for the duration of 1sec (KA)</b>	17.48	28.55	37.79
17	<b>Approximate Overall diameter (mm)</b>	63±3	73±3	80±3
18	<b>Standard Drum Length (Mtr.)</b>	500+/-5%		
19	<b>Standard to which the cables confirm</b>	IS: 8130/84, 7098/88, 5831/84, 3975/88 with latest up to date ammendments.		

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>SPECIFICATIONS FOR LT BRASS PALM CONNECTOR WITH ALUMINUM BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date: 01/06/2020</b>	
<b>Rev. No</b>	00	<b>Page 1 of 9</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

### **CONTENTS**

- 1.0 SCOPE**
- 2.0 APPLICABLE STANDARDS**
- 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION**
- 4.0 GENERAL TECHNICAL REQUIREMENTS**
- 5.0 OTHER REQUIREMENTS**
- 6.0 TESTS**
- 7.0 TYPE TEST CERTIFICATES**
- 8.0 MARKING**
- 9.0 PRE DESPATCH INSPECTION**
- 10.0 INSPECTION AFTER RECEIPT AT STORES**
- 11.0 GUARANTEE**
- 12.0 TENDER SAMPLE**
- 13.0 QUALITY CONTROL**
- 14.0 MINIMUM TESTING FACILITIES**
- 15.0 DRAWINGS AND DOCUMENTS**
- 16.0 SCHEDULE OF DEVIATIONS**

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

	<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 2 of 9</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

**1. SCOPE:**

The scope of this technical document is to give design & constructional features of LT connectors used with LV bushing stem of 3 phase distribution transformers from 100 KVA capacity to 1000KVA capacity with Al. Bus Bar. The specific requirements for the LT Connectors are covered in the enclosed General Technical requirements.

**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 Standards and shall conform to the regulations of the local authorities:

- a) IS 3347: Part 1 : Sec 2 : 1979 Dimensions for Porcelain Transformer Bushings for Use in Lightly Polluted Atmospheres – Part 1 : Up to and Including 1 Kv – Section 2 : Metal Parts.
- b) IS 292:1983: Specification for Leaded Brass Ingots and Castings
- c) IS 7421 – 1988: Porcelain bushings for alternating voltage up to and including 1000 V

**3. 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.

**4. GENERAL TECHNICAL REQUIREMENTS:**

**4.A. GENERAL TECHNICAL REQUIREMENTS FOR LT CONNECTORS**

S. No	Description	Requirement
1.	Application	LT Connectors alongwith bus bars are provided for LT bushing stem of 3 phase distribution transformers upto 1000 KVA capacity to connect the jumper without disturbing the bushing stem.
2.	Material	Tinned brass
3.	Relevant Standards	IS :3347 (Part 1 /Sec 2)-1979/ IS 7421 – 1979/ IS 292

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

	<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 3 of 9</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

4.	Rated system Voltage	12 KV
5.	Current Rating	
	a. For 100 Kva	250 A
	b. For 250/315/400 Kva	630 A
	c. For 630 Kva	1000 A
	d. For 1000Kva	2000 A
6.	Minimum Tensile Strength	300 N/mm <sup>2</sup>
7.	Rated short time current	
8.	Temperature rise limits	Temperature rise of palm connectors above a reference ambient temperature of 40 deg C with rated current shall not exceed 45 deg C.
9.	Maximum weight of the clamp body excluding the nut bolts	
	e. For 100 Kva	550 gms
	f. For 250/315/400 Kva	800 gms
	g. For 630 Kva	1.15 kgs
	h. For 1000Kva	3.7 kgs
10.	Number of spring washers & plain washers	
	i. For 100 Kva	2 No. of Plain Washers & 01 No. of Spring washer
	j. For 250/315/400 Kva	2 No. of Plain Washers & 01 No. of Spring washer
	k. For 630 Kva	2 No. of Plain Washers & 01 No. of Spring washer
	l. For 1000Kva	2 No. of Plain Washers & 01 No. of Spring washer
11.	Applicable standards for Tinned brass for 1000A, 630Kva Transformer & 2000A, 1000Kva Transformer	Grade 3 of IS 292:1961 or to IS 3488 -1966

**5. A. OTHER REQUIREMENTS:-**

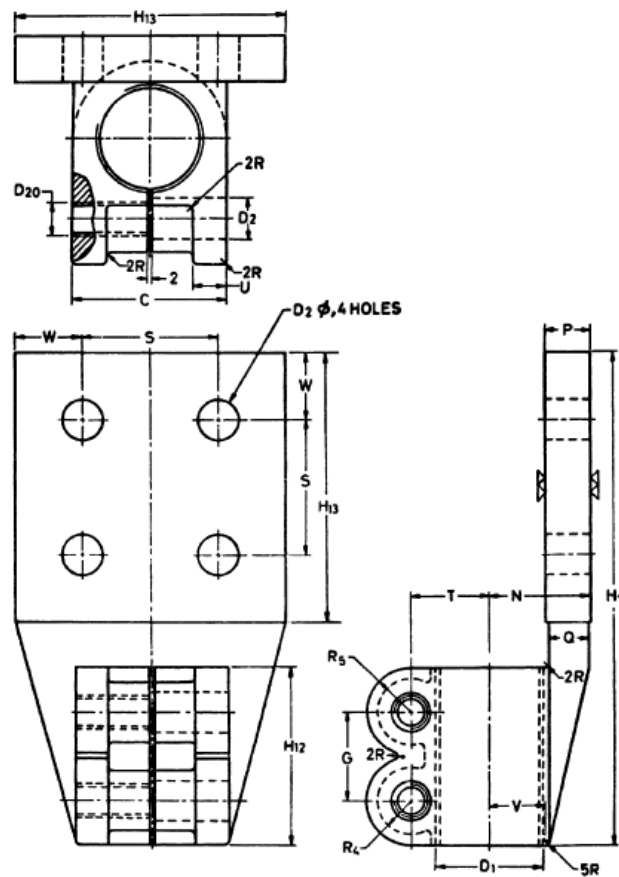
- a. Connectors shall be suitable for Copper stem with M8 hexagonal bolts of brass tinned material for 100 Kva, M10 hexagonal bolts of brass tinned material for 250/315/400 Kva, M12 hexagonal bolts of brass tinned material for 630 Kva & M16 hexagonal bolts of brass tinned for 1000 Kva.
- b. The connector shall be suitable for outdoor application.
- c. Connectors shall be smooth, free from any defect such as cavities blow hole etc.
- d. All parts of connectors shall be suitably protected against the corrosion
- e. Sufficient contact pressure shall be maintained at the joint by the provision of the required number of bolts or fixing arrangements.
- f. The connector shall be made of single piece without any joint and with single material i.e. Tinned brass.
- g. Cracks shall not develop on the connector body.
- h. All the nuts, bolts, plain washers etc shall be hot dipped galvanized.
- i. Chemical composition of brass shall be as per IS 292.
- j. Connectors shall be provided with eyebolt to receive insulated conductor on LT Side and shall be suitable to carry the specified current.

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 4 of 9</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

**Tinned Brass Palm Connector**

(These dimensions & drawing is as per Fig. 13 of Connecting Lug of IS 3347, Part 1, Sec-2 :1979)



All dimensions in millimetres.

S. No.	Item Description	C	D1	D2	D20	G	H11	H12	H13	S	W	X	T	P	Q	R4	R5	U	V	No. of Holes
1	Palm Connector LT Brass for 100 Kva Transformer	35	M12X2	10	M8	18	110	36	56	32	12	17	15	8	7	9	9	8	9	3
2	Palm Connector LT Brass for 250Kva Transformer	35	M20x2	12	M10	26	120	50	60	32	14	26	20	10	9	7	12	8	15	4
3	Palm Connector LT Brass for 315Kva Transformer	35	M20x2	12	M10	26	120	50	60	32	14	26	20	10	9	7	12	8	15	4

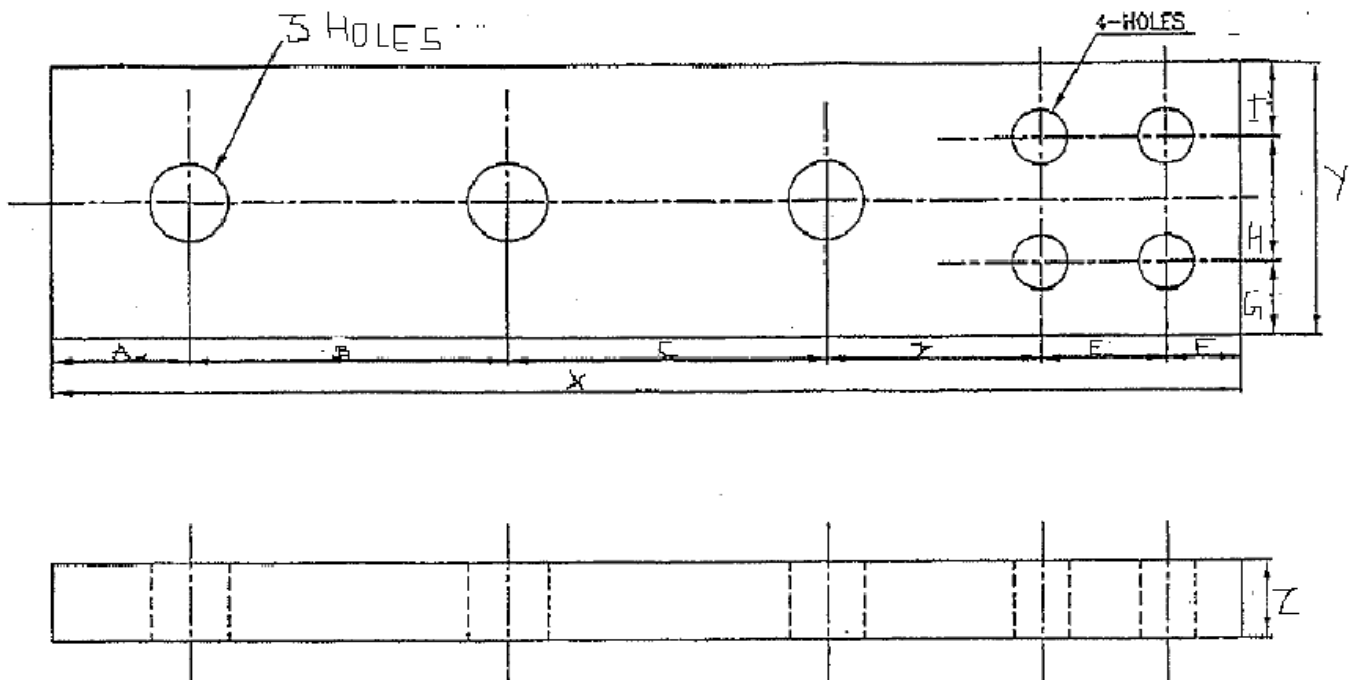
Initiator	HOG (PLANT ENGINEERING)
-----------	-------------------------

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>	
<b>TECHNICAL SPECIFICATION</b>	
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>
<b>Doc. No</b>	ENG-LV-80
<b>Rev. No</b>	00
<b>Prepared by:</b>	Reviewed By: _____ Approved By: _____
	Eff. Date: _____ Page 5 of 9 Issued By: _____

4	Palm Connector LT Brass for 630A, 400Kva Transformer	35	M20x2	12	M10	26	120	50	60	32	14	26	20	10	9	7	12	8	15	4
5	Palm Connector LT Brass for 1000A, 630Kva Transformer	45	M30x2	14	M12	30	130	60	60	32	14	30	25	12	10	10	15	10	16	4
6	Palm Connector LT Brass for 2000A, 1000Kva Transformer	58	M42x3	18	M16	40	195	80	100	50	25	45	35	20	18	15	20	15	26	4

#### 4.B. GENERAL TECHNICAL REQUIREMENTS FOR ALUMINIUM BUS BARS

S. No	Description	Requirement
1.	Application	Al. bus bars are used alongwith LT Palm Connectors
2.	Material & relevant standards	Aluminum & Al- 63400 (HE9) WP & Tamper as per IS 733:1983
3.	Number of spring washers & plain washers	
	a. For 250/315/400 Kva	2 No. of Plain Washers & 01 No. of Spring washer
	b. For 630 Kva	2 No. of Plain Washers & 01 No. of Spring washer
	c. For 1000Kva	2 No. of Plain Washers & 01 No. of Spring washer
4.	Type of core cable	Single Core
5.	Type of Bolts	Hexagonal
6.	No. of Holes in Bus Bar	03
7.	Number of Holes in Bus bar for connecting with LT Connector	04



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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>	
<b>TECHNICAL SPECIFICATION</b>	
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>
<b>Doc. No</b>	ENG-LV-80
<b>Rev. No</b>	00
<b>Prepared by:</b>	Reviewed By: _____ Approved By: _____
	Eff. Date: _____ Page 6 of 9 Issued By: _____

### AL. BUS BAR

S . N o.	Type of ratings	Holes are for cable size (in sqmm)	Size of holes to be ReDrilled (in sqmm)	Dia. Of Plain washer (O.D.X TH)	Length of bus bar (X)	Width of Bus Bar (Y)	Thickness of bus bar (Z)	Hole size	A	B	C	D	E	F	G	H	I
1	Bus Bar for 250Kva Transformer	150	300	27 X 2TH	225	60	15	12	25	55	55	44	32	14	14	32	14
2	Bus Bar for 315Kva Transformer	150	300	27 X 2TH	225	60	15	12	25	55	55	44	32	14	14	32	14
3	Bus Bar for 400Kva Transformer	150	300	27 X 2TH	225	60	15	12	25	55	55	44	32	14	14	32	14
4	Bus Bar for 630Kva Transformer	300	630	39 X 3TH	300	70	20	16	35	80	80	54	32	19	19	32	19
5	Palm Connector LT Brass for 1000Kva Transformer	300	630	39 X3TH	350	100	20	16	40	85	85	65	50	25	25	50	25

All dimensions are in mm.

#### 5. B. OTHER REQUIREMENTS:-

- a. Al. Bus Bar shall be suitable for LT Palm Connector.
- b. Al. Bus Bar shall have 3 number of holes for M12 hexagonal bolt of brass tinned material for 250/315/400 Kva, M18 hexagonal bolt of brass tinned material for 630 Kva/1000 Kva.
- c. Al. Bus Bar shall have 4 number of holes for M10 hexagonal bolt of brass tinned material for connecting it with LT Palm connector of 250/315/400 Kva, M12 hexagonal bolt of brass tinned material for connecting it with LT Palm Connector of 630 Kva/1000 Kva.
- d. Bus Bar shall be smooth, free from any defect such as cavities blow hole etc.
- e. The Bus Bar shall be made of single piece without any joint and with single material i.e. Aluminum.
- f. All the nuts, bolts, plain washers etc shall be hot dipped galvanized.

#### 6. TESTS:

Following Routine/Acceptance tests for LT connectors for 100 Kva Rating and LT Connectors for 250/300/415/630/1000 kva alongwith Bus Bar should be done as per relevant IS.

- a) Dimensions as per approved drawing
- b) Temperature rise test as per IS 7421
- c) Visual examination
- d) Surface finishing
- e) Chemical Composition of Tinned brass as per IS 292

#### 7. TYPE TEST CERTIFICATES:

The bidder shall furnish the type test certificates of the LT Brass Palm connectors alongwith Bus Bar for the tests as mentioned above as per corresponding standards & as per IS 7421 for Porcelain Bushings. All the tests shall be conducted by CPRI/ERDA 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.

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



	<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	Page 7 of 9	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

**8. MARKING**

The Palm Connector shall be marked with Manufacturer's name & Ampere Rating.

**9. PRE DESPATCH INSPECTION**

The Material shall be subject to inspection by a duly authorized representative of the TPCL. The inspection shall be carried out as per TPCL specification and relevant IS standards. 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) 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 contracts & 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 TPCL.

**12 TENDER SAMPLE**

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

**13 QUALITY CONTROL**

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

**Rejection and Retest**

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

	<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 8 of 9</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

During inspection if any one of the test pieces first selected fail to pass the tests, three further samples from the same batch shall be selected as per IS, one of which shall be from the length from which the original test sample was taken, unless that length has been withdrawn by the supplier.

If all of the three test pieces from these additional samples satisfy the requirements of the tests, the batch represented by these samples shall be deemed to comply with the standard. In case, the test pieces from any of the three additional samples fail, the batch represented shall be deemed not to comply with the standard.

#### 14. 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.

#### 15. 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 and test certificates.		√	√
5	Installation Instructions		√	√
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.

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

	<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>STANDARD TECHNICAL PARTICULARS FOR LT BRASS PALM CONNECTORS WITH AL. BUS BAR</b>		
<b>Doc. No</b>	ENG-LV-80	<b>Eff. Date:</b>	
<b>Rev. No</b>	00	Page 9 of 9	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

16

**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 TPCL'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

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

	TPCODL, BHUBANESWAR		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
<b>Doc. No</b>	<b>ENG-HV-53</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Rev. No</b>	<b>01</b>	<b>Page 1 of 8</b>	
<b>Prepared By:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

## CONTENTS

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

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

*Property of TPCL – Not to be reproduced without permission of TPCL*

## TECHNICAL SPECIFICATION

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 2 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

**1. SCOPE:**

This specification covers technical requirements of design, manufacture, construction, performance, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site of 11KV, Button type fast blowing (K-Type) fuse link of 2A,5A,8A,10A,20A,30A & 100 Amp for use in drop down Fuse unit for trouble free and efficient performance.

**2. APPLICABLE STANDARDS:**

DO Fuse unit shall comply with the requirements stated in the latest editions of the following standards

- a) IS 9385 (Part-II) –1979 : Specification for high voltage fuse Part II- Expulsion and similar fuses.
- b) IEC 60282-2-2008 : High voltage fuses part 2: Expulsion fuses..
- d) ANSIC37.42-1996 : Specification for high-voltage expulsion type distribution class fuses, cutouts, fuse disconnecting switches and fuse-links..

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

The material shall be suitable for following climatic conditions,

1. Maximum 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:**

DESCRIPTION	REQUIREMENT
Type of fuse link	Button type fast blowing (K Type)
Class of fuse link	Expulsion, Class-2
Rated Voltage	12 kV
Service Voltage	11 kV
Rated Frequency	50 Hz

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

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 3 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

Rated continuous current	2A,5A,8A,10A,20A,30A & 100 Amp
Tensile withstand strength	6.1 Kg
Minimum Overall length of fuse link	510 mm

#### 4.11. TIME CURRENT- CHARACTERISTICS

The time –current characteristics of fuse link shall be based on applying current to a new and unloaded fuse-link in a fuse base specified by the bidder. The curves shall show the following:

- The pre-arcing time or the operating time.
- The relation between the time and the r.m.s. symmetrical prospective current for the time range, at least 0.1s to 300s as appropriate to the fuse-link rated current.
- The type and rating and speed designation of the fuse-link to which the curve applies.

The Pre-arcing (melting) time-current characteristics for fuse link shall meet the minimum and maximum current values required to meet the fuse link at the three points as follows:

- 300 Sec.
- 10 Sec.
- 0.1 Sec.

#### 4.12 ACCURACY

The minimum melting – current characteristics for fuse-link shall not be less than the minimum values specified in GTP. The minimum melting-current characteristics plus manufacturing tolerance for fuse link shall not be greater than the maximum values specified in GTP as per ANSI C37.42-1996.

#### 5.0 GENERAL CONSTRUCTIONAL REQUIREMENTS:

The expulsion fuse-link shall be removable button head type K as the relevant IS/IEC/ANSI standard when used in system with voltages less than the rated voltages of the fuse, the breaking capacity in kilo amperes shall not be less than the rated breaking capacity.

#### 5.1 DIAMETER OF BUTTON HEAD AND WASHER

The diameter of button head and washer to be used with the fuse links shall be specified in GTP.

#### 5.2 SIZE AND SHAPE

The size and shape of fuse links for all rating shall be such that they can freely enter a fuse link tube having the inside diameter specified in GTP.

#### 5.3 MINIMUM OVERALL LENGTH

The minimum overall length of fuse links of all rating for use in fuses shall be as specified in GTP.

#### 5.4 BENDING REQUIREMENTS

Fuses links shall bend readily when installed and during operation so as not to interfere with the proper functioning of fuse cutouts.

#### 5.5 MAXIMUM THICKNESS OF BENDING SECTION

To ensure proper clamping of the fuse links, the maximum thickness of the bending section shall not exceed the values as specified in GTP.

#### 6. NAMEPLATE & MARKINGS:

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

## TECHNICAL SPECIFICATION

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 4 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

The fuse link shall have a name plate clearly visible and effectively secured against removal. Indelibly and distinctly marked with all essential particulars as per relevant standards along with the following.

- a) Manufacturer's name.
- b) Type designation.
- c) Rated continuous current.
- d) Rated Voltage.

#### 7. TESTS:

All the Routine, acceptance & type tests shall be carried out on random selected 3 sample of each rated current fuse link of as per IS 9385 Part 2 and IEC 60282 Part 2. All routine/acceptance tests shall be witnessed by the Purchaser/his authorized representative. All the components should have been type tested as per relevant standards.

Following Tests shall be necessarily conducted on the fuse link as mentioned in the IS/IEC:

##### Routine Test:

- i) Resistance test (0.001-0.003 ohm).
- ii) Dimensional verification.

##### Acceptance Test:

- i) Resistance test.
- ii) Dimensional verification.
- iii) Test for time/current characteristics.
- iv) Mechanical test.

##### Type Test:

- i) Dielectric tests
- ii) Temperature rise test.
- iii) Test for time/current characteristics.
- iv) Mechanical test.

#### 8. TYPE TESTS CERTIFICATES:

The bidder shall furnish the type test certificates and result for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 3 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 not carried out, same shall be carried out without any cost implication to TPCL.

#### 9. PRE-DISPATCH INSPECTION:

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

Following documents shall be sent along with material

- a) Test reports

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

## TECHNICAL SPECIFICATION

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 5 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

- b) MDCC issued by TPCL
- 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 STORE:**

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 contracts and engineering department.

**11. GUARANTEE:**

Supplier shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company shall 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. Supplier shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company.

**12. PACKING:**

Supplier shall ensure that all equipment covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit.

**13. TENDER SAMPLE:**

The supplier shall provide each rating of fuse link as sample at the time of submission of bid.

**14. QUALITY CONTROL:**

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 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 shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

**15. MINIMUM TESTING FACILITIES:**

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

**16. MANUFACTURING ACTIVITIES:**

The successful bidder shall 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

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



## TECHNICAL SPECIFICATION

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 6 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

submitted with the offer. This bar chart shall have to be submitted within 15 days from the release of the order.

**17. SPARES, ACCESSORIES AND TOOLS:**

Not applicable.

**18. DRAWINGS:**

Following drawings & Documents shall be prepared based on TPCL specifications and statutory requirements and shall be submitted with the bid:

- Completely filled-in technical parameter.
- General arrangement drawings.
- Mounting and fixing drawing.
- Type Test Certificates
- Experience List
- General description of equipment and all components including brochures.

Drawings/documents to be submitted after the award of the contract:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical parameters	√		√
2	General Arrangement drawings	√		√
3	Single line diagram	√		√
4	Installation instruction		√	√
5	Instruction for Use		√	√
6	Transport/ Shipping dimension drawing		√	√
7	Mounting and fixing drawing.		√	√
8	QA &QC Plan	√	√	√
9	Test Certificates	√	√	√

All the documents & drawings shall be in English language.

After receipt of the order, the successful bidder shall be required to furnish five copies of all relevant drawings for TPCL approval.

Instruction Manuals: Supplier shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

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

## TECHNICAL SPECIFICATION

Doc. Title	<b>SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS</b>		
Doc. No	<b>ENG-HV-53</b>	Eff. Date:	
Rev. No	<b>01</b>	Page 7 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

**19. GUARANTEED TECHNICAL PARTICULARS:**

Bidder shall submit following Guaranteed Technical Particulars for the material, along with the bid offer:

SI No.	Description	Units	TPCL Requirement				
1	Type of fuse link		Button type fast blowing (K-Type)				
2	Class of fuse link		Expulsion, class-2				
3	Rated Voltage	Kv	12				
4	Service Voltage	kV	11				
5	Rated Frequency	Hz	50				
6	Rated continuous current	Amp	2,5,8,10,20,30 and 100				
7	Tensile withstand strength	Kg	6.1				
8	Minimum overall length of fuse link	mm	510				
9	Rated continuous current		8	10	20	30	100
	Melting current & time						
	300 Sec melting current	Minimum	15	19.5	39	63	200
		Maximum	18	23.4	47	76	240
	10 Sec melting current	Minimum	18	22.4	48	77.5	258
		Maximum	27	34	71	115	388
	0.1 Sec melting current	Minimum	97	128	273	447	1520
		Maximum	116	154	328	546	1820
10	Diameter of button head	mm	12.5±0.5				
11	Diameter of the washer	mm	19±0.5				
12	Inside diameter of fuse link tube	mm	8 to 14				
13	Max. thickness of the bending section	mm	4mm up to 30 Amp and 5mm for 100 Amp.				
14	Material of the fuse link tube		Fiber with flame retardant properties				
15	Material of the fuse element		Tinned copper				
16	Material of the flexible wire		Tinned copper				
17	Material of the button head & washer		Brass				
18	Time/Current characteristics		To be provided by the bidder				

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

	TATA POWER COMPANY LIMITED, BHUBANESWAR		
	TECHNICAL SPECIFICATION		
Doc. Title	SPECIFICATION FOR 11KV BUTTON TYPE FAST BLOWING (K TYPE) FUSE-LINKS		
Doc. No	ENG-HV-53	Eff. Date:	
Rev. No	01	Page 8 of 8	
Prepared By:	Reviewed By:	Approved By:	Issued By:

**20. SCHEDULES OF DEVIATIONS:**

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.

**SCHEDULE OF DEVIATIONS**

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

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

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

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

Seal of the Company:

Signature

Designation

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

	<b>TPCODL, ODISHA</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.06.2020	
<b>Revision No.</b>	00	<b>Page 1 of 8</b>	
<b>Prepared By:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

### **CONTENTS**

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

1.0	Scope	This specification covers the technical requirements of design, manufacturing, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site of single compression brass gland of various sizes for LT cables
-----	-------	--

Initiator		<b>HOG(ENGINEERING)</b>	
-----------	--	-------------------------	--

**TATA POWER COMPANY LIMITED, ODISHA**

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 2 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

2.0	Applicable Standards	<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 authorities.</p> <table border="1"> <tr> <td>IS 12943:1990</td> <td>Brass Glands for PVC cables-Specification</td> </tr> <tr> <td>BS 6121(Part-1):2005</td> <td>For Mechanical cable glands, Armour Glands requirement and test methods</td> </tr> <tr> <td>IS 2147:1962</td> <td>Degree of protection provided by enclosure for low voltage switchgear and control gear</td> </tr> <tr> <td>IS 4218</td> <td>General Purpose metric screw threads</td> </tr> </table>		IS 12943:1990	Brass Glands for PVC cables-Specification	BS 6121(Part-1):2005	For Mechanical cable glands, Armour Glands requirement and test methods	IS 2147:1962	Degree of protection provided by enclosure for low voltage switchgear and control gear	IS 4218	General Purpose metric screw threads																									
IS 12943:1990	Brass Glands for PVC cables-Specification																																			
BS 6121(Part-1):2005	For Mechanical cable glands, Armour Glands requirement and test methods																																			
IS 2147:1962	Degree of protection provided by enclosure for low voltage switchgear and control gear																																			
IS 4218	General Purpose metric screw threads																																			
3.0	Climate conditions of the installation	<table> <tr> <td>a) Max. Ambient Temperature</td> <td>:</td> <td>50 deg.C</td> </tr> <tr> <td>b) Max. Daily average ambient temp.</td> <td>:</td> <td>40 deg.C</td> </tr> <tr> <td>c) Min Ambient Temp</td> <td>:</td> <td>0 deg. C</td> </tr> <tr> <td>d) Ground Temperature</td> <td>:</td> <td>25 deg.C</td> </tr> <tr> <td>e) Maximum Humidity</td> <td>:</td> <td>95%</td> </tr> <tr> <td>f) Minimum Humidity</td> <td>:</td> <td>10%</td> </tr> <tr> <td>g) Average No. of thunderstorm days per annum :</td> <td></td> <td>50</td> </tr> <tr> <td>h) Average Annual Rainfall</td> <td>:</td> <td>750 mm</td> </tr> <tr> <td>i) Average No. of rainy days per annum</td> <td>:</td> <td>60</td> </tr> <tr> <td>j) Thermal Resistivity of soil</td> <td>:</td> <td>150deg.Ccm/W</td> </tr> <tr> <td>k) Wind Pressure</td> <td>:</td> <td>126 kg/sq. m up to an elevation of 10 meter.</td> </tr> </table> <p>The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p>		a) Max. Ambient Temperature	:	50 deg.C	b) Max. Daily average ambient temp.	:	40 deg.C	c) Min Ambient Temp	:	0 deg. C	d) Ground Temperature	:	25 deg.C	e) Maximum Humidity	:	95%	f) Minimum Humidity	:	10%	g) Average No. of thunderstorm days per annum :		50	h) Average Annual Rainfall	:	750 mm	i) Average No. of rainy days per annum	:	60	j) Thermal Resistivity of soil	:	150deg.Ccm/W	k) Wind Pressure	:	126 kg/sq. m up to an elevation of 10 meter.
a) Max. Ambient Temperature	:	50 deg.C																																		
b) Max. Daily average ambient temp.	:	40 deg.C																																		
c) Min Ambient Temp	:	0 deg. C																																		
d) Ground Temperature	:	25 deg.C																																		
e) Maximum Humidity	:	95%																																		
f) Minimum Humidity	:	10%																																		
g) Average No. of thunderstorm days per annum :		50																																		
h) Average Annual Rainfall	:	750 mm																																		
i) Average No. of rainy days per annum	:	60																																		
j) Thermal Resistivity of soil	:	150deg.Ccm/W																																		
k) Wind Pressure	:	126 kg/sq. m up to an elevation of 10 meter.																																		
4.0	General Technical Requirements	<table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Parameter</th> <th>Requirement</th> </tr> <tr> <th>S. No.</th> <th>Description</th> <th>Requirement</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Cable Size( with OD in mm)</td> <td>                     a) 4x25 sq.mm— Min-24, Max-28                      b) 4x50 sq.mm— Min- 28,Max-32                      c) 4x95 sq.mm— Min-38 ,Max-42                      d) 4x150 sq.mm— Min-49, Max-54                      e) 4x300 sq.mm— Min-67, Max-72                 </td> </tr> <tr> <td>2</td> <td>Gland Size(With type designation as per table-1 in this specification)</td> <td>                     a) 4x25 sq.mm- SCG7                      b) 4x50 sq.mm- SCG8                      c) 4x95 sq.mm-SCG10                      d) 4x150 sq.mm-SCG12                      e) 4x300 sq.mm- SCG16 + one nos. additional rubber ring as per SCG 14 dimensions                 </td> </tr> </tbody> </table>		Sr. No.	Parameter	Requirement	S. No.	Description	Requirement	1	Cable Size( with OD in mm)	a) 4x25 sq.mm— Min-24, Max-28 b) 4x50 sq.mm— Min- 28,Max-32 c) 4x95 sq.mm— Min-38 ,Max-42 d) 4x150 sq.mm— Min-49, Max-54 e) 4x300 sq.mm— Min-67, Max-72	2	Gland Size(With type designation as per table-1 in this specification)	a) 4x25 sq.mm- SCG7 b) 4x50 sq.mm- SCG8 c) 4x95 sq.mm-SCG10 d) 4x150 sq.mm-SCG12 e) 4x300 sq.mm- SCG16 + one nos. additional rubber ring as per SCG 14 dimensions																					
Sr. No.	Parameter	Requirement																																		
S. No.	Description	Requirement																																		
1	Cable Size( with OD in mm)	a) 4x25 sq.mm— Min-24, Max-28 b) 4x50 sq.mm— Min- 28,Max-32 c) 4x95 sq.mm— Min-38 ,Max-42 d) 4x150 sq.mm— Min-49, Max-54 e) 4x300 sq.mm— Min-67, Max-72																																		
2	Gland Size(With type designation as per table-1 in this specification)	a) 4x25 sq.mm- SCG7 b) 4x50 sq.mm- SCG8 c) 4x95 sq.mm-SCG10 d) 4x150 sq.mm-SCG12 e) 4x300 sq.mm- SCG16 + one nos. additional rubber ring as per SCG 14 dimensions																																		

**TATA POWER COMPANY LIMITED, ODISHA**

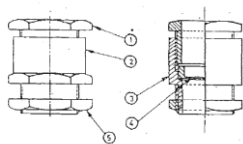
**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 3 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

3	Gland Material	Brass
4	Plating	Nickel( with minimum 10 microns thickness)
5	Gland Type	Single Compression heavy duty
6	Cable type	Steel wire armored
7	Rubber Ring	Synthetic rubber with shore hardness of 55 to 60

The General construction of the glands shall be as per Fig-1. It mainly consists of the following parts

- a) Compression nut
- b) Gland body with hexagonal head
- c) Rubber ring
- d) Washers
- e) Check nut



Sl. No.	Part	Quantity
1	Compression nut	1
2	Gland body	1
3	Rubber ring	1
4	Washer	3
5	Check nut	1

FIG. 1 GENERAL ARRANGEMENT OF CABLE GLAND

5.0 General Construction

Gland body shall be made out of brass casting and machined to the final sizes. All the gland brass parts shall be nickel plated with minimum thickness of 10 microns.  
 Rubber Ring shall be made of synthetic rubber with a shore hardness of 55 to 60.  
 The nipples are normally threaded. These shall be metric threads of 1.5 pitch.  
 All external projecting edges and corners of gland components shall be rounded to reduce the danger of injury in handling or after installation. Internal edges shall be rounded to prevent damage to the cable.  
 The metal parts shall be free from blow holes and surface shall be machined smooth.  
 The dimensions of the gland and rubber ring shall be as per Table-1 of IS 12943 (as per attached Annexure II).

6.0 **Name plate and Marking**  
 The gland shall be suitably packed in carton. The carton shall have following information on it

- i) Manufacturer's name
- ii) Month and Year of manufacture
- iii) Property of TPCL

**TATA POWER COMPANY LIMITED, ODISHA**

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 4 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

iv) Type designation of gland

All Routine, Acceptance & Type Tests shall be carried out in accordance with relevant IS standards. Acceptance Tests shall be witnessed by TATA POWER – CODL's authorized representative

7.1 Type Test:  
Following Type tests are applicable for "Cable Glands "

S. No.	Test	Requirement	Reference Standard
1	Proof Torque Test	As specified in table 2 of IS 12943	IS 12943 clause 5.2
2	Tensile Test	As specified in table 2 of IS 12943	IS 12943 clause 5.3
3	Electrical Continuity Test	As specified in clause 5.4.1 of IS 12943	IS 12943 clause 5.4
4	Seal Test for degree of protection IP60	As specified in clause 5.5 of IS 12943	IS 2147 for IP 60
5	Thickness of nickel coating	Min 10 Microns	As specified in clause 4.2 of IS 12943

7.2 Routine Test & Acceptance Test on Cable glands:

Following Routine & acceptance tests are applicable for "Cable Glands "

S. No.	Test	Requirement	Reference Standard
1	Visual Inspection	The metal parts shall be free from blow holes and surface shall be machined smooth. All edges shall be deburred.	As per IS 12943 clause 4.3.4
2	Dimension check	Dimensions checks as specified in the specification as per table 1	As per TPCL specification clause 5.0
3	Symbol and marking check	As per TPCL specification clause 6.0	As per TPCL specification clause 6.0

8.0

**Type Test Certificate**

The Bidder shall furnish the type test certificates of the Gland for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA/any NABL accredited lab 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 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 TATA Power-CODL.

9.0

**Pre-dispatch inspection**

Equipment shall be subject to inspection by a duly authorized representative of TATA Power-CODL. Inspection may be made at any stage of manufacturing at the option of TATA Power-CODL and the

Initiator

HOG(ENGINEERING)

**TATA POWER COMPANY LIMITED, ODISHA**

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 5 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

		<p>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 TATA Power-CODL's representatives at all times when the work is in progress. Inspection by TATA Power-CODL's authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications.</p> <p>Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TATA Power-CODL</p> <p>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 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> </ul>
<b>10.0</b>	<b>Inspection after receipt at Stores</b>	Material received at TATA Power-CODL's 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 TATA Power-CODL up to a period of at least 12 months from the date of commissioning or 18 months from the date of last supplies made under the contract whichever is later.</p> <p>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 TATA Power-CODL, failing which TATA Power-CODL 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 TATA Power-CODL.</p>
<b>12.0</b>	<b>Packaging</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. The material used for packing shall be environmentally friendly
<b>13.0</b>	<b>Tender Sample</b>	Bidders are required to send two nos of the samples to TATA POWER-CODL for the approval of the product during tender and before manufacturing of the Lot.
<b>14.0</b>	<b>Training</b>	Detailed Installation instruction with drawings shall be provided by Bidder with tender documents in English Language.
<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>TATA Power-DDL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.</p>

Initiator	HOG(ENGINEERING)
-----------	------------------



**TATA POWER COMPANY LIMITED, ODISHA**

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision 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>

<b>16.0</b>	<b>Minimum Testing facilities</b>	Bidder shall have adequate in house/ out sourced 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"> <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>Manual/Catalogues</td> <td></td> <td align="center">√</td> <td align="center">√</td> </tr> <tr> <td>3</td> <td>Transport/ Shipping dimension drawing</td> <td></td> <td align="center">√</td> <td align="center">√</td> </tr> <tr> <td>4</td> <td>QA &amp;QC Plan</td> <td align="center">√</td> <td align="center">√</td> <td align="center">√</td> </tr> <tr> <td>5</td> <td>Routine, Acceptance and Type Test Certificates</td> <td align="center">√</td> <td align="center">√</td> <td align="center">√</td> </tr> </tbody> </table> <p>All the documents &amp; drawings shall be in English language.</p>	S. No.	Description	For Approval	For Review Information	Final Submission	1	Technical Parameters	√		√	2	Manual/Catalogues		√	√	3	Transport/ Shipping dimension drawing		√	√	4	QA &QC Plan	√	√	√	5	Routine, Acceptance and Type Test Certificates	√	√	√
S. No.	Description	For Approval	For Review Information	Final Submission																												
1	Technical Parameters	√		√																												
2	Manual/Catalogues		√	√																												
3	Transport/ Shipping dimension drawing		√	√																												
4	QA &QC Plan	√	√	√																												
5	Routine, Acceptance and Type Test Certificates	√	√	√																												
<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 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"> <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>	S.No.	Clause No.	Details of deviation with justifications																											
S.No.	Clause No.	Details of deviation with justifications																														

	<b>TATA POWER COMPANY LIMITED, ODISHA</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 7 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

<p>We confirm that there are no deviations apart from those detailed above.</p> <p>Seal of the Company: _____ Signature: _____</p> <p>Designation: _____</p>						

Annexure - I  
Inspection Testing Plan

S. No.	Name of test	Specified value(Range)	Reference documents	Test Result	Pass/Fail
1	Visual Inspection	The metal parts shall be free from blow holes and surface shall be machined smooth. All edges shall be deburred.	As per IS 12943 clause 4.3.4		
2	Dimension check	Dimensions checks as specified in the specification as per table 1	As per TPCL specification clause 5.0		
3	Symbol and marking check	As per TPCL specification clause 6.0	As per TPCL specification clause		

Initiator		HOG(ENGINEERING)	
-----------	--	------------------	--

**TATA POWER COMPANY LIMITED, ODISHA****TECHNICAL SPECIFICATION**

<b>Document Title</b>	Technical Specification – LV Cable Glands		
<b>Document No.</b>	ENG-LV-3006	<b>Eff. Date:</b> 01.04.2020	
<b>Revision No.</b>	00	<b>Page 8 of 8</b>	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

6.0

Initiator

HOG(ENGINEERING)

*Property of TPCL – Not to be reproduced without permission of TPCL*

	<b>TPCODL,Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 1 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

## **CONTENTS**

- 1.0 SCOPE
- 2.0 APPLICABLE STANDARDS
- 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION
- 4.0 GENERAL TECHNICAL REQUIREMENTS
- 5.0 GENERAL CONSTRUCTIONS
- 6.0 NAME PLATE AND MARKING
- 7.0 TESTS
- 8.0 TYPE TEST CERTIFICATES
- 9.0 PRE-DESPATCH INSPECTION
- 10.0 INSPECTION AFTER RECEIPT AT STORE
- 11.0 GUARANTEE
- 12.0 PACKING
- 13.0 TENDER SAMPLE
- 14.0 TRAINING
- 15.0 QUALITY CONTROL
- 16.0 MINIMUM TESTING FACILITIES
- 17.0 MANUFACTURING ACTIVITIES
- 18.0 SPARES, ACCESSORIES AND TOOLS
- 19.0 DRAWING AND DOCUMENTS
- 20.0 GURANTEED TECHNICAL PARTICULARS
- 21.0 SCHEDULE OF DEVIATIONS

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 2 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

<b>1.0</b>	<b>SCOPE</b>	<ol style="list-style-type: none"> <li>This Specification covers the technical requirements of design, manufacturing, testing at manufacturer's works, packing, forwarding, supply and unloading of polymer 11 kV, 3-pole 200 Amp and 400 Amps Air Break Gang Operated Switch at site / stores complete with all accessories.</li> <li>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>Such of the parts that may have not been specifically included, but otherwise form part of the GO Switch 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" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Indian Standards ( IS )</th> <th style="text-align: left;">Title</th> </tr> </thead> <tbody> <tr> <td>IS 9920</td> <td>High Voltage Switches for rated voltages above 11kV and up to and including 52kV</td> </tr> <tr> <td>IEC 61109</td> <td>Composite insulators for A.C. overhead line with nominal voltages greater than 1000V</td> </tr> <tr> <td>IEC 62271-102</td> <td>High Voltage switchgear and control gear- Part 102: Alternating current disconnectors and earthing switches</td> </tr> <tr> <td>IS: 2633</td> <td>Method for testing uniformity of coating on zinc coated articles</td> </tr> <tr> <td>IS: 2629</td> <td>Recommended practice for hot dip galvanizing of iron and steel</td> </tr> <tr> <td>IS 4759</td> <td>Hot-dip zinc coatings on structural steel and other allied product</td> </tr> </tbody> </table>	Indian Standards ( IS )	Title	IS 9920	High Voltage Switches for rated voltages above 11kV and up to and including 52kV	IEC 61109	Composite insulators for A.C. overhead line with nominal voltages greater than 1000V	IEC 62271-102	High Voltage switchgear and control gear- Part 102: Alternating current disconnectors and earthing switches	IS: 2633	Method for testing uniformity of coating on zinc coated articles	IS: 2629	Recommended practice for hot dip galvanizing of iron and steel	IS 4759	Hot-dip zinc coatings on structural steel and other allied product
Indian Standards ( IS )	Title															
IS 9920	High Voltage Switches for rated voltages above 11kV and up to and including 52kV															
IEC 61109	Composite insulators for A.C. overhead line with nominal voltages greater than 1000V															
IEC 62271-102	High Voltage switchgear and control gear- Part 102: Alternating current disconnectors and earthing switches															
IS: 2633	Method for testing uniformity of coating on zinc coated articles															
IS: 2629	Recommended practice for hot dip galvanizing of iron and steel															
IS 4759	Hot-dip zinc coatings on structural steel and other allied product															

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 3 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

<b>3.0</b>	<b>CLIMATIC CONDITIONS OF THE INSTALLATION</b>	The material shall be suitable for following climatic conditions,		
		1	Maximum ambient temperature	50 deg.C
		2	Max. Daily average ambient temp	40 deg.C
		3	Min Ambient Temperature	0 deg.C
		4	Maximum Humidity	100%
		5	Minimum Humidity	10%
		6	Average Annual Rainfall	750mm
		7	Average No. of rainy days per annum	60
		8	Rainy months	June to Oct.
		9	Altitude above MSL not exceeding	300m
		10	Wind Pressure	126 kg/m <sup>2</sup> up an elevation of 10 m
		The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.		

<b>4.0 GENERAL TECHNICAL REQUIREMENTS</b>				
<b>S No</b>	<b>Description</b>	<b>Units</b>	<b>Requirements</b>	
1.	Rating of GO Switch		400 Amps GO Switch	200 Amps GO Switch
2.	Installation		Outdoor	Outdoor
3.	Type		3 Pole	3 Pole
4.	Service Voltage		11 kV	11 kV
5.	Rated Voltage		12 kV	12 kV
6.	Rated Frequency		50 Hz	50 Hz
7.	Current Carrying Capacity		400 Amps	200 Amps
8.	Rated short time current		28 kA for 1sec	16 kA for 1sec
9.	Rated peak withstand current		70 kA	40 kA
10.	Rated main active load breaking capacity		10 Amp	10 Amp
11	Rated off-loads breaking capacity		6.3 A	6.3 A
12	Power Frequency withstand voltage between pole and earth		28kV	28kV
13	Power frequency withstand voltage across the isolation distance		32kV	32kV
14	No. of Post Per Phase		3	3
15	Total No. of post		9	9
16	Minimum Creepage Distance		320 mm	320mm
17	Phase to Phase Clearance		750mm	750mm
18	Isolation Distance		310mm	310 mm
19	Size of flexible tinned copper braid/rope (with 2A/mm <sup>2</sup> current density)		200 sq.mm	100 sq.mm

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

<b>TPCODL, Bhubaneswar</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date:</b> 01-06-2020	
<b>Revision No.</b>	00	Page 4 of 14	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By:</b> Parveen Verma

20	Minimum length of insulated tinned copper braid/rope per phase		650 mm	650 mm
23	Size of fixed contacts (with 2 A/mm <sup>2</sup> current density)		200 sq. mm	100 sq. mm
24	Current density of tinned Copper		< 2 Amps/mm <sup>2</sup>	< 2 Amps/mm <sup>2</sup>
25	Size of rods used for arcing horns		8 mm	8 mm
26	Insulation for tinned Copper braid/rope		Polyolefin of woer make, (RSFR-H) type	Polyolefin of woer make, (RSFR-H) type
27	Minimum size*Length of Coupling GI Solid Rod		25*25*2200mm	25*25*2200mm
28	Minimum Thickness of GI Strip (Pentograph)		20mm * 3mm	20mm * 3 mm
29	Temperature Rise Limit (w.r.t ambient temp) - Tinned Copper contacts - Terminals - Metal Parts		50 <sup>o</sup> C 40 <sup>o</sup> C 40 <sup>o</sup> C	50 <sup>o</sup> C 40 <sup>o</sup> C 40 <sup>o</sup> C

<b>5.0</b>	<b>GENERAL CONSTRUCTION</b>	<ol style="list-style-type: none"> <li>1. The Air break switch shall be outdoor type, triple pole gang operated and shall be suitable for vertical installation.</li> <li>2. The Cantilever type operating mechanism shall be suitable for manual operation from ground level and shall be designed in such way that all the three phases shall open and close simultaneously in smooth way.</li> <li>3. The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 8mm M.S. Hot dip galvanized, arcing horn shall be bolted on double bolt.</li> <li>4. The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer.</li> <li>5. Each joint shall be provided with one plane and one spring of not less than 2mm thickness.</li> <li>6. Connectors shall be of tinned copper.</li> <li>7. All current carrying parts should have current density less than 2Amps/mm<sup>2</sup> &amp; minimum cross section for fixed contact shall be 200 sq.mm for 400 Amp GO Switch and 100 sq.mm for 200 Amp GO Switch.</li> <li>8. Tinned Copper braid/rope shall be insulated by Polyolefin of woer make, (RSFR-H) type to prevent animal electrocution.</li> <li>9. All ferrous parts shall be hot dip galvanized with heavy coating after proper surface treatment as per standards. Coating thickness shall not be less than 86micron at any point.</li> <li>10. All Copper parts shall be heavily tinned plated as per relevant standards and coating thickness not less than 30micron at any point.</li> <li>11. Equipment grounding shall be provided by bidder at two points with terminals.</li> <li>12. The GI strip of the pantograph should be riveted, full threaded bolts in the pantograph will not be accepted.</li> <li>13. Metal Pantograph shall be connected through insulator on live post to prevent flow of parallel current.</li> </ol>
------------	-----------------------------	---

Initiator	HOG (Engineering)
-----------	----------------------

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date:</b> 01-06-2020	
<b>Revision No.</b>	00	Page 5 of 14	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

		<p>14. Metal Pentagraph must be insulated with polyolefin.</p> <p>15. All the nut bolt used must be Hot dip Galvanized and of size not less than M10.</p> <p>16. A rigid base of galvanized steel channel of size approx. 75x40x6mm shall be provided with suitable holes, clamps and bolts for vertical mounting firmly on steel structure.</p> <p>17. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.</p>
<b>5.1</b>	<b>SILICONE RUBBER POST INSULATOR</b>	<p>1. All insulators provided to form a stack shall conform to the relevant standard specifications.</p> <p>2. Composite insulator's shed and sheath shall be made of High Temperature Vulcanizing (HTV) type silicone rubber having silicone polymer content by weight 30% minimum.</p> <p>3. The sheath and shed shall have excellent Hydrophobic and anti-tracking properties.</p> <p>4. The composite polymer weathersheds made via injection molded and shall be free from imperfections, dust and air bubble etc. It should protect the FRP rod against environmental influences, external pollution and humidity.</p> <p>5. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer.</p> <p>6. The FRP rods used for insulator shall be of glass-fiber reinforced epoxy resin rod of high strength (FRP rod).</p> <p>7. 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.</p> <p>8. Glass fibers and resin shall be optimized in the FRP rod.</p> <p>9. The end fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminum alloy.</p> <p>10. Metal end fitting shall be suitable for hardware support of respective specified mechanical load and shall be hot dip galvanized with average minimum of 115micron and no value less than 90micron in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique.</p> <p>11. The OD of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is molded over it. The material used in fittings shall be corrosion resistant.</p> <p>12. The Post insulator shall be homogenous and free from all the cavities and flaws.</p> <p>13. Design of insulators shall ensure ample insulation, mechanical strength and rigidity for satisfactory operation under site conditions.</p> <p>14. The design shall also ensure that the losses caused by capacitive current or conduction through dielectric are minimum and that the leakage due to moist and dirty insulators surfaces is least.</p> <p>15. All metal caps and supports shall be crimped to the FRP rod.</p> <p>16. There should be a closed ring of Stainless steel of 0.3x1mm at insulated bottom of the insulators.</p>
<b>5.2</b>	<b>FIXED AND MOVABLE CONTACT SYSTEM</b>	<p>1. The material of the fixed and moving contacts shall be electrolytic hard drawn copper (min. 95% copper) heavily tinned Coated.</p>

Initiator		HOG (Engineering)	
-----------	--	----------------------	--



	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date:</b> 01-06-2020	
<b>Revision No.</b>	00	Page 6 of 14	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By :</b> Parveen Verma

		<ol style="list-style-type: none"> <li>2. The contact shall be of high pressure and self-aligning type with positive wiping action and minimum contact pressure shall be ¼ gram per amp of current carrying capacity.</li> <li>3. The fixed contact shall have insulating bushes at spring ends and proper guide arrangement for preventing misalignment of springs.</li> <li>4. The minimum distance between the fixed and the nearest part on the moving contact in the completely open position shall not be less than the defined value in GTP.</li> <li>5. The withstand level across the break, shall be as specified under Type test.</li> </ol>
<b>5.3</b>	<b>TERMINATIONS</b>	<ol style="list-style-type: none"> <li>1. The electrical terminations shall be made of tinned copper with minimum cross section and rating equivalent to fixed contact.</li> <li>2. The terminations shall be suitable for connections for AL conductor with AL Lug.</li> <li>3. Incoming terminal shall be of extended dimension for LILLO connections, there should be provision for connecting two nos. of Al Lugs.</li> <li>4. For outgoing side, there should be provision for connecting one nos. of connections.</li> <li>5. All nut bolts, washer, spring washers required for connections shall be provided with equipment.</li> </ol>
<b>5.4</b>	<b>OPERATING MECHANISM</b>	<ol style="list-style-type: none"> <li>6. Bidder shall provide Galvanized operating Cantilever made from Channel of 50*50*6 mm as per drawing attached annexure.</li> <li>7. There shall be provision to fix Eye hook with rod diameter of 18mm for pulling arrangement for both ON and OFF operations manually.</li> <li>8. There shall not be any misalignment in post insulators/complete assembly and the touch time of main contacts of all poles shall be same i.e. at the time of closing, the moving main contacts of all poles shall come in touch with fix contact at the same instance.</li> <li>9. There shall not be any discrepancy in contact touch timing while operations.</li> <li>10. At the time of installation if any issue arises because of alignment, then the bidder shall extend the support in attaining the same or replacing the GO switch with in 15days.</li> <li>11. Suitable padlock/locking arrangement shall be provided for locking the operating cantilever in OFF position.</li> </ol>
<b>5.5</b>	<b>MECHANICAL STRENGTH</b>	<ol style="list-style-type: none"> <li>1. GO switches shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability or current carrying properties.</li> <li>2. GO switches inclusive of their operating mechanism shall not come out of their open or closed positions by gravity, wind pressure, vibrations or reasonable shocks.</li> <li>3. GO switches shall be capable of resisting in closed position dynamic and thermal effects of the maximum possible short circuit current at the installation point and should not open under the influence of short circuit current.</li> </ol>
<b>6.0</b>	<b>NAME PLATE AND MARKING</b>	<p>Below parameters should be embossed on SS sheet of thickness 1mm with black background. It should be riveted on MS channel of switch :</p> <ol style="list-style-type: none"> <li>1. Rated Voltage</li> </ol>

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date:</b> 01-06-2020	
<b>Revision No.</b>	00	Page 7 of 14	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By:</b> Parveen Verma

		<ol style="list-style-type: none"> <li>2. Manufacturer's Name</li> <li>3. Month/Year of Manufacture</li> <li>4. Serial Number</li> <li>5. PO no.</li> <li>6. Rated normal current in Amps</li> <li>7. Rated one second short-time current in Amps</li> </ol>																																			
<b>7.0</b>	<b>TESTS</b>	<ol style="list-style-type: none"> <li>1. All routine, acceptance &amp; type tests shall be carried out in accordance with the relevant IS 9921 and relevant IEC.</li> <li>2. All routine/acceptance tests shall be witnessed by the TPDDL authorized representative.</li> <li>3. All the components and fittings shall also be type tested as per the relevant standards.</li> <li>4. <b>Following tests for Air Break GO Switch should be done as per relevant IS/IEC standards:</b></li> </ol>																																			
<b>7.1</b>	<b>ROUTINE TEST</b>	<ol style="list-style-type: none"> <li>1. Power Frequency Voltage dry test</li> <li>2. Dimensional Check</li> <li>3. Satisfactory Operation Test</li> <li>4. Measurement of resistance in main circuit</li> <li>5. Voltage test for auxiliary circuit</li> </ol>																																			
<b>7.2</b>	<b>ACCEPTANCE TEST</b>	<table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Test to be done</th> <th>Reference BIS</th> <th>Clause no.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Power Frequency Voltage Dry test</td> <td>IS 9920 part-4</td> <td>4.1</td> </tr> <tr> <td>2</td> <td>Satisfactory Operation Test</td> <td>IS 9920 part-4</td> <td>4.3</td> </tr> <tr> <td>3</td> <td>Measurement of resistance in main circuit</td> <td>IS 9920 part-4</td> <td>4.2</td> </tr> <tr> <td>4</td> <td>Visual and Dimensional checks</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Verification of metallic or no nonmetallic dust and air bubbles with in polymeric housing and shed of insulator (Destructive test)</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>Voltage test for auxiliary circuit</td> <td>IS 9920 part-4</td> <td>4.01 &amp; 3.1.11</td> </tr> <tr> <td>7</td> <td>Galvanizing test for– i. GI pantograph ii. Operating Rod, cantilever, channel and base structure iii. Post Insulator parts iv. Nut bolts</td> <td>IS 4759</td> <td>cl.9</td> </tr> </tbody> </table>	Sr. No.	Test to be done	Reference BIS	Clause no.	1	Power Frequency Voltage Dry test	IS 9920 part-4	4.1	2	Satisfactory Operation Test	IS 9920 part-4	4.3	3	Measurement of resistance in main circuit	IS 9920 part-4	4.2	4	Visual and Dimensional checks			5	Verification of metallic or no nonmetallic dust and air bubbles with in polymeric housing and shed of insulator (Destructive test)			6	Voltage test for auxiliary circuit	IS 9920 part-4	4.01 & 3.1.11	7	Galvanizing test for– i. GI pantograph ii. Operating Rod, cantilever, channel and base structure iii. Post Insulator parts iv. Nut bolts	IS 4759	cl.9			
Sr. No.	Test to be done	Reference BIS	Clause no.																																		
1	Power Frequency Voltage Dry test	IS 9920 part-4	4.1																																		
2	Satisfactory Operation Test	IS 9920 part-4	4.3																																		
3	Measurement of resistance in main circuit	IS 9920 part-4	4.2																																		
4	Visual and Dimensional checks																																				
5	Verification of metallic or no nonmetallic dust and air bubbles with in polymeric housing and shed of insulator (Destructive test)																																				
6	Voltage test for auxiliary circuit	IS 9920 part-4	4.01 & 3.1.11																																		
7	Galvanizing test for– i. GI pantograph ii. Operating Rod, cantilever, channel and base structure iii. Post Insulator parts iv. Nut bolts	IS 4759	cl.9																																		
<b>7.3</b>	<b>TYPE TEST</b>	<ol style="list-style-type: none"> <li>1. Test for Temperature rise as per IS 9920 part4 cl.3.2.</li> <li>2. Test to verify the insulation level including withstand test at power frequency voltages on auxiliary equipment test as per IS 9920 part4 cl. 3.1.</li> <li>3. Test to prove satisfactory operation and mechanical endurance as per IS 9920 part4 cl.3.5.</li> <li>4. Making and braking test as per IS 9920 part4 cl.3.3.</li> </ol>																																			

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date:</b> 01-06-2020	
<b>Revision No.</b>	00	Page 8 of 14	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By :</b> Parveen Verma

		<p>5. Test to prove the capability of the switch to carry the rated peak withstand current and rate short circuit current as per IS 9920 part4 cl.3.4.</p> <p>6. Test to prove satisfactory operation under ice conditions as per IS 9920 part4 cl.3.6.</p>
<b>8.0</b>	<b>TYPE TEST CERTIFICATES</b>	The bidder shall furnish the type test certificates as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA/NABL accredited LAB 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 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.
<b>9.0</b>	<b>PRE-DESPATCH INSPECTION</b>	<p>Equipment shall be subject to inspection by a duly authorized representative of TPDDL. 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. 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 TPDDL or 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 TPDDL</p> <p>Following documents shall be sent along with material:</p> <ol style="list-style-type: none"> <li>a) Test report</li> <li>b) MDCC issued by TPDDL</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>
<b>10.0</b>	<b>INSPECTION AFTER RECEIPT AT STORE</b>	The material received at TPDDL 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>	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges( @ 20% of expenses incurred), from the supplier or from the " Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 9 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

		THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company
<b>12.0</b>	<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. <b>Note: One use plastic not to be used for packing of the material.</b>
<b>13.0</b>	<b>TENDER SAMPLE</b>	One no. Sample of braided tinned Copper to be submitted during technical bid submission along with current density calculation.
<b>14.0</b>	<b>TRAINING</b>	The bidder shall arrange to provide training of our staff if required for installation & commissioning or maintenance etc.
<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. TATA POWER-DDL'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>1. 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>2. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.</li> <li>3. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections</li> <li>4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.</li> <li>5. QAP withhold points for TATA POWER- DDL inspection.</li> </ol>
<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 and pre-dispatch inspection as per relevant International / Indian standards.
<b>17.0</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>18.0</b>	<b>SPARES, ACCESSORIES AND TOOLS</b>	1. Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. The Purchaser may order all or any of the spare part listed at the time of award of contract and

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 10 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

		<p>these parts shall be supplied as a part of definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract document.</p> <p>2. Bidder shall give an assurance that the reparability of GO Switch, spare parts and consumable items will continue to be available through the life of the equipment which shall be 15 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.</p> <p>3. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification.</p>
<b>19.0</b>	<b>DRAWINGS AND DOCUMENTS</b>	<p>Following drawings and documents shall be prepared based on TATA POWER- DDL 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 GO Switch.</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> <li>Current density calculation of tinned braided Copper.</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 GO Switch (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).</li> <li>Terminal and connection drawings</li> <li>Manual catalogue</li> <li>Instructions for use</li> <li>Transport/shipping dimension drawing</li> <li>Type Test Certificates.</li> <li>Installation/ Mounting Instructions/Drawing.</li> <li>Quality Assurance plan.</li> </ol> <p><b><u>List of Calculations to be submitted:</u></b></p>

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 11 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

		<p>All the calculations shall be step by step showing the use of formulas and other practical considerations. <b>Concise calculations in table or excel sheet shall not be accepted.</b> Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.</p> <ol style="list-style-type: none"> <li>Short Circuit withstand.</li> <li>Temperature Rise Calculations.</li> </ol> <p><b>Additional Documents to be submitted :</b></p> <ol style="list-style-type: none"> <li>List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.</li> <li>Type test certificates of the raw materials and bought out accessories.</li> <li>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.</li> </ol> <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 TATA POWER- DDL for approval.</p> <p><b>Instruction Manuals:</b> 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>						
<b>20.0</b>	<b>GUARANTEED TECHNICAL PARTICULARS</b>	<b>All clauses and points in the Specification to be complied for along with GTR.</b>						
<b>21.0</b>	<b>SCHEDULE OF DEVIATIONS</b>							
	<b>(TO BE ENCLOSED WITH THE BID)</b>							
	<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"> <thead> <tr> <th><b>S.No.</b></th> <th><b>Clause No.</b></th> <th><b>Details of deviation with justifications</b></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. Seal of the Company: Signature  Designation</p>		<b>S.No.</b>	<b>Clause No.</b>	<b>Details of deviation with justifications</b>			
<b>S.No.</b>	<b>Clause No.</b>	<b>Details of deviation with justifications</b>						

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 12 of 14</b>	
<b>Prepared By:</b> <b>Rakesh Kumar</b>	<b>Reviewed By:</b> <b>Ravindra Bhanage</b>	<b>Approved By:</b> <b>Sanjeev Atri</b>	<b>Issued By :</b> <b>Parveen Verma</b>

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

<b>TPCODL, Bhubaneswar</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 13 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By :</b> Parveen Verma

## **ANNEXURE-I**

### **INSPECTION TEST PLAN FOR PRE-DELIVERY OF GO SWITCH**

1	Name of the firm / BA	
2	Date of inspection	
3	Details of offer made	
	(i) Order No. and date	
	(ii) Rating	
	(iii) Quantity	
	(iv) Sl. No. of material offered	
4	Sample Quantity	Sr. No. ....

### **ACCEPTANCE TESTS TO BE CARRIED OUT**

<b>S No.</b>	<b>PARTICULARS</b>	<b>Specified Value</b>	<b>Reference documents</b>	<b>Test Results</b>	<b>Pass/Fail</b>
1	Power Frequency Voltage Dry Withstand test	35KV	IS 9920 part-4 cl.4.1		
2	Satisfactory Operation Test	satisfactory	IS 9920 part-4 cl.4.3		
3	Measurement of resistance in main circuit	GTP	IS 9920 part-4 cl.4.2		
4	Voltage test for auxiliary circuit		IS 9920 part-4 cl.4.01 & 3.1.11		
5	Visual and Dimensional checks	GTP/TPDDL Specification			
6	Verification of metallic or nonmetallic dust and air bubbles within polymeric housing of Post insulator (Destructive test)	Free from metallic or nonmetallic dust, air bubbles etc.			
7	Mechanical strength test	GTP			
8	Galvanizing test for– i. GI pantograph ii. Operating Rod, cantilever, channel and base structure iii. Post Insulator parts iv. Nut bolts	- GI Coating min. >86micron - Uniform GI coating - Free from rust, burr deformation	IS 4759 cl.9		
9	Verification of Raw material TC, invoice and its consumption record	Record must be maintained for each raw material			

PURCHASER'S OFFICER

BIDDER'S REPRESENTATIVE

DATE OF INSPECTION

Initiator		HOG (Engineering)	
-----------	--	----------------------	--



	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 11 kV, 200 Amps and 400 Amps Polymeric GO Switches		
<b>Document No.</b>	ENG-HV-2007	<b>Eff. Date: 01-06-2020</b>	
<b>Revision No.</b>	00	<b>Page 14 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By :</b> Parveen Verma

## ANNEXURE – II

### SOURCE OF MATERIAL/PLACES OF MANUFACTURE, TESTING AND INSPECTION

S No.	Item	Source of Material	Place of Manufacture	Place of testing and Inspection
1	Steel (channel, angle etc)			
2	Galvanizer			
3	Zinc			
4	Silicon Rubber			
5	FRP Rod			
6	Insulation			
7	Tinned Copper braid/rope			
8	Copper for terminal & contacts			

Initiator		HOG (Engineering)	
-----------	--	----------------------	--

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date: 01/06/2020	
<b>Rev. No</b>	00	Page 1 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

### **CONTENTS**

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

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 2 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

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>

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 3 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

<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 (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

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 4 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

(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

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%

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 5 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		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:

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 6 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

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>

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 7 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

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 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>

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



<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 8 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		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

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 9 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

	<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 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="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 Information</th> <th style="width: 10%;">Final Submission</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Technical Parameters</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">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	√		√													

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	<b>Date:</b>	
<b>Rev. No</b>	00	<b>Page 10 of 12</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

				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.  <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>	SI 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				

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 11 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

		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	

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

<b>TATA POWER COMPANY LIMITED, BHUBANESWAR</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Doc. Title</b>	<b>Specification of 11kV Polymer Ball and Socket Disc Insulator 70 KN</b>		
<b>Doc. No</b>	ENG-HV-100	Date:	
<b>Rev. No</b>	00	Page 12 of 12	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

20.0	<b>SCHEDULE OF DEVIATIONS</b> <b>(TO BE ENCLOSED WITH TECHNICAL BID)</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:						
		<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>	S.No.	Clause No.	Details of deviation with justifications			
S.No.	Clause No.	Details of deviation with justifications						
		<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 Signature</b></p>						

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

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightening Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 1 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Atri	<b>Issued By :</b> Parveen Verma


## **CONTENTS**

- 1.0 SCOPE
- 2.0 APPLICABLE STANDARDS
- 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION
- 4.0 GENERAL TECHNICAL REQUIREMENTS
- 5.0 GENERAL CONSTRUCTIONS
- 6.0 NAME PLATE AND MARKING
- 7.0 TESTS
- 8.0 TYPE TEST CERTIFICATES
- 9.0 PRE-DESPATCH INSPECTION
- 10.0 INSPECTION AFTER RECEIPT AT STORE
- 11.0 GUARANTEE
- 12.0 PACKING
- 13.0 TENDER SAMPLE
- 14.0 TRAINING
- 15.0 QUALITY CONTROL
- 16.0 MINIMUM TESTING FACILITIES
- 17.0 MANUFACTURING ACTIVITIES
- 18.0 SPARES, ACCESSORIES AND TOOLS
- 19.0 DRAWING AND DOCUMENTS
- 20.0 GURANTEED TECHNICAL PARTICULARS
- 21.0 SCHEDULE OF DEVIATIONS

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 2 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

<b>1.0 SCOPE</b>	<p>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.</p> <p>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</p> <p>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.</p>														
<b>2.0 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" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Indian Standards ( IS /IEC</th> <th style="text-align: left;">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.														


Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	Page 3 of 14	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

<b>3.0</b>	<b>CLIMATIC CONDITIONS OF THE INSTALLATION</b>	The material shall be suitable for following climatic conditions,		
		1	Maximum ambient temperature	50 deg.C
		2	Max. Daily average ambient temp	40 deg.C
		3	Min Ambient Temperature	0 deg.C
		4	Maximum Humidity	90%
		5	Minimum Humidity	20%
		6	Average Annual Rainfall	760mm
		7	Average No. of rainy days per annum	60
		8	Rainy months	June to Oct.
		9	Altitude above MSL not exceeding	300m
		10	Wind Pressure	126 kg/m <sup>2</sup> up an elevation of 10 m
		The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.		

<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 molding	Metal Oxide gapless cage type
3	Housing Material	Injection molded silicone rubber	Injection molded 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	7.2 kV (rms)	7.2 kV (rms)
8	Arrester Rating Ur	9 kV (rms)	9 kV (rms)
9	Nominal Discharge Current In	10 kA	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>
13	Insulation Voltage Withstand on Arrester Housing		
13.1	Power Frequency Voltage (Dry/ Wet) for one minute.	28 kV (rms)	28 kV (rms)


Initiator		HOG (Engineering)	
-----------	---	----------------------	--



## TECHNICAL SPECIFICATION

Document Title	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
Document No.	ENG-HV-2004	Eff. Date: 01/06/2020	
Revision No.	00	Page 4 of 14	
Prepared By: Rakesh Kumar Ravindra Bhanage	Reviewed By: Ravindra Bhanage	Approved By: Sanjeev Kumar Atri	Issued By : Parveen Verma

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>	100 (kAp)
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
15.1	Disconnecter connecting lead	<b>Insulated flexible tinned plated copper braid with lugs</b>	<b>Insulated flexible tinned plated copper braid with lugs</b>
15.2	Size of Insulated Tinned copper braid	<b>25 sqmm</b>	<b>25 sqmm</b>
15.3	Length of Insulated Tinned copper braid	<b>300 mm</b>	<b>300 mm</b>
16	Material of Insulating Bracket	<b>UV resistant Fire retardant DMC</b>	<b>UV resistant Fire retardant DMC</b>
17	Material of End fittings	<b>Machined / pressure die casted Aluminum</b>	<b>Machined / pressure die casted Aluminum</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


Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 5 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

29	The bolt grade	All hardware bolt shall be of 8.8 grade	All hardware bolt shall be of 8.8 grade
----	----------------	---	---


<b>5.0</b>	<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 molded units with <b>absolutely no air volume inside</b>, suitable for mounting on bracket. <b>Arresters of tubular construction i.e arresters assembled in hollow core insulators with enclosed air volume are not acceptable</b></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 aluminum 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>
<b>5.1</b>	<b>ASSEMBLY</b>	<ol style="list-style-type: none"> <li>Lightning arrester shall be supplied along with disconnecter, insulating braket, 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 Aluminum 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> </ol>

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 6 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma


		<p>11. All similar parts, particularly removable ones, shall be interchangeable.</p> <p>12. The arrester shall have thermal stability to withstand the heat generated from the ZnO element due to continuous operating voltage and surges.</p> <p>13. The 9kV 10kA station class Lightning Arrester shall have L-shaped terminal clamp suitable for conductor size of 9mm-16mm diameter.</p>
<b>5.2</b>	<b>DISCONNECTOR</b>	<p>1. Each individual unit of Lightning Arrester with disconnecter shall be hermetically sealed and fully protected against ingress of moisture.</p> <p>2. The hermetic seal shall be effective for the entire life time of the Lightning Arrester with disconnecter under the specified service conditions.</p> <p>3. Disconnectors shall give the visible indication of the failed arrester.</p> <p>4. The Lightning Arrester with disconnecter shall be suitable for bracket type mounting. .</p> <p>5. The corresponding units of Lightning Arrester with disconnecter of the same rating shall be interchangeable without adversely affecting the performance.</p> <p>6. 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.</p> <p>7. The mounting details for mounting the Lightning Arrester with disconnecter on purchaser's support shall be given along with the bid.</p>
<b>5.3</b>	<b>MOUNTING BRACKET</b>	<p>1. The 9kV 10kA Distribution class Lightning Arrester shall be fixed over a mounting bracket made of UV resistance, Fire retardant DMC material.</p> <p>2. 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</p>
<b>5.4</b>	<b>MECHANICAL STRENGTH</b>	<p>1. The Lightning Arrester and its base shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability.</p> <p>2. The Lightning Arrester shall not come out of their positions by gravity, wind pressure, vibrations or reasonable shocks.</p>
<b>6.0</b>	<b>NAME PLATE AND MARKING</b>	<p>1. The Lightning Arrester shall be provided with durable and legible name plate embossing, effectively secured against removal.</p> <p>2. The name plate shall be indelibly and distinctly marked with all essential particulars as per the relevant standards along with the following :</p> <p>3. The Name plate/product shall have marking of "PO no. with date" &amp; "Property of TATA POWER - CODL"</p> <p>4. The following information shall be mentioned on the Name Plate:</p> <ul style="list-style-type: none"> <li>i. Continuous operating Voltage</li> <li>ii. Rated Voltage</li> <li>iii. Rated Frequency</li> <li>iv. Nominal Discharge Current</li> </ul>

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 7 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma


		<p>v. Manufacturer's Name vi. Type and Identification of the complete arrester vii. Year of Manufacture viii. Serial Number</p>																																							
<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> <li>Following tests shall be necessarily conducted on the Lightning Arrester in addition to others specified in IS/IEC standards.</li> </ol> <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>7.1</b>	<b>TYPE TEST</b>	<p><b>List of type test Reports to be submitted along with offer as per IEC 60099-4 Ed.3</b></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> </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
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																																							

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**

<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date:</b> 01/06/2020	
<b>Revision No.</b>	00	Page 8 of 14	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

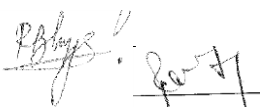
		<table border="1"> <tr> <td>13</td> <td>Temperature cycling and seal pumping test on Disconnector</td> <td>As per IEC 60099-4 Ed.3 clause 8.9.5</td> </tr> <tr> <td>14</td> <td>Short-circuit tests a. High current SC b. Low current SC</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.10</td> </tr> <tr> <td>15</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 withstand of internal components</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.15</td> </tr> <tr> <td>19</td> <td>Test of internal grading components</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.16</td> </tr> <tr> <td>20</td> <td>Thermal cyclic test</td> <td>As per IEC 60099-4 Ed.3 clause 8.16.2</td> </tr> <tr> <td>21</td> <td>Weather aging Test for 1000 hours of slat fog test and 1000 hours of UV test</td> <td>As per IEC 60099-4 Ed.3 clause 10.8.17</td> </tr> </table>	13	Temperature cycling and seal pumping test on Disconnector	As per IEC 60099-4 Ed.3 clause 8.9.5	14	Short-circuit tests a. High current SC 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 withstand of internal components	As per IEC 60099-4 Ed.3 clause 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
13	Temperature cycling and seal pumping test on Disconnector	As per IEC 60099-4 Ed.3 clause 8.9.5																											
14	Short-circuit tests a. High current SC 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 withstand of internal components	As per IEC 60099-4 Ed.3 clause 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. Disconnector Assembly- Proper assembly of each disconnector has to be demonstrated by either measurement of resistance / capacitance or partial discharges.</li> </ol>																											

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

**TECHNICAL SPECIFICATION**


<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 9 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

<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/TATA POWER-CODL Specification</td> </tr> <tr> <td>7</td> <td>Verification of type test of ZnO Blocks</td> <td>Document Verification</td> </tr> <tr> <td>8</td> <td>Peel off test (removal of housing)</td> <td>Samples shall confirm to the specified design. Samples shall be free from air void, cavity and other visual defects. shall be Design conformation verification.</td> </tr> <tr> <td>9</td> <td>Thermal stability test</td> <td>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</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/TATA POWER-CODL Specification	7	Verification of type test of ZnO Blocks	Document Verification	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
		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/TATA POWER-CODL Specification																												
		7	Verification of type test of ZnO Blocks	Document Verification																												
		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- TATA POWER-CODL. 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>The bidder shall furnish the type test certificates as mentioned above as per the corresponding standards.</li> <li>All the tests shall be conducted at CPRI / ERDA as per the relevant standards.</li> <li>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>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 TATA POWER-CODL.</li> </ol>																														
<b>9.0</b>	<b>PRE-DESPATCH INSPECTION</b>	<ol style="list-style-type: none"> <li>Equipment shall be subject to inspection by a duly authorized representative of TATA POWER-CODL.</li> </ol>																														

Initiator		HOG (Engineering)	
-----------	---	----------------------	--


	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 10 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

		<ol style="list-style-type: none"> <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 TATA POWER-CODL's representatives at all times when the work is in progress.</li> <li>4. Inspection by TATA POWER-CODL 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 TATA POWER-CODL.</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 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> </li> </ol>
<b>10.0</b>	<b>INSPECTION AFTER RECEIPT AT STORE</b>	The material received at TATA POWER-CODL 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>1. 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>2. 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>1. 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> </ol>

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightening Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 11 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

		<p>2. 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.</p> <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. TATA POWER-CODL'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>1. 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>2. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.</li> <li>3. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections</li> <li>4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.</li> <li>5. QAP withhold points for TATA POWER- CODL inspection.</li> </ol>
<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 and pre-dispatch inspection as per relevant International / Indian standards.
<b>17.0</b>	<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 Tata POWER-CODL.</p>
<b>18.0</b>	<b>SPARES, ACCESSORIES ND TOOLS</b>	Not Applicable
<b>19.0</b>	<b>DRAWINGS AND DOCUMENTS</b>	Following drawings and documents shall be prepared based on TATA POWER- CODL specifications and statutory requirements and shall be submitted with the bid:


Initiator		HOG (Engineering)	
-----------	---	----------------------	--



**TECHNICAL SPECIFICATION**


<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightening Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 12 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

		<p>a. Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details.</p> <p>b. Description of the equipment and all components including brochures.</p> <p>c. General Drawing arrangement of lightening arrester.</p> <p>d. Sectional drawing showing internal blocks etc.</p> <p>e. Bill of material.</p> <p>f. Experience Certificate and list.</p> <p>g. Type test certificates.</p> <p>h. List of makes of major components.</p> <p><b>Drawings / documents to be submitted after the award of the contract are as under:</b></p> <p><b>List of Drawings/Parameters to be submitted:</b></p> <ol style="list-style-type: none"> <li>1. 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>2. General Arrangement Drawing of the Lightening arrester (Front view and Top view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).</li> <li>3. Sectional drawing showing the blocks arrangement.</li> <li>4. Terminal and connection drawings</li> <li>5. Type Test Certificates.</li> <li>6. Installation/ Mounting Instructions/Drawing.</li> </ol> <p><b>Additional Documents to be submitted :</b></p> <ol style="list-style-type: none"> <li>a. List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.</li> <li>b. Type test certificates of the raw materials and bought out accessories.</li> <li>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.</li> </ol> <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 TATA POWER- CODL for approval.</p> <p><b>Instruction Manuals:</b> 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>
--	--	--

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightening Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 13 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

<b>20.0</b>	<b>GUARANTEED TECHNICAL PARTICULARS</b>	<b>All clauses and points in the Specification to be complied for along with GTR.</b>						
<b>21.0</b>	<b>SCHEDULE OF DEVIATIONS</b>							
	<b><u>(TO BE ENCLOSED WITH THE 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:							
	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 10%;">S.No.</th> <th style="width: 20%;">Clause No.</th> <th style="width: 70%;">Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td style="height: 50px;"></td> <td></td> <td></td> </tr> </tbody> </table>		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							


Initiator		HOG (Engineering)	
-----------	---	----------------------	--

	<b>TPCODL, Bhubaneswar</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification of 9kV 10kA Distribution Class and Station Class Polymeric Lightning Arrester		
<b>Document No.</b>	ENG-HV-2004	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	<b>Page 14 of 14</b>	
<b>Prepared By:</b> Rakesh Kumar Ravindra Bhanage	<b>Reviewed By:</b> Ravindra Bhanage	<b>Approved By:</b> Sanjeev Kumar Atri	<b>Issued By :</b> Parveen Verma

## 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/TATA POWER-CODL 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 disconnector 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	Disconnector 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.

Initiator		HOG (Engineering)	
-----------	---	----------------------	--

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>		
<b>Document No.</b>	ENG-C-17	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	02	<b>Page 1 of 10</b>	
Prepared By	Reviewed By	Approved By	Issued By

## **CONTENTS**

- 1.0 SCOPE**
- 2.0 APPLICABLE STANDARDS**
- 3.0 CLIMATIC CONDITIONS OF THE INSTALLATION**
- 4.0 GENERAL TECHNICAL REQUIREMENTS**
- 5.0 GENERAL CONSTRUCTIONS**
- 6.0 NAME PLATE AND MARKING**
- 7.0 TESTS**
- 8.0 TYPE TEST CERTIFICATES**
- 9.0 PRE-DESPATCH INSPECTION**
- 10.0 INSPECTION AFTER RECEIPT AT STORE**
- 11.0 GUARANTEE**
- 12.0 PACKING**
- 13.0 TENDER SAMPLE**
- 14.0 QUALITY CONTROL**
- 15.0 MINIMUM TESTING FACILITIES**
- 16.0 MANUFACTURING ACTIVITIES**
- 17.0 SPARES, ACCESSORIES AND TOOLS**
- 18.0 DRAWING AND DOCUMENTS**
- 19.0 GURANTEED TECHNICAL PARTICULARS**
- 20.0 SCHEDULE OF DEVIATIONS**

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 2 of 10

1	<b>SCOPE</b>	This specification covers technical requirements of design, manufacturing, Inspection, testing, Supply, transportation and unloading of Aluminum Lugs at TPCL stores/site. Aluminum Lugs to be used for cable termination purpose.																																																										
2	<b>APPLICABLE STANDARDS</b>	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 8309:1993- Specification for Compression type tubular terminal ends for aluminum conductors of Insulated cables																																																										
3	<b>CLIMATE CONDITIONS OF THE INSTALLATION</b>	The service conditions shall be as follows: <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 (g being acceleration due to gravity)</li> <li>11. Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.</li> </ol> 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	<b>GENERAL TECHNICAL REQUIREMENTS</b>	<table border="1"> <thead> <tr> <th rowspan="2">S. No</th> <th rowspan="2">Item Description</th> <th colspan="10">Dimension of Lugs (mm)</th> </tr> <tr> <th>E(± 0.1)</th> <th>A(± 0.1)</th> <th>C(± 0.1)</th> <th>D(± 0.3)</th> <th>F(± 0.2)</th> <th>B</th> <th>H</th> <th>G</th> <th>L(± 0.1)</th> <th>J</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Lugs Al 4 sq.mm XLPE single hole</td> <td>5.1</td> <td>2.9</td> <td>5.5</td> <td>12</td> <td>1.2</td> <td>7</td> <td>7</td> <td>6</td> <td>-</td> <td>24</td> </tr> <tr> <td>2</td> <td>Lugs Al 10 sq.mm XLPE single hole</td> <td>5.2</td> <td>4.4</td> <td>7.4</td> <td>10</td> <td>2.8</td> <td>9</td> <td>9</td> <td>8</td> <td>-</td> <td>30</td> </tr> <tr> <td>3</td> <td>Lugs Al 25 sq.mm</td> <td>8.4</td> <td>6.8</td> <td>12</td> <td>16</td> <td>5.2</td> <td>32</td> <td>10</td> <td>8</td> <td>-</td> <td>57</td> </tr> </tbody> </table>	S. No	Item Description	Dimension of Lugs (mm)										E(± 0.1)	A(± 0.1)	C(± 0.1)	D(± 0.3)	F(± 0.2)	B	H	G	L(± 0.1)	J	1	Lugs Al 4 sq.mm XLPE single hole	5.1	2.9	5.5	12	1.2	7	7	6	-	24	2	Lugs Al 10 sq.mm XLPE single hole	5.2	4.4	7.4	10	2.8	9	9	8	-	30	3	Lugs Al 25 sq.mm	8.4	6.8	12	16	5.2	32	10	8	-	57
S. No	Item Description	Dimension of Lugs (mm)																																																										
		E(± 0.1)	A(± 0.1)	C(± 0.1)	D(± 0.3)	F(± 0.2)	B	H	G	L(± 0.1)	J																																																	
1	Lugs Al 4 sq.mm XLPE single hole	5.1	2.9	5.5	12	1.2	7	7	6	-	24																																																	
2	Lugs Al 10 sq.mm XLPE single hole	5.2	4.4	7.4	10	2.8	9	9	8	-	30																																																	
3	Lugs Al 25 sq.mm	8.4	6.8	12	16	5.2	32	10	8	-	57																																																	

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>											
Document No.	ENG-C-17										Eff. Date:	
Revision No.	02										Page 3 of 10	

			XLPE single hole										
	4	Lug Al 35 sq.mm for 7/10 SWG Stay wire	6.4	8	10.8	15	2.8	18	11	11	-	47	
	5	Lugs Al 50 sq.mm XLPE single hole	10.5	9.8	16	21.5	6.2	42	12	10	-	72	
	6	Lug Al 70 sq.mm for 7/8 SWG Stay wire	10.2	11.6	16	22	4.4	26	13	13	-	60	
	7	Lugs Al 95 sq.mm XLPE single hole	13	13.2	22	30	8.8	56	15	13	-	95	
	8	Lugs Al 150 sq.mm XLPE single hole	13	16.3	21.6	31.2	4.9	60	20	15	-	108	
	9	Lugs Al 185 sq.mm XLPE single hole	16.3	18.4	24.0	34.5	5.5	60	20	15	-	108	
	10	Lugs Al 1C*300 sq.mm XLPE single hole circular	16.2	21.8	31.2	44.2	7.5	70	25	19	-	130	
	11	Lugs Al 4C*300 sq.mm XLPE single hole sector shaped	16.2	23.5	31.2	42	7.5	70	25	19	-	130	
	12	Lugs Al 400 sq.mm XLPE single hole	20.3	26.8	35.5	51.0	8.5	70	25	19	-	130	
	13	Lugs Al 630 sq.mm XLPE single hole	12.7	31.7	44.4	63	12.7	140	25	19	-	200	
	14	Lugs Al 300 sq.mm	12.7	21.8	30.2	42	8.4	89	25	19	44.4	191.4	

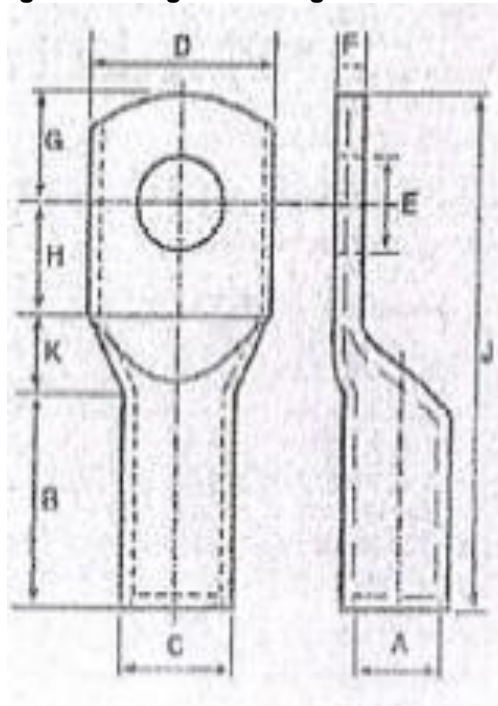
Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 4 of 10

	XLPE double hole										
15	Lugs Al 630 sq.mm XLPE double hole	12.7	31.7	44.4	61	12.7	140	25	19	44.4	244.4

Tolerances on B, H, G and J are  $\pm 5$  percent.

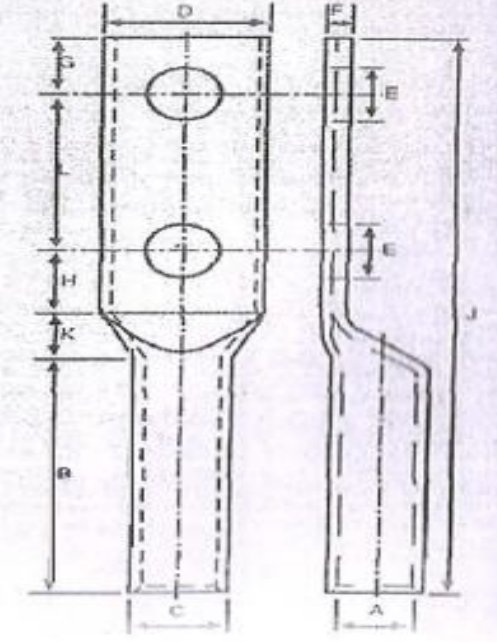
**Diagram of Single Hole Lugs in below**



**Diagram of Double Hole Lugs in below**

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 5 of 10

		
5	<b>GENERAL CONSTRUCTIONS</b>	The material of lugs should be Aluminum of 99.9% pure. Material of aluminum shall be as per IS: 5082:1991. Lugs is made of aluminum compression type tubular ends for termination of aluminum conductor of insulated cables. Edges and corners of aluminum lugs shall be free from burrs and sharp edges. Lugs is a connecting device with barrel accommodating respective conductor size of electrical cable and which has a fixing arrangement of termination by means of a bolt fixing or pin insertion in tunnel type terminal blocks and screwing.
6.0	<b>NAME PLATE AND MARKING</b>	N.A.
7.0	<b>TESTS</b>	All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine & type tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. All dimension of lugs shall meet with the relevant IS 8309:1993, where ever specifically not mentioned.
7.1	<b>TYPE TEST</b>	The following tests shall constitute the type tests and shall be carried out as per IS 8309:1993. <ul style="list-style-type: none"> <li>1) Chemical Composition Test.</li> <li>2) Electrical Conductivity test.</li> </ul>
7.2	<b>ROUTINE TEST</b>	The following tests shall be conducted as per IS 8309:1993. Routine test to be done on the random samples (As per IS) taken from the offered lot material for the purpose of acceptance of that lot of material. <ul style="list-style-type: none"> <li>1) Dimension of all type of Lugs as per IS 8309:1993.</li> <li>2) Electrical Conductivity test.</li> <li>3) Surface Finish.</li> <li>4) Flattening Test.</li> </ul>

Initiator		HOG (Engineering)	
-----------	--	-------------------	--



Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 6 of 10

<b>7.3</b>	<b>ACCEPTANCE TEST</b>	<p>1) Dimension of all type of Lugs as per IS 8309:1993.</p> <p>2) Surface Finish.</p>
<b>8.0</b>	<b>TYPE TEST CERTIFICATE</b>	The Bidder shall furnish the type test certificates of files for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI or NABL accredited Lab 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 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
<b>9.0</b>	<b>PRE-DESPATCH INSPECTION</b>	<p>9.1- Material shall be subjected to Visual inspection.</p> <p>9.2- Unit shall be subject to inspection by a duly authorized representative of the TPCL. Inspection may be made at any stage of manufacture at the option of the purchaser and the unit 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 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 TPCL.</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 TPCL</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>10.0</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.
<b>11.0</b>	<b>GUARANTEE</b>	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of 12 months from the date of commissioning and 18 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 his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the " Security cum Performance Deposit" as the case may be.

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 7 of 10

		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.
<b>12.0</b>	<b>PACKING</b>	Bidder shall ensure that all the Aluminum lugs covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.
<b>13.0</b>	<b>TENDER SAMPLE</b>	Bidders are required to manufacture 2 sample of Lugs as per the Purchaser's specification and submit the sample along with the bid to Contracts for approval.
<b>14.0</b>	<b>QUALITY CONTROL</b>	<p>The bidder shall have a prove track of not less than 5 years in manufacturing and servicing of Aluminum Lugs in Indian 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.</p> <p>14.1 The Bidder shall invariably furnish following information along with his bid, failing which the bid shall be liable for rejection. Information shall be separately given for individual type of equipment offered.</p> <ul style="list-style-type: none"> <li>a) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in the presence of Bidder's representative, copies of test certificates.</li> <li>b) Information and copies of test certificates as in (a) above in respect of bought out accessories.</li> <li>c) List of manufacturing facilities available.</li> <li>d) Level of automation achieved and list of areas where manual processing exists.</li> <li>e) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspection.</li> <li>f) List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports shall be furnished with the bid. Manufacturer shall possess 0.1 class instruments for measurement of losses.</li> <li>g) Quality Assurance Plan (QAP) withholds points for purchaser's inspection.</li> </ul> <p>14.2 The successful Bidder shall within 30 days of placement of order, submit following</p>

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 8 of 10

		<p>information to the purchaser.</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>14.3 The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.</p>																									
15.0	<b>MINIMUM TESTING FACILITIES</b>	Bidder shall have adequate in house testing facilities for carrying out all routine /acceptance tests and pre-dispatch inspection as per relevant International / Indian standards.																									
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>	N.A.																									
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> <p>a) Completely filled in Technical Particulars.</p> <p>b) General description of the equipment and all components including brochures.</p> <p>c) Bill of Material</p> <p>d) Type test Certificates</p> <p>e) Experience List.</p> <p>After the award 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 TPCL.</p> <p>Following Drawings/Documents shall be submitted after the award of the contract:</p> <table border="1"> <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>√</td> <td></td> <td>√</td> </tr> <tr> <td>2</td> <td>Manual/Catalogues/drawings for all components.</td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>3</td> <td>Technical details and test certificates of the component.</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>4</td> <td>Instructions for use</td> <td></td> <td>√</td> <td>√</td> </tr> </tbody> </table>	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		√	√
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		√	√																							

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

Document Title	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
Document No.	ENG-C-17	Eff. Date:
Revision No.	02	Page 9 of 10

		<table border="1"> <tr> <td>5</td> <td>Transport/shipping dimension drawing</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>6</td> <td>QA &amp; QC Plan</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>7</td> <td>Routine, Acceptance and Type test Certificates</td> <td>√</td> <td>√</td> <td>√</td> </tr> </table> <p>All the Documents and Drawings shall be in English Language.</p>	5	Transport/shipping dimension drawing		√	√	6	QA & QC Plan	√	√	√	7	Routine, Acceptance and Type test Certificates	√	√	√																																																					
5	Transport/shipping dimension drawing		√	√																																																																		
6	QA & QC Plan	√	√	√																																																																		
7	Routine, Acceptance and Type test Certificates	√	√	√																																																																		
<b>19.0</b>	<b>GUARANTEED TECHNICAL PARTICULARS</b>	<table border="1"> <thead> <tr> <th rowspan="2">S.No</th> <th rowspan="2">Conductor size</th> <th colspan="10">Dimension of Lugs (mm)</th> </tr> <tr> <th>E</th> <th>A</th> <th>C</th> <th>D</th> <th>F</th> <th>B</th> <th>H</th> <th>G</th> <th>L</th> <th>J</th> </tr> </thead> <tbody> <tr><td>1</td><td>Lugs Al crimping 4 sq.mm XLPE single hole</td><td colspan="10" rowspan="18" style="text-align: center; vertical-align: middle;">Bidder has to Submit</td></tr> <tr><td>2</td><td>Lugs Al crimping 10 sq.mm XLPE single hole</td></tr> <tr><td>3</td><td>Lugs Al crimping 25 sq.mm XLPE single hole</td></tr> <tr><td>4</td><td>Lug Al crimping 35 sq.mm for 7/10 SWG Stay wire</td></tr> <tr><td>5</td><td>Lugs Al crimping 50 sq.mm XLPE single hole</td></tr> <tr><td>6</td><td>Lug Al crimping 70 sq.mm for 7/8 SWG Stay wire</td></tr> <tr><td>7</td><td>Lugs Al crimping 95 sq.mm XLPE single hole</td></tr> <tr><td>8</td><td>Lugs Al crimping 150 sq.mm XLPE single hole</td></tr> <tr><td>9</td><td>Lugs Al crimping 185 sq.mm XLPE single hole</td></tr> <tr><td>10</td><td>Lugs Al crimping 1C*300 sq.mm XLPE single hole circular</td></tr> <tr><td>11</td><td>Lugs Al crimping 4C*300 sq.mm XLPE single hole sector shaped</td></tr> <tr><td>12</td><td>Lugs Al crimping 400 sq.mm XLPE single hole</td></tr> <tr><td>13</td><td>Lugs Al crimping 630 sq.mm XLPE single hole</td></tr> <tr><td>14</td><td>Lugs Al crimping 300 sq.mm XLPE double hole</td></tr> <tr><td>15</td><td>Lugs Al crimping 630 sq.mm XLPE double hole</td></tr> <tr><td>16</td><td>Surface Finish</td></tr> <tr><td>17</td><td>Electrical Conductivity test</td></tr> <tr><td>18</td><td>Flattening Test</td></tr> </tbody> </table>	S.No	Conductor size	Dimension of Lugs (mm)										E	A	C	D	F	B	H	G	L	J	1	Lugs Al crimping 4 sq.mm XLPE single hole	Bidder has to Submit										2	Lugs Al crimping 10 sq.mm XLPE single hole	3	Lugs Al crimping 25 sq.mm XLPE single hole	4	Lug Al crimping 35 sq.mm for 7/10 SWG Stay wire	5	Lugs Al crimping 50 sq.mm XLPE single hole	6	Lug Al crimping 70 sq.mm for 7/8 SWG Stay wire	7	Lugs Al crimping 95 sq.mm XLPE single hole	8	Lugs Al crimping 150 sq.mm XLPE single hole	9	Lugs Al crimping 185 sq.mm XLPE single hole	10	Lugs Al crimping 1C*300 sq.mm XLPE single hole circular	11	Lugs Al crimping 4C*300 sq.mm XLPE single hole sector shaped	12	Lugs Al crimping 400 sq.mm XLPE single hole	13	Lugs Al crimping 630 sq.mm XLPE single hole	14	Lugs Al crimping 300 sq.mm XLPE double hole	15	Lugs Al crimping 630 sq.mm XLPE double hole	16	Surface Finish	17	Electrical Conductivity test	18	Flattening Test
S.No	Conductor size	Dimension of Lugs (mm)																																																																				
		E	A	C	D	F	B	H	G	L	J																																																											
1	Lugs Al crimping 4 sq.mm XLPE single hole	Bidder has to Submit																																																																				
2	Lugs Al crimping 10 sq.mm XLPE single hole																																																																					
3	Lugs Al crimping 25 sq.mm XLPE single hole																																																																					
4	Lug Al crimping 35 sq.mm for 7/10 SWG Stay wire																																																																					
5	Lugs Al crimping 50 sq.mm XLPE single hole																																																																					
6	Lug Al crimping 70 sq.mm for 7/8 SWG Stay wire																																																																					
7	Lugs Al crimping 95 sq.mm XLPE single hole																																																																					
8	Lugs Al crimping 150 sq.mm XLPE single hole																																																																					
9	Lugs Al crimping 185 sq.mm XLPE single hole																																																																					
10	Lugs Al crimping 1C*300 sq.mm XLPE single hole circular																																																																					
11	Lugs Al crimping 4C*300 sq.mm XLPE single hole sector shaped																																																																					
12	Lugs Al crimping 400 sq.mm XLPE single hole																																																																					
13	Lugs Al crimping 630 sq.mm XLPE single hole																																																																					
14	Lugs Al crimping 300 sq.mm XLPE double hole																																																																					
15	Lugs Al crimping 630 sq.mm XLPE double hole																																																																					
16	Surface Finish																																																																					
17	Electrical Conductivity test																																																																					
18	Flattening Test																																																																					
<b>20.0</b>	<b>SCHEDULE OF DEVIATIONS</b>	<b><u>(TO BE ENCLOSED WITH THE BID)</u></b>																																																																				

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

<b>Document Title</b>	<b>SPECIFICATION FOR DIFFERENT SIZES OF ALUMINIUM LUGS</b>	
<b>Document No.</b>	ENG-C-17	<b>Eff. Date:</b>
<b>Revision No.</b>	02	<b>Page 10 of 10</b>

		<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: 10%;">S.No.</th> <th style="width: 30%;">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>Seal of the Company:</p> <div style="text-align: right; margin-top: 20px;"> <p>Signature</p> <p>Designation</p> </div>	S.No.	Clause No.	Details of deviation with justifications			
S.No.	Clause No.	Details of deviation with justifications						

Initiator		HOG (Engineering)	
-----------	--	-------------------	--

	<b>TPCODL, BHUBANESHWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	SPECIFICATION FOR DANGER PLATES		
<b>Document No.</b>		<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	01	Page 1 of	
<b>Prepared By:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

## CONTENTS

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

Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 2 of 7

1.	SCOPE	This specification covers technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site, performance of danger plates.																																		
2.	APPLICABLE STANDARDS	The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities. The danger plate shall comply with the Indian Standard IS 2551- 1982																																		
3.	CLIMATIC CONDITIONS OF THE INSTALLATION	<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 (g being acceleration due to gravity)</li> <li>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</li> <li>12. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</li> </ol>																																		
4.	GENERAL TECHNICAL REQUIREMENTS	<table border="1"> <thead> <tr> <th></th> <th>DESCRIPTION</th> <th>UNITS</th> <th>REQUIREMENTS</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Plate material</td> <td></td> <td>Mild steel</td> </tr> <tr> <td>2.</td> <td>Plate thickness, min</td> <td>Mm</td> <td>1.6</td> </tr> <tr> <td>3.</td> <td>Front side paint</td> <td></td> <td>Vitreous enameled white</td> </tr> <tr> <td>4.</td> <td>Letters/ figure/skull/cross bones colour</td> <td></td> <td>Red color</td> </tr> <tr> <td>5.</td> <td>Rear side of plate</td> <td></td> <td>enamelled</td> </tr> <tr> <td>6.</td> <td>Dimension</td> <td>mm</td> <td>250x200</td> </tr> <tr> <td>7.</td> <td>Corners of the plate</td> <td></td> <td>Rounded off</td> </tr> </tbody> </table>				DESCRIPTION	UNITS	REQUIREMENTS	1.	Plate material		Mild steel	2.	Plate thickness, min	Mm	1.6	3.	Front side paint		Vitreous enameled white	4.	Letters/ figure/skull/cross bones colour		Red color	5.	Rear side of plate		enamelled	6.	Dimension	mm	250x200	7.	Corners of the plate		Rounded off
	DESCRIPTION	UNITS	REQUIREMENTS																																	
1.	Plate material		Mild steel																																	
2.	Plate thickness, min	Mm	1.6																																	
3.	Front side paint		Vitreous enameled white																																	
4.	Letters/ figure/skull/cross bones colour		Red color																																	
5.	Rear side of plate		enamelled																																	
6.	Dimension	mm	250x200																																	
7.	Corners of the plate		Rounded off																																	
5.	GENERAL CONSTRUCTIONS	<p>5.1.Dimensions:</p> <p>5.1.1 For 415V, 11kV, and 33kV voltage installations: 250x200mm (see figure given in Annexure).</p> <p>5.1.2 All letterings shall be centrally spaced. The dimensions of the letters, figures and their respective positions shall be as given in figure. The size of each letter in the word in each language, and the spacing between them for purposes of scribing shall be so chosen that they are uniformly written in the space earmarked for them.</p> <p>5.1.3 The corners of the plate shall be rounded off.</p> <p>5.1.4 The locations of the fixing holes shall be left to the choice of the user.</p> <p>LANGUAGES</p>																																		

Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 3 of 7

		<p>ENGLISH: for denoting in English, the type of lettering recommended is as shown in the figure.</p> <p>Local Language: for denoting in Local Language, the type of lettering recommended is as shown in the figure.</p>
6.	NAME PLATE AND MARKING	<p>The essential information that would be necessary to identify the manufacturer of the danger board plates shall be marked, in such a manner and position on the plates that it does not interfere with the other information.</p> <p>The danger board plates shall also be marked with ISI certification mark.</p> <p>“PROPERTY OF TATA POWER COMPANY LIMITED, BUBANESHWAR” to be written in blue color (PANTONE 300C) along with the logo.</p>
7.	TESTS	<p><b>General</b></p> <p>7.0.1 In order to ensure that the notice plates conform to this specification, the following essential tests are specified. The number of samples to be tested shall be as agreed to between the supplier and the user.</p> <p>7.0.2 the following shall constitute the tests:</p> <p>a) Visual examination b) Dimensional check, and c) Test for weather proofness.</p> <p>7.1 Visual Examination</p> <p>The samples of notice shall be examined visually for conformity to the various requirements of this standard in respect of the works and letters used their relative position and size. The colour of the paint used shall be visually compared with the signal red colour as specified in IS:5-1978</p> <p>7.2 Dimensional Check</p> <p>The dimension of the plate, its thickness and the size of lettering, figures, etc. shall conform generally to the stipulations in 5.1.2 to 5.1.4</p> <p>7.3 Tests for weather proofness</p> <p>For the purpose of verifying colour retention of the vitreous enamel coatings, the method of test specified in IS 8709-1977 shall apply.</p>
8	TYPE TEST CERTIFICATES	Supplies shall be tested and five duly attested/certified copies of test certificates for respective items shall be submitted for approval and issuing Material Dispatch Clearance Certificate called MDCC.
9.	PRE-DISPATCH INSPECTION	<p>A) TESTS: the material shall be subjected to following tests:</p> <p>1) Visual Inspection</p> <p>B) The Material shall be subject to inspection by a duly authorized representative of the TPCL, Bhubaneshwar. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to 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, Bhubaneshwar.</p> <p>Following documents shall be sent along with material:</p> <p>a. Test reports b. MDCC issued by TPCL, Bhubaneshwar c. Invoice in duplicate d. Packing list e. Drawings &amp; catalogue f. Guarantee / Warrantee card g. Delivery Challan h. Other Documents (as applicable).</p>

Initiator		Approval	
-----------	--	----------	--



Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 4 of 7

10.	INSPECTION AFTER RECEIPT AT STORES	The material received at TPCL, Bhubaneshwar store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering & Contracts department
11.	GUARANTEE	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 12/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser
12.	PACKING	Suppliers shall ensure that all the equipments covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit.
13.	TENDER SAMPLE	As and when required.
14.	QUALITY CONTROL	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material.
15.	TESTING FACILITIES	Supplier/Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.
16.	MANUFACTURING ACTIVITIES	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order
17.	SPARES, ACCESSORIES AND TOOLS	The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of danger board plate along with the installation procedure
18.	DRAWINGS AND DOCUMENTS	<p>Following documents shall be prepared based on TPCL specifications and statutory requirements with complete BOM and shall be submitted with the bid:</p> <ul style="list-style-type: none"> <li>a) Completely filled in Technical Particulars.</li> <li>b) General description of the equipment and all components including brochures.</li> <li>c) Type test Certificates</li> <li>d) Experience List.</li> </ul> <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>

Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 5 of 7

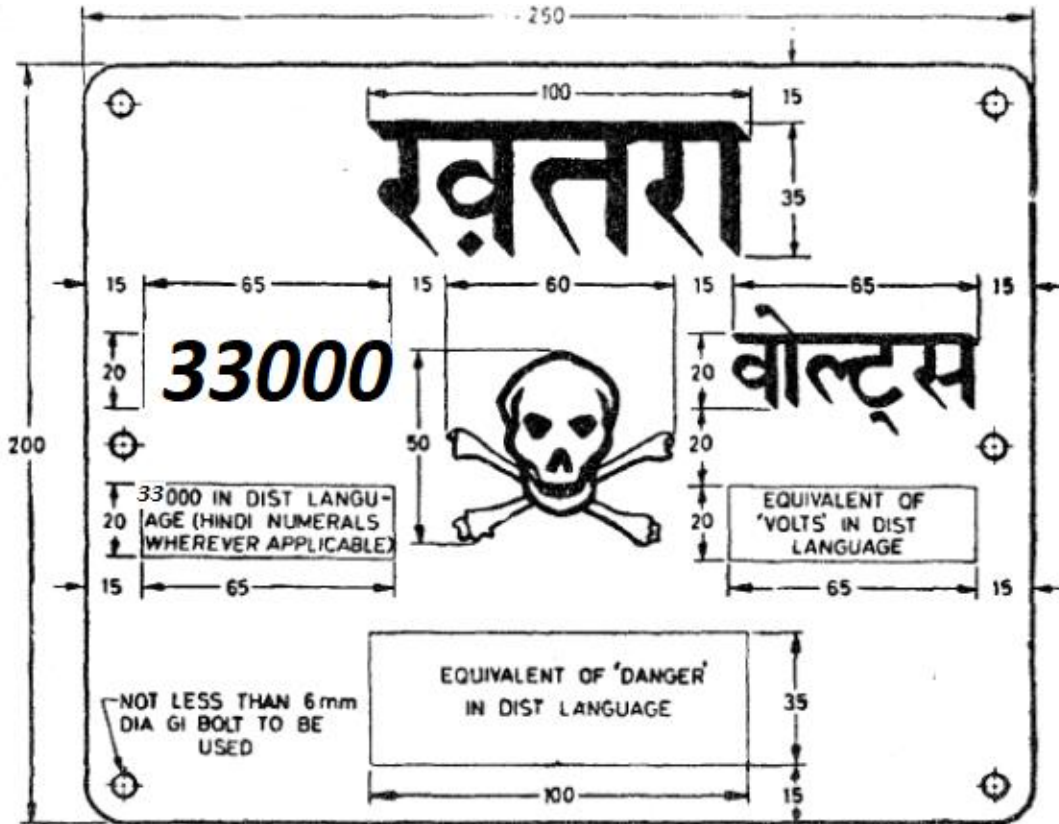
19.	GENERAL TECHNICAL PARTICULARS	S.No.	DESCRIPTION	UNITS	REQUIREMENTS
		1.	Plate material		To be furnished by the bidder
		2.	Plate thickness, min	mm	
		3.	Front side paint		
		4.	Letters/ figure/skull/cross bones colour		
		5.	Rear side of plate		
		6.	Dimension	mm	
		7.	Corners of the plate		

20.	<b>SCHEDULE OF DEVIATIONS</b>						
	<b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b>						
	<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%;"> <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>		S. No	Clause No.	Details of deviation with justifications		
S. No	Clause No.	Details of deviation with justifications					

Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	Eff. Date:
Document No.		Page 6 of 7
Revision No.	01	

ANNEXURE

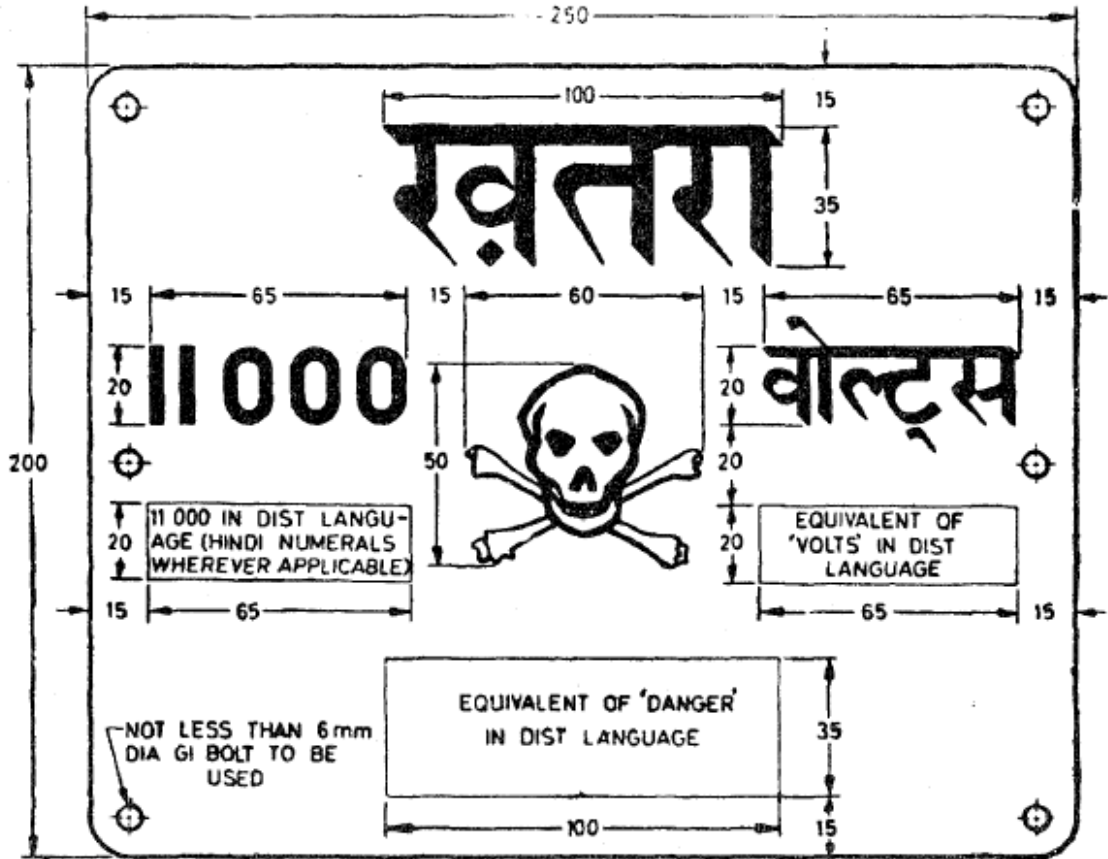


- NOTE 1 — All letterings should be centrally spaced.  
 NOTE 2 — The dimensions for the words in district language are mainly for guidance, however, care should be taken to space them centrally between the edges and the area of the skull and bones.  
 NOTE 3 — The location of the fixing holes shall be left to the choice of the user.  
 NOTE 4 — 33 000 volts is just specimen, actual voltage is to be inserted for different system voltages.  
 NOTE 5 — The corners of the plates should be rounded off.

All dimensions in millimetres.

Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	Eff. Date:
Document No.		Page 7 of 7
Revision No.	01	



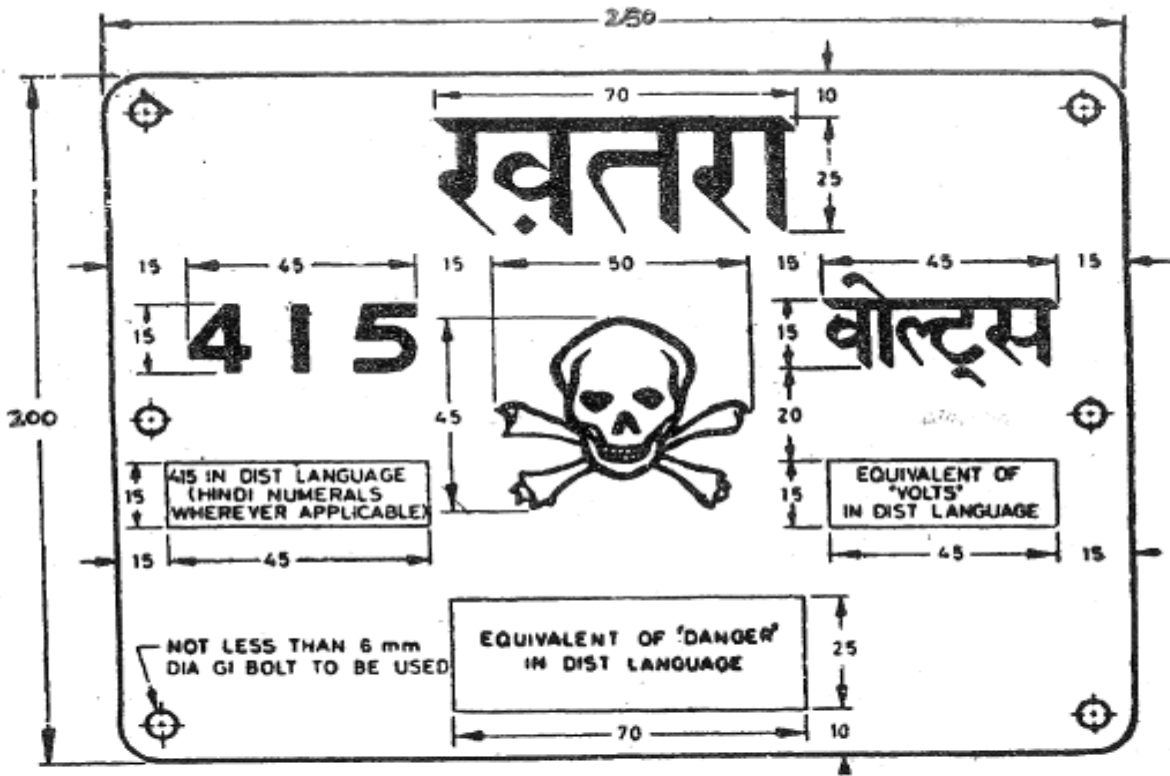
NOTE 1 — All letterings should be centrally spaced.  
 NOTE 2 — The dimensions for the words in district language are mainly for guidance, however, care should be taken to space them centrally between the edges and the area of the skull and bones.

NOTE 3 — The location of the fixing holes shall be left to the choice of the user.  
 NOTE 4 — 11 000 volts is just specimen, actual voltage is to be inserted for different system voltages.  
 NOTE 5 — The corners of the plates should be rounded off.

All dimensions in millimetres.

Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 8 of 7



NOTE 1 — All letterings should be centrally spaced.

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

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

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

All dimensions in millimetres.

**Sample pics of danger boards**



Initiator		Approval	
-----------	--	----------	--

Document Title	SPECIFICATION OF DANGER PLATE	
Document No.		Eff. Date:
Revision No.	01	Page 9 of 7



Initiator		Approval	
-----------	--	----------	--

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
Document Title	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
Document No.	ENG-LV-3011	Eff. Date: 01.06.2020	
Revision No.	00	Page 1 of 21	
Prepared By: Pratibha Kumari	Reviewed By: Vinoth Kumar M	Approved By: Brajanath Dey	Issued By : H C Sharma

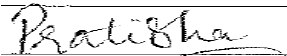

## CONTENTS

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

<b>1.0</b>	<b>SCOPE</b>	This specification covers the technical requirements of design, engineering, manufacturing, testing at manufacturer's works, packaging, forwarding, supply and
------------	--------------	--

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 2 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		unloading at site/store and performance of LT Air Circuit Breaker – Microprocessor based with fault data recording (FDR) feature along with all accessories required for trouble free and efficient operation.																																				
<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 / IEC and shall conform to the regulations of the local authorities. In case of any conflict in the below mentioned standards, Tata Power-CODL specification shall prevail.</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Standards</th> <th>Title</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>IS/IEC 60947-1 :2007</td> <td>Low-voltage switchgear and control gear</td> </tr> <tr> <td>2.</td> <td>IS/IEC 60947-2 : 2003</td> <td>Low-voltage Switchgear and Control gear, Part-2: Circuit Breakers</td> </tr> <tr> <td>3.</td> <td>IS/IEC 60947-5-1 : 2003</td> <td>Low-voltage Switchgear and Control gear, Part 5-Control Circuit Devices and Switching Elements, Section 1-Electromechanical Control Circuit Devices</td> </tr> <tr> <td>4.</td> <td>IEC 60439-1 :1999</td> <td>Low-voltage switchgear and control gear assemblies :Type-tested and partially type tested assemblies</td> </tr> <tr> <td>5.</td> <td>IS 8623-1 : 1993</td> <td>Low-Voltage Switchgear and Control gear Assemblies : Requirements for Type-Tested and Partially Type-Tested Assemblies</td> </tr> <tr> <td>6.</td> <td>IS/IEC 60529 : 2001</td> <td>Degree of Protection provided by enclosures</td> </tr> <tr> <td>7.</td> <td>IS 8623-2 :1993</td> <td>Low-voltage Switchgear and Control gear Assemblies : Particular Requirements for Busbar Trunking Systems</td> </tr> <tr> <td>8.</td> <td>IEC 61439-6 :2012 (Edition 1.0)</td> <td>Low-voltage switchgear and control gear assemblies: Busbar trunking systems (bus ways)</td> </tr> <tr> <td>9.</td> <td>IS 14772 : 2000</td> <td>General Requirements for Enclosures for Accessories for Household and Similar Fixed Electrical Installations</td> </tr> <tr> <td>10.</td> <td>IEC 60664-1 :2007</td> <td>Insulation coordination for equipment within low-voltage supply systems : Principles, requirements and tests</td> </tr> <tr> <td>11.</td> <td>IS 2551 : 1982</td> <td>Danger notice plates</td> </tr> </tbody> </table>	S. No.	Standards	Title	1.	IS/IEC 60947-1 :2007	Low-voltage switchgear and control gear	2.	IS/IEC 60947-2 : 2003	Low-voltage Switchgear and Control gear, Part-2: Circuit Breakers	3.	IS/IEC 60947-5-1 : 2003	Low-voltage Switchgear and Control gear, Part 5-Control Circuit Devices and Switching Elements, Section 1-Electromechanical Control Circuit Devices	4.	IEC 60439-1 :1999	Low-voltage switchgear and control gear assemblies :Type-tested and partially type tested assemblies	5.	IS 8623-1 : 1993	Low-Voltage Switchgear and Control gear Assemblies : Requirements for Type-Tested and Partially Type-Tested Assemblies	6.	IS/IEC 60529 : 2001	Degree of Protection provided by enclosures	7.	IS 8623-2 :1993	Low-voltage Switchgear and Control gear Assemblies : Particular Requirements for Busbar Trunking Systems	8.	IEC 61439-6 :2012 (Edition 1.0)	Low-voltage switchgear and control gear assemblies: Busbar trunking systems (bus ways)	9.	IS 14772 : 2000	General Requirements for Enclosures for Accessories for Household and Similar Fixed Electrical Installations	10.	IEC 60664-1 :2007	Insulation coordination for equipment within low-voltage supply systems : Principles, requirements and tests	11.	IS 2551 : 1982	Danger notice plates
S. No.	Standards	Title																																				
1.	IS/IEC 60947-1 :2007	Low-voltage switchgear and control gear																																				
2.	IS/IEC 60947-2 : 2003	Low-voltage Switchgear and Control gear, Part-2: Circuit Breakers																																				
3.	IS/IEC 60947-5-1 : 2003	Low-voltage Switchgear and Control gear, Part 5-Control Circuit Devices and Switching Elements, Section 1-Electromechanical Control Circuit Devices																																				
4.	IEC 60439-1 :1999	Low-voltage switchgear and control gear assemblies :Type-tested and partially type tested assemblies																																				
5.	IS 8623-1 : 1993	Low-Voltage Switchgear and Control gear Assemblies : Requirements for Type-Tested and Partially Type-Tested Assemblies																																				
6.	IS/IEC 60529 : 2001	Degree of Protection provided by enclosures																																				
7.	IS 8623-2 :1993	Low-voltage Switchgear and Control gear Assemblies : Particular Requirements for Busbar Trunking Systems																																				
8.	IEC 61439-6 :2012 (Edition 1.0)	Low-voltage switchgear and control gear assemblies: Busbar trunking systems (bus ways)																																				
9.	IS 14772 : 2000	General Requirements for Enclosures for Accessories for Household and Similar Fixed Electrical Installations																																				
10.	IEC 60664-1 :2007	Insulation coordination for equipment within low-voltage supply systems : Principles, requirements and tests																																				
11.	IS 2551 : 1982	Danger notice plates																																				

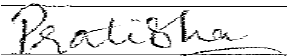

Initiator		HoG(Plant Engineering)	
-----------	---	------------------------	---



<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 3 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

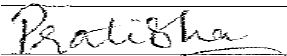

<b>3.0</b>	<b>CLIMATIC CONDITIONS OF THE INSTALLATION</b>	<p>a) Max. Ambient Temperature : 50 deg.C  b) Max. Daily average ambient temp. : 40 deg.C  c) Min Ambient Temp : 0 deg. C  d) Ground Temperature : 25 deg.C  e) Maximum Humidity : 95%  f) Minimum Humidity : 10%  g) Average No. of thunderstorm days per annum : 50  h) Average Annual Rainfall : 750 mm  i) Average No. of rainy days per annum : 60  j) Thermal Resistivity of soil : 150deg.Ccm/W  k) Wind Pressure : 126 kg/sq. m up to an elevation of 10 meter.</p> <p>The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p>
------------	--	---

<b>4.0</b>	<b>GENERAL TECHNICAL REQUIREMENT</b>	<b>Sr. No.</b>	<b>Parameter</b>	<b>Unit</b>	<b>REQUIREMENT</b>
		1	Current Rating (AC)	A	400, 800,1250,1600 & 2000
		2	Type of ACB		Outdoor, Fixed type, Manually Operated
		3	Type of Release/Relay		Microprocessor based with Over Load (OL), Short Circuit (SC) & Earth Fault (EF)
		4	Overload Release range		40 % to 120 %
		5	Utilization Category		B
		6	No. of Poles		Four- gang operated
		7	Rated operational Voltage	V	415 ± 10%
		8	Rated Impulse withstand voltage (U imp)	kVp	8
		9	Rated ultimate short circuit breaking capacity (Icu)	kA	50 kA rms at 415V, 50Hz

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

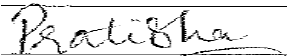

	<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 4 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		10	Rated service short circuit breaking capacity (Ics)		100% of Icu
		11	Rated Insulation voltage (Ui)		1100V ac
		12	Rated Short time withstand Capacity (Icw)	kAp	50 kAp for 1 sec.
		13	Rated Making Capacity (Icm)	kAp	105
		14	Breaker opening time	ms	40
		15	Breaker closing time	ms	60
		16	Material of Busbar		Aluminum (Aluminum shall be sourced from M/S Hindalco, M/S Nalco, M/s Sterlite only)
		17	Current Density of Busbar (max.)	A/m <sup>2</sup>	1
		18	Max. permissible temperature		80°C on terminals at an ambient temperature not exceeding 40°C
		19	Min. Clearance between phases	mm	25.4 (after cable termination including LUGs)
		20	Min. Clearance between phase & earth	mm	19.4 ( after cable termination including LUGs)
		21	Degree of Protection		IP 55 for Enclosure IP 55 or above for Relay cabinet
		22	Mechanical Operations		20000
		23	CT Secondary Current	A	5 or 1
		24	CT class		5P10
		25	Provision of shunt trip coil 240V AC for remote operation of breaker		To be provided by bidder
		26	'Push to trip' button, 'Close button' and 'relay reset button' on the front door		A 'push to trip' button , 'close' button and 'relay reset button' shall be provided on the front door with rain-shed covering the buttons of the ACB

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

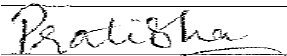

	<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 5 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		27	Relay	Relay design shall be suitable for auxiliary supply of range from 180 V to 350 V for trouble free operations
		28	Surge protection in relay	Relay and associated accessories should be provided with minimum 4.5 kV surge protection device
		29	Latching of fault indication LED	Fault indicating LEDs should latch/blink until it is reset manually
		30	FDR record with display	Last five tripping records should be stored in the memory and displayed on FIFO basis
		31	Auxiliary Contact(Breaker)	4 NO + 4 NC (Min)
		32	ACB should have peak load recording feature with reset	ACB should have peak load recording feature with reset for all three phases and neutral
		33	Separation between incomers and outgoing	The incomer and outgoing terminals should be separated by 125 mm(min.) & FRP sheet of 8 mm(min.) thickness should be properly fixed at both ends for separation between incomer & outgoing
		34	Outgoing bus-bar	Outgoing bus-bar should be inverted L-shaped, straight extension from the enclosure should be 100mm(min.) till L bent and after L-bent 100mm(min.)
		35	Incoming bus-bar	Incoming bus-bar shall be angular shaped. The bent should be provided after 150mm (min.) straight extension from enclosure at an angle of 140-150 degrees for about 100 mm (min.).
		36	Bus-bar Insulation	Both incoming and outgoing bus-bars outside enclosure should be insulated with heat shrink tube up to bent of insulation level suitable for 1.1 kV

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

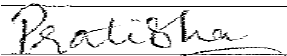

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 6 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

				Phase to phase and phase to neutral separators of FRP material having thickness minimum 3 mm should be provided
		37	Phase separator	(a) For incoming bus-bar the separator should be fixed with bolt at top and at bottom U-clip should be provided such that the separator can be lifted upwards during connections
				(b) For outgoing bus-bar the separator should be fixed with bolt at top and at bottom U-clip should be provided such that the separator can be lifted upwards during connections or alternate arrangement
		38	Orientation should be B-Y-R-N	Poles orientation should be B-Y-R-N as viewed left to right from back side
		39	CT secondary wires	CT secondary wires should not be accessible from outside
		40	Locking	Push to lock arrangement
		41	Voltage Indication	Outgoing voltage presence should be indicated by blinking LED
		42	Mechanism Interlocking	Mechanism interlocking to be provided for front door closing
		43	ACB door	ACB door hinges should be anti-theft
		44	Rated Control Circuit Voltage	240VAC
		45	Limits of voltage for the satisfactory operation of the following devices as % of nominal voltage (a) Trip Coil (b) Close Coil (c) Spring Charge Motor	(a) 70 to 120% (b) 85 to 120% (c) 85 to 120%

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

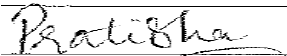

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 7 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

<b>5.0</b>	<b>GENERAL CONSTRUCTION</b>	<p><b>5.1 Enclosure</b> The ACB shall be housed in an enclosure made of 3mm thick sheet steel which shall be weather proof and vermin proof. The enclosure shall be provided with taper type construction &amp; an overall canopy extension of not less than 100 mm in front side &amp; 250 mm in back side to prevent accumulation of water. The enclosure shall be suitable for outdoor application with Degree of protection as IP55 and IP 55 &amp; above for relay cabinet. The enclosure shall be provided with extended insulated Aluminum links outside &amp; designed for use of 415V, 3-Phase 4 Wire, and 50Hz supply system. The pockets of Aluminum links shall be sealed properly to avoid ingress of moisture.</p> <p><b>5.1.1</b> The enclosure shall have single door arrangement with hinges so that it is not possible to remove the door. However a separate lifting window type arrangement should be provided on the door for operation of ACB. It shall be so designed that when the front cover is opened, there should be no accessible space. The access should only be such that the maintenance of the ACB and its protective parts can be easily carried out.</p> <p><b>5.1.2</b> One no. of 5 Pin 16mm Female Metal Shell Connector shall be provided in the enclosure to ease the operation of breaker locally from a safe distance. Technical requirement of the Metal Shall Connector shall be as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Particulars</th> <th style="text-align: left;">Requirement</th> </tr> </thead> <tbody> <tr> <td>Coupling</td> <td>Threaded coupling</td> </tr> <tr> <td>Shell Material</td> <td>Zinc Alloy with Nickel Plated</td> </tr> <tr> <td>Insert Material</td> <td>Bakelite</td> </tr> <tr> <td>Contact Material</td> <td>Copper</td> </tr> <tr> <td>Termination</td> <td>Solder</td> </tr> <tr> <td>Mating Cycle</td> <td>500 Times</td> </tr> <tr> <td>Temperature Range</td> <td>-20oC to 85oC</td> </tr> <tr> <td>Cable Diameter</td> <td>7.5mm to 8.5mm</td> </tr> <tr> <td>Degree of Protection</td> <td>IP55</td> </tr> <tr> <td>Working Voltage</td> <td>250V</td> </tr> <tr> <td>Rated Current</td> <td>5A</td> </tr> <tr> <td>Pin Configuration</td> <td>1 – 240VAC from LT ACB 2 – ACB Open Command 3 – ACB Close Command 4 – Spare 5 – Spare</td> </tr> </tbody> </table> <p><b>5.1.3</b> A 'push to trip' &amp; 'push to close' button and 'relay reset button' shall be provided on the front door of the ACB. All parts shall be manufactured in accordance with relevant IS/IEC. In case of equipment with conductive enclosures, means shall</p>	Particulars	Requirement	Coupling	Threaded coupling	Shell Material	Zinc Alloy with Nickel Plated	Insert Material	Bakelite	Contact Material	Copper	Termination	Solder	Mating Cycle	500 Times	Temperature Range	-20oC to 85oC	Cable Diameter	7.5mm to 8.5mm	Degree of Protection	IP55	Working Voltage	250V	Rated Current	5A	Pin Configuration	1 – 240VAC from LT ACB 2 – ACB Open Command 3 – ACB Close Command 4 – Spare 5 – Spare
Particulars	Requirement																											
Coupling	Threaded coupling																											
Shell Material	Zinc Alloy with Nickel Plated																											
Insert Material	Bakelite																											
Contact Material	Copper																											
Termination	Solder																											
Mating Cycle	500 Times																											
Temperature Range	-20oC to 85oC																											
Cable Diameter	7.5mm to 8.5mm																											
Degree of Protection	IP55																											
Working Voltage	250V																											
Rated Current	5A																											
Pin Configuration	1 – 240VAC from LT ACB 2 – ACB Open Command 3 – ACB Close Command 4 – Spare 5 – Spare																											

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

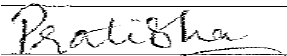

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 8 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		<p>be provided if necessary to ensure electrical continuity between exposed conductive parts of the equipment and the metal sheathing of connecting conductors. The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations. When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices.</p> <p><b>5.1.4</b> For equipment operated by means of three push buttons, only the push button designated for the opening operation shall be RED or marked with symbol "O". Red color shall not be used for any other push-button. The colors of other push-buttons shall be in accordance with IEC-73. The bidder shall provide Provision of shunt trip coil 240V AC for remote operation of breaker. Two NO &amp; two NC contacts to be provided for status confirmation from remote.</p> <p><b>5.1.5</b> The Air Circuit Breaker shall have the provision to lock the operating mechanism in OFF position. One padlock at the front side shall be provided with common master key for all the circuit breakers. There shall be provision for Lock-out Tag-out (LOTO) on the front door. All the hardware used shall be hot dipped Galvanized as per IS 2629 (latest edition) with zinc coating. The enclosure should have mounting clamp at base on all four corners. Center to center hole distance shall be 400mm.</p> <p><b>5.2 AIR CIRCUIT BREAKERS</b></p> <p>The ACB shall be of fixed type, manually operated stored energy design. Switching ON &amp; OFF of the ACBs shall be independent of speed of the operator. For safety of operator, the ACB shall be totally front shielded with an escutcheon cover, while maintaining the required IP55 it shall also prevent contact with live parts when the enclosure door is opened. There shall be no path or opening which allows incandescent particles to be discharged from the area of the manual operating means.</p> <p><b>5.2.1</b> The Air Circuit Breaker shall be capable of rapid and smooth interruption of currents under all conditions, completely suppressing all undesirable phenomena even under the most severe and persistent short circuit conditions.</p> <p><b>5.2.2</b> Main contacts shall have ample area and contacts pressure for carrying the rated current and the short time rated tripping current of the breakers without excessive temperature rise which may cause pitting or welding. Contacts shall be adjustable to allow for wear and shall be easily replaceable and shall have a minimum of moveable parts. It shall be designed such that no maintenance shall be required under normal condition of use.</p> <p><b>5.2.3</b> The temperature rise and maximum temperature on any part of the circuit breaker, while in service under continuous full load conditions shall not exceed the</p>
--	--	---

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

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 9 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

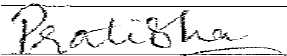

		<p>permissible limits of temperature rise as specified in the IS-IEC 60947-2 for alternating current circuit breakers with bolted type tin plated bus bars, jumpers &amp; riser ends. Gaskets shall be of a material which will not deteriorate under service conditions. Metallic compression steps shall be provided for compressible gasket.</p> <p><b>5.2.4</b> The circuit breaker shall be suitable for rapid closing and tripping. The breaker opening and closing operations shall be obtained from compressed spring charging mechanism. The operating mechanism must be stored energy type with operation by means of chargeable springs fitted with anti-pumping facility. The springs charging shall be by means of geared motor and also manually by actuating the front lever. The operating mechanism shall be of the Open/Close/Open stored energy type. The mechanism for spring charging shall be motor operated with facility for manual charging when required. It shall be suitable for re-closing once. Spring operated mechanism shall be complete with opening spring, closing spring and all necessary accessories to make the mechanism a complete unit. Each mechanism shall be designed to have a continuous sequence of circuit breaker opening and closing operations, to be obtained by control switch. Operating mechanism shall be operated by local / remote electrical control.</p> <p><b>5.2.5</b> The mechanical indicators on the front panel of the circuit breaker shall indicate 'ON', 'OFF' 'Spring Charged' and 'Spring Discharged' status conditions. It shall be possible to connect all auxiliary wiring from the front of the circuit breaker. The Air Circuit Breaker shall be with position and door interlocks, required no. of Auxiliary contacts, isolating contacts, closing and shunt releases, spring charge motor, safety interlocks, barriers, mechanical indicators, push buttons etc. required for safe and reliable operation. Mechanical indicators to show the 'close' or 'open' position of the contacts shall be provided. Operating handle shall be provided for charging the operating mechanism. All MS parts of breakers and ferrous parts shall be hot dip galvanized as per IS: 2629 (latest edition) with zinc plating. The material for spring shall be rust proof. The Air Circuit Breakers and their drawings shall have phase indications as Red, Yellow, Blue and Black.</p> <p><b>5.2.6</b> The actuator of the equipment shall be insulated from the live parts of the ACB. If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation. If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage. The direction of movement of the actuator shall comply with the requirements of IEC-447. The open and closed positions shall be ambiguously indicated by means of position indicating devices.</p> <p><b>5.2.7 MICRO-PROCESSOR BASED RELEASE</b> The ACB shall have a microprocessor based release for Overload, Short Circuit &amp; Earth Fault. Overload setting range shall be minimum adjustability from 40% to</p>
--	--	---

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



<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 10 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		<p>120%. Time Multiplier Setting (TMS) range shall be 0.05 to 1Sec. However the same shall be preset at 80% of the rated current while calibrating during manufacturing. The CTs mounted for relay shall have secondary terminals inaccessible from front including tripping mechanism to avoid tampering of CTs. Separate indications mechanical/ Electrical for overload trip, earth fault trip and short circuit trip shall be provided. A Mechanical flag shall also be provided to ensure relay trip operation; this flag should not operate on manual trip. Besides this, temperature at cable terminals should not exceed 80°C at 40°C ambient on full rated current.</p> <p>The time-current characteristics shall be of IDMT, with curve selection option and factory preset with normal inverse curve. For Short Circuit (SC) pick up range shall be 1.0 to 10 times the rated current settings and for Earth Fault (EF) pick up range shall be 0.05 to 1 times the rated current settings. The relay shall have self-diagnostic test feature. The relay shall be communicable over Modbus RS485.</p> <p>The circuit breaker shall be provided with arc chutes which shall be design to permit rapid dispersion, cooling and extinction of arc. The arc chutes shall be of arc resistant material and ensure that the arc is positively extinguished within the arc chutes while clearing the rated breaking current.</p> <p><b>5.2.8 PENDANT PUSH BUTTON STATION</b> Bidder shall supply 1 No. of Pendant type Push Button Station with necessary Push Buttons to Control the ACB, to extend supply the spring charge mechanism at the Pendant Station end and 5 Pin 16mm Male Metal Shell Connector at the ACB end. The Pendant Push Button Station shall be supplied with 1100V grade four core multi strand flexible copper conductor wires with HRPVC insulation and shall be flame retardant, vermin and rodent proof. The length of the Pendant Push Button Station Cable shall not be less than 5m and shall be enclosed with stainless flexible hose.</p> <p><b>5.3 TERMINALS AND CONNECTIONS</b> Current carrying parts shall have the necessary mechanical strength and current carrying capacity for their intended use. All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength. Standard sizes of bolts, screws, pipe and other fittings shall be used and number of sizes to be kept minimum. Terminals shall be so constructed that the conductors can be clamped between suitable surfaces without any significant damage either to conductors or terminals. Terminals shall not allow the conductors to be displaced or be displaced themselves in a manner detrimental to the operation of equipment and the insulation voltage shall not be reduced below the rated values. Terminals for connection to external conductors shall be readily accessible during installation. Fire retardant (Non-Bakelite) Phase barriers between phase bus bars shall be provided to avoid short circuit. Clamping screws and nuts shall not serve to fix any other component although they may hold the terminals in place or prevent them from turning.</p>
--	--	--

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



<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 11 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

**5.3.1** All mechanism shall be made of such material as to prevent corrosion due to sticking of dust. The bolts, nuts and washers shall be of Stainless steel only to avoid corrosion and trouble free operation at the time of maintenance. All connections and contacts shall be of ample section and surfaces for carrying continuously the specified current without undue heating and shall be secured rigidly & locked in position. The manufacturer shall state the type (rigid/stranded/flexible), the minimum and the maximum cross-section of conductors for which the terminal is suitable and, if applicable, the number of conductors simultaneously connectable to the terminal.

**5.3.2** The enclosure shall incorporate neutral link. Cable lugs shall be of crimping type and symmetrically arranged to facilitate easy cable connections. The cable lugs shall be of long barrel type with two hole arrangement (pls. refer ENG-C-17-03). Aluminum lugs with the provision of wire sizes as mentioned in the below table are required to be supplied with each ACB. Sizes of incoming and outgoing cables for phases and neutral shall be as given below. The cables shall be 1100V, single core and XLPE insulated. Single core cables shall be unarmored, whereas multi core cables shall be armored. All terminals, connectors, bus bars shall be designed in such a way that, the incoming & outgoing cables shall not develop any mechanical stress.

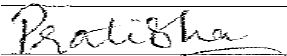

The provision of control wiring where ever shall be including spiral PVC conduits. All Busbar, connectors, terminals shall be suitable for the following arrangement of cable connection:

S.No.	Rated Phase Current (A)	Size of I/C cable (sq. mm) / phase	Size of O/G cable (sq. mm)
1	400	1RX1CX 630	4CX300
2	800	2RX1CX 630	4CX300
3	1250	2RX1CX 630	4CX300
4	1600	3RX1CX630	4CX300
5	2000	3RX1CX 630	4CX300
6	Neutral Busbar	Same as of Phase size	

#### **5.4 BUS-BAR SUPPORT & INSULATION**

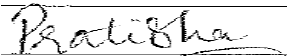

The bidder shall use fire retardant material (not Bakelite) for insulation and seal the gap near the bus-bars with sealing agent, to prevent the inrush of dust and moisture from the back side of enclosure.

Phase to phase and phase to neutral separators of FRP material having thickness minimum 3 mm should be provided. If in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure. ACB enclosure should have two separate windows for incoming and outgoing bus-bars. The windows should be covered with minimum 10 mm FRP sheet through which bus-bars shall be taken out. FRP sheet should be fixed at minimum 10 points.

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

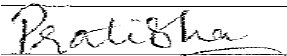

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 12 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		<p><b>5.5 PROTECTIVE MEASURES</b></p> <p>The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance so that there is no possibility of the operator experiencing a shock during normal operation. All apparatus, connections and cabling shall be designed / arranged to minimize risks of fire and any damage which might cause in the event of fire. Bakelite impregnated / non-impregnated should not be used internally or externally. All apparatus shall be so designed and constructed as to obviate the risks or short circuits of the live parts by lizards / rodents.</p> <p><b>5.5.1</b> When the operating person is opening the door, at any circumstances he should not be able to access the live bus directly, Insulated barriers shall be provided wherever necessary so as to ensure that no accidental contact with any live parts inside is possible.</p> <p><b>5.5.2 INTERNAL WIRING</b></p> <p>All wiring shall be carried out with 1100V grade single core multi strand flexible copper conductor wires with HRPVC insulation and shall be flame retardant, vermin and rodent proof. The current carrying capacity of wire shall be adequate for the duty assigned to it considering short circuit condition and shall have sufficient flexibility to facilitate proper termination at any location. Color coded wires (red, yellow, blue, black) shall be used for CT. The CT wiring shall be of 4 sq.mm size and copper conductor used for internal wiring of 2.5 Sq. mm per lead. The wire numbers shown in the wiring diagram shall be in accordance with IS375/BS152/BS156. All wires directly connected to trip circuit breaker or devices shall be distinguished by addition of a red colored lettered ferrule. Number 6 and 9 shall be used with proper marking conforming certainty of 6 and 9 Number from all directions.</p> <p>Panel wiring shall be securely supported, neatly installed by lacing and tying, readily accessible and connected to equipment terminals and terminal blocks. Flame retardant, plastic wiring channels/troughs with strap on plastic covers shall be used for this purpose. Sufficient space in channel for modification of wiring shall be kept. Wire termination shall be made with solder less crimping type of tinned copper lugs which firmly grip the conductor. Insulation sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules, marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall off when the wire is disconnected from terminal blocks.</p> <p><b>5.6 PROTECTIVE EARTHING</b></p> <p>The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor. The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other</p>
--	--	---

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

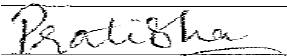

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 13 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

		<p>than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor. Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place.</p> <p>The ACB shall be provided with a Copper Earth Bus suitable for the rated short circuit current of the breaker. Two nos. studs shall be provided on side of boxes for body earthing of size M10 .One more stud shall be provided for neutral earthing of same size. The earth terminal /stud shall be of suitable size to accommodate the earth conductor and shall be corrosion protected. The earth terminal shall be identified by means of earthing sign marked in legible and indelible manner on or adjacent terminals. The earthing stud shall be welded from inside so as to prevent access to theft. The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed.</p> <p><b>5.7 TERMINAL BLOCKS</b></p> <p>Terminal blocks shall be 1100 V grade, 5 A rated, one piece molded, complete with insulated barriers, stud type, melamine housing brass terminals, washers, brass nuts, brass lock nuts and identification strips. Markings on the terminals strips shall correspond to wire number on the wiring diagrams. Not more than 2 wires shall be connected to any terminals.</p> <p>All spare contacts and terminals of the circuit breaker shall be wired up to terminal blocks in the panel with distinguished ferrule numbers. Molding materials shall be self-extinguishing or resistant to flame propagation, substantially non hygroscopic and shall not carbonize when tested for tracking. The insulation between any terminal and frame work between adjacent terminals shall with stand test of 2kV RMS for one minute. The molding shall be mechanically robust to withstand handling while making terminations. Easily removable Protective transparent plastic covers for placing over the live parts of the terminal blocks shall be provided invariably.</p> <p><b>5.8 PAINTING</b></p> <p>The paint shall be applied on clean, dry surface under suitable atmospheric conditions by seven tank process followed by powder coating. The paint shall be RAL 7032 (Grey) with thickness of powder coating not less than 80 microns. Oil, grease, dirt and swart shall be thoroughly removed by emulsion cleaning.</p>
		<p>All the components and operating devices like connectors, switches, motors, relays, coils, springs, etc., of the ACB shall be provided with durable and legible tag/label corresponding to the drawing. These tags/labels shall be mounted directly by the side of the respective equipment and/or accessories and shall not be hidden by the equipment wiring. The name plate containing all the technical parameters on</p>

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

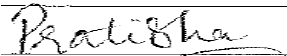

	<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 14 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

<b>6.0</b>	<b>NAMEPLATE &amp; MARKING</b>	<p>enclosure of the ACB shall be embossed with "PROPERTY OF TATA POWER-CODL, DELHI" along with the following parameters:</p> <ul style="list-style-type: none"> <li>a) PO number with date</li> <li>b) Code Number.</li> <li>c) Manufacturer's Name</li> <li>d) Sr. No</li> <li>e) Month &amp; Year of Manufacture (MM/YYYY).</li> <li>f) Country Of manufacture.</li> <li>g) Danger Plate</li> <li>h) Utilization category.</li> <li>i) Rated Operation Voltage (Ue)</li> <li>j) Rated Frequency.</li> <li>k) Rated Service Short Circuit Breaking Capacity(Ics)</li> <li>l) Rated ultimate short circuit breaking capacity (Icu).</li> <li>m) Line &amp; load terminals.</li> <li>n) Relevant Standards.</li> <li>o) IP class.</li> <li>p) Rated insulation Voltage (Ui)</li> <li>q) Guarantee Period</li> </ul> <p>The following markings to be provided by the bidder:</p> <ul style="list-style-type: none"> <li>a) Protective earth terminals</li> <li>b) Terminal markings</li> </ul> <p>Name plate/tags/labels shall be made of Aluminum anodized plate PV castings or permanent type and shall have white letters on black background. All equipment/ accessories shall be given standard abbreviation numbers with name of the device, corresponding to the ones shown in the panel internal wiring and breaker manual.</p>
------------	--	---

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

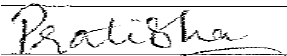

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 15 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

<b>7.0</b>	<b>TESTS</b>	<p>All routine, acceptance and type tests shall be carried out in accordance with the relevant IS/IEC standards. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components should have been type tested as per the relevant standards from CPRI/ERDA. Following tests shall be necessarily conducted on the LT Air Circuit Breaker in addition to others specified in IS/IEC standards. Other than the tests specified below, all tests specified as per IS/ IEC 60947; I and II shall be carried out.</p> <p><b>7.1 TYPE TEST</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: center;">Test</th> <th style="text-align: center;">Reference Standard</th> </tr> </thead> <tbody> <tr> <td>Temperature rise test</td> <td>IEC 60947-1:2007</td> </tr> <tr> <td>Tripping Limits &amp; Characteristics</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Dielectric Properties</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Operational Performance Capability</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Overload Performance</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Short Circuit breaking capacities</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Short Time withstand current</td> <td>IEC 60947-2:2016</td> </tr> <tr> <td>Degree of Protection of enclosed equipment</td> <td>IEC 60947-1:2007</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>EMC Tests</b></td> </tr> <tr> <td>Electrostatic Discharge</td> <td>IEC 60255-22-2, Class-III IEC 61000-4-2, Class-III</td> </tr> <tr> <td>Fast Transient Disturbance</td> <td>IEC 60255-22-4, Class-A IEC 61000-4-4</td> </tr> <tr> <td>Surge Immunity Test</td> <td>IEC 60255-22-5 IEC 61000-4-5</td> </tr> <tr> <td>Power Frequency Immunity Test</td> <td>IEC 60255-22-7, Class-A</td> </tr> <tr> <td>Power Frequency Magnetic Field Test</td> <td>IEC 61000-4-8</td> </tr> <tr> <td>Radiated &amp; Conducted Electromagnetic Field Disturbance</td> <td>IEC 60255-22-3 IEC 6100-4-3</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>Insulation Test</b></td> </tr> <tr> <td>Dielectric Test Impulse Voltage Test Insulation Resistance</td> <td>IEC 60255-5</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>Environmental Test</b></td> </tr> <tr> <td>Cold Test</td> <td>IEC 60068-2-1</td> </tr> <tr> <td>Dry Heat Test</td> <td>IEC 60068-2-2</td> </tr> <tr> <td>Damp Heat Test</td> <td>IEC 60068-2-3</td> </tr> </tbody> </table> <p><b>7.2 ACCEPTANCE TEST</b></p>	Test	Reference Standard	Temperature rise test	IEC 60947-1:2007	Tripping Limits & Characteristics	IEC 60947-2:2016	Dielectric Properties	IEC 60947-2:2016	Operational Performance Capability	IEC 60947-2:2016	Overload Performance	IEC 60947-2:2016	Short Circuit breaking capacities	IEC 60947-2:2016	Short Time withstand current	IEC 60947-2:2016	Degree of Protection of enclosed equipment	IEC 60947-1:2007	<b>EMC Tests</b>		Electrostatic Discharge	IEC 60255-22-2, Class-III IEC 61000-4-2, Class-III	Fast Transient Disturbance	IEC 60255-22-4, Class-A IEC 61000-4-4	Surge Immunity Test	IEC 60255-22-5 IEC 61000-4-5	Power Frequency Immunity Test	IEC 60255-22-7, Class-A	Power Frequency Magnetic Field Test	IEC 61000-4-8	Radiated & Conducted Electromagnetic Field Disturbance	IEC 60255-22-3 IEC 6100-4-3	<b>Insulation Test</b>		Dielectric Test Impulse Voltage Test Insulation Resistance	IEC 60255-5	<b>Environmental Test</b>		Cold Test	IEC 60068-2-1	Dry Heat Test	IEC 60068-2-2	Damp Heat Test	IEC 60068-2-3
Test	Reference Standard																																													
Temperature rise test	IEC 60947-1:2007																																													
Tripping Limits & Characteristics	IEC 60947-2:2016																																													
Dielectric Properties	IEC 60947-2:2016																																													
Operational Performance Capability	IEC 60947-2:2016																																													
Overload Performance	IEC 60947-2:2016																																													
Short Circuit breaking capacities	IEC 60947-2:2016																																													
Short Time withstand current	IEC 60947-2:2016																																													
Degree of Protection of enclosed equipment	IEC 60947-1:2007																																													
<b>EMC Tests</b>																																														
Electrostatic Discharge	IEC 60255-22-2, Class-III IEC 61000-4-2, Class-III																																													
Fast Transient Disturbance	IEC 60255-22-4, Class-A IEC 61000-4-4																																													
Surge Immunity Test	IEC 60255-22-5 IEC 61000-4-5																																													
Power Frequency Immunity Test	IEC 60255-22-7, Class-A																																													
Power Frequency Magnetic Field Test	IEC 61000-4-8																																													
Radiated & Conducted Electromagnetic Field Disturbance	IEC 60255-22-3 IEC 6100-4-3																																													
<b>Insulation Test</b>																																														
Dielectric Test Impulse Voltage Test Insulation Resistance	IEC 60255-5																																													
<b>Environmental Test</b>																																														
Cold Test	IEC 60068-2-1																																													
Dry Heat Test	IEC 60068-2-2																																													
Damp Heat Test	IEC 60068-2-3																																													

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

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 16 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajnath Dey	<b>Issued By :</b> H C Sharma

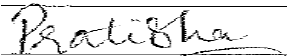

		<b>Test</b>	<b>Reference Standard</b>
		Dimensional and visual checks	As per Tata Power-CODL specification
		Clearance & Creepage distances	IEC 60947-1:2007
		Dielectric Test on main and control circuit	IEC 60947-1: 2007
		Mechanical Operation Tests	IEC 60947-2: 2016
		Tests of auxiliary electrical devices	IEC 60947-1: 2007
		Verification of correct wiring	IEC 60947-1: 2007
		Calibration of Releases	IEC 60947-2: 2016
		Temperature rise (once in RO)	IEC 60947-1:2007
		Insulation Resistance	IEC 60947-2: 2016
		High voltage power frequency withstand for power and control circuit	IEC 60947-1:2007
		Short circuit making and breaking capabilities	IEC 60947-2:2016
<b>7.3 ROUTINE TEST</b>			
		<b>Test</b>	<b>Reference Standard</b>
		Dimensional and visual checks	As per Tata Power-CODL specification
		Verification of clearances	IEC 60947-1:2007
		Dielectric Test on main and control circuit	IEC 60947-1: 2007
		Mechanical Operation Tests	IEC 60947-2: 2016
		Calibration of Releases	IEC 60947-2: 2016
		High voltage power frequency withstand for power and control circuit	IEC 60947-1:2007
<b>8.0</b>	<b>TYPE TEST CERTIFICATES</b>	The bidder shall furnish the type test certificates of LT ACB for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI/ERDA as per the relevant standards. Type test should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to Tata Power-CODL.	

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



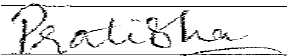

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 17 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajnath Dey	<b>Issued By :</b> H C Sharma

<b>9.0</b>	<b>PRE DISPATCH INSPECTION</b>	<p>The Material shall be subject to inspection by a duly authorized representative of the Tata Power-CODL. 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 Tata Power-CODL's representatives at all times when the work is in progress.</p> <p>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 and one copy of the report shall be sent to Plant Engineering and Contracts department. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by Tata Power-CODL. 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 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> </ul>
<b>10.0</b>	<b>INSPECTION AFTER RECEIPT AT STORES</b>	<p>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.</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 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>

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

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 18 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

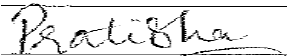

<b>12.0</b>	<b>PACKING</b>	Bidder shall ensure that all equipment covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit.															
<b>13.0</b>	<b>TENDER SAMPLE</b>	Not Applicable.															
<b>14.0</b>	<b>TRAINING</b>	The successful bidder shall be required to provide facility for in-plant training, at no extra cost to the purchaser's engineers to be nominated by the purchaser at his works, where the equipment offered shall be manufactured. The training shall cover familiarization with manufacturing and assembly techniques, procedures of installation, testing, commissioning, operation, maintenance and trouble shooting on the circuit breaker. Hands-on training shall utilize equipment identical to that being supplied to Employer. The schedule, location and detailed contents of each course will be finalized during Employer and Contractor discussions.															
<b>15.0</b>	<b>QUALITY CONTROL</b>	The bidder shall submit with the offer Quality Assurance Plan (QAP) indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the technical specifications.															
<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 relevant International / Indian standards/Technical Specification.															
<b>17.0</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 along with GTP/Drawing approval.															
<b>18.0</b>	<b>SPARES, ACCESSORIES AND TOOLS</b>	<p>The bidder shall have to provide the list of spares, which may be required for ensuring the availability during the guaranteed availability period. The list of spares shall be part of scope of supply and accordingly the price thereof shall be quoted by the bidder (as per confirmation given by Plant Engineering) and shall be considered in the evaluation of the bids.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">S. No.</th> <th style="width: 50%;">SPARES</th> <th style="width: 30%;">Units</th> </tr> </thead> <tbody> <tr> <td>(i)</td> <td>CT</td> <td>20 % of supply</td> </tr> <tr> <td>(ii)</td> <td>Relay</td> <td>20 % of supply</td> </tr> <tr> <td>(iii)</td> <td>Trip Coil</td> <td>20 % of supply</td> </tr> <tr> <td>(iv)</td> <td>ARC Chute</td> <td>20 % of supply</td> </tr> </tbody> </table> <p>Note: - The spares shall be included in PR only after furnishing requirement from user group.</p>	S. No.	SPARES	Units	(i)	CT	20 % of supply	(ii)	Relay	20 % of supply	(iii)	Trip Coil	20 % of supply	(iv)	ARC Chute	20 % of supply
S. No.	SPARES	Units															
(i)	CT	20 % of supply															
(ii)	Relay	20 % of supply															
(iii)	Trip Coil	20 % of supply															
(iv)	ARC Chute	20 % of supply															

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



<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 19 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

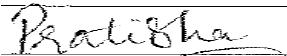

<b>19.0</b>	<b>DRAWINGS AND DOCUMENTS</b>	<p>Following documents shall be prepared based on Tata Power-CODL specifications and statutory requirements with Drawing including complete BOM and shall be submitted with the bid:</p> <ol style="list-style-type: none"> <li>a) Signed &amp; stamped copy of clause-wise compliance on Technical Specification</li> <li>b) General description &amp; drawing of the equipment</li> <li>c) Type test Certificates with drawings</li> <li>d) Experience List</li> <li>e) Drawing with complete BOM</li> <li>f) Signed &amp; stamped copy of pre-bid queries</li> <li>g) Signed &amp; stamped copy of No deviation certificate</li> </ol> <p>After the award of the contract, clause wise compliance on Technical Specification, complete equipment drawing with BOM, spare list, compliances on undertaking provided during technical evaluation shall be submitted for approval within the timelines mentioned in the contract. Category-A approval is mandatory from Plant Engineering for application of MDCC.</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="text-align: center;">S. No</th> <th style="text-align: center;">Description</th> <th style="text-align: center;">For Approval</th> <th style="text-align: center;">For Review Information</th> <th style="text-align: center;">Final Submission</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Technical Parameters</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">2</td> <td>General Arrangement drawings</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Dimensional drawings</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Bill of Material</td> <td style="text-align: center;">√</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">5</td> <td>Foundation Plan/ Mounting details</td> <td style="text-align: center;">√</td> <td></td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Manual/Catalogues/drawings for ACB</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Installation Instructions</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">8</td> <td>Instruction for Use</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">9</td> <td>Transport/ Shipping dimension drawing</td> <td></td> <td style="text-align: center;">√</td> <td style="text-align: center;">√</td> </tr> <tr> <td style="text-align: center;">10</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 style="text-align: center;">11</td> <td>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>	S. No	Description	For Approval	For Review Information	Final Submission	1	Technical Parameters	√		√	2	General Arrangement drawings	√		√	3	Dimensional drawings	√		√	4	Bill of Material	√			5	Foundation Plan/ Mounting details	√		√	6	Manual/Catalogues/drawings for ACB		√	√	7	Installation Instructions		√	√	8	Instruction for Use		√	√	9	Transport/ Shipping dimension drawing		√	√	10	QA & QC Plan	√	√	√	11	Test Certificates	√	√	√
S. No	Description	For Approval	For Review Information	Final Submission																																																										
1	Technical Parameters	√		√																																																										
2	General Arrangement drawings	√		√																																																										
3	Dimensional drawings	√		√																																																										
4	Bill of Material	√																																																												
5	Foundation Plan/ Mounting details	√		√																																																										
6	Manual/Catalogues/drawings for ACB		√	√																																																										
7	Installation Instructions		√	√																																																										
8	Instruction for Use		√	√																																																										
9	Transport/ Shipping dimension drawing		√	√																																																										
10	QA & QC Plan	√	√	√																																																										
11	Test Certificates	√	√	√																																																										
<b>20.0</b>	<b>GUARANTEED TECHNICAL PARTICULARS</b>	Bidder to comply all above clauses as per specification																																																												

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

	<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 20 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

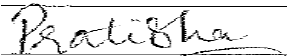

<b>21.0</b>	<b>SCHEDULE OF DEVIATIONS</b>	<b><u>(TO BE ENCLOSED WITH TECHNICAL BID)</u></b>		
		<p>All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications: We confirm that there are no deviations apart from detailed Below</p>		
		<b>S.No.</b>	<b>Clause No.</b>	<b>Details of deviation with justifications</b>
		Seal of the Company:	Signature: Designation:	

**Annexure-1  
Inspection Testing Plan**

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

<b>TATA POWER DELHI DISTRIBUTION LIMITED, DELHI</b>			
<b>TECHNICAL SPECIFICATION</b>			
<b>Document Title</b>	<b>TECHNICAL SPECIFICATION FOR LT AIR CIRCUIT BREAKER- MICROPROCESSOR BASED</b>		
<b>Document No.</b>	<b>ENG-LV-3011</b>	<b>Eff. Date: 01.06.2020</b>	
<b>Revision No.</b>	<b>00</b>	<b>Page 21 of 21</b>	
<b>Prepared By:</b> Pratibha Kumari	<b>Reviewed By:</b> Vinoth Kumar M	<b>Approved By:</b> Brajanath Dey	<b>Issued By :</b> H C Sharma

<b>Test</b>	<b>Reference Standard</b>	<b>Requirement</b>
Dimensional and visual checks	IEC 60947-2: 2016	As per Tata Power-CODL specification
Clearance & Creepage distances	IEC 60947-1:2007	As per table 13 & table 15
Dielectric Test on main and control circuit	IEC 60947-1: 2007	As per Ui & Ue of table 12A
Mechanical Operation Tests	IEC 60947-2: 2016	5 nos. each operation (Electrical/ Mechanical)
Tests of auxiliary electrical devices	IEC 60947-1: 2007	As per specification
Verification of correct wiring	IEC 60947-1: 2007	As per specification
Calibration of Releases	IEC 60947-2: 2016	(i) 1.5 In (should not trip in specified time limit) (ii) 1.3 In (should trip in specified time limit)
Temperature rise (once in RO)	IEC 60947-1:2007	80 deg. C Rise
Insulation Resistance	IEC 60947-2: 2016	Min. 1 M ohm at 500V DC
High voltage power frequency withstand for power and control circuit	IEC 60947-1:2007	30% of Uimp or 2Ui for 1sec.
Short circuit making and breaking capabilities	IEC 60947-2:2016	As per table 2 of 4.3.6.3

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

	<b>TPCODL, BHUBANESWAR</b>		
	<b>TECHNICAL SPECIFICATION</b>		
<b>Document Title</b>	Specification for Anchor rod		
<b>Document No.</b>	<b>ENG-HV-49</b>	<b>Eff. Date: 01/06/2020</b>	
<b>Revision No.</b>	00	Page 1 of 12	
<b>Prepared By</b>	<b>Reviewed By</b>	<b>Approved By</b>	<b>Issued By</b>

**CONTENTS**

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

Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

Document Title	Specification for Anchor rod	
Document No.	ENG-HV-49	Eff. Date:
Revision No.	00	Page 2 of 12

## 1.0 SCOPE

The scope of this document is to give design & constructional features, inspection, supply and transportation guidelines for Anchor rod.

## 2.0 APPLICABLE STANDARDS

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

- a) IS 2629-1985 - For Recommended practice for hot dip galvanized of iron and steel
- b) IS 4759-1996 - For Hot dip zinc coatings on structural steel and other allied products- specification
- c) IS 2062- 2006 - Hot Rolled Low, Medium and High Tensile Structural Steel
- d) IS 18521985 - Rolling and cutting tolerances for hot rolled steel products

## 3.0 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.

## 4.0 GENERAL CONSTRUCTION:

The material shall be-

- a) All parts shall be of GI and galvanizing shall be done as per IS 4759:1996
- b) The design shall be suitable for the climatic condition stated above.
- c) The constructional details shall be as per the attached drawing no **TPD-S-116-E-146**
- d) Zinc electroplated/painted material will not be accepted
- e) All threading and fabrication works should be done before galvanization
- f) Hot dip galvanized nuts must be used.
- g) Fabrication tolerances should be  $\pm 2\%$  until and unless otherwise specified
- h) Dimensional tolerances shall be as per IS 1852-1985

## 5.0 GENERAL TECHNICAL REQUIREMENTS:

Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

Document Title	Specification for Anchor rod	
Document No.	ENG-HV-49	Eff. Date:
Revision No.	00	Page 3 of 12

Technical parameters	TPCODL requirements
Application	Anchor rod is used to hold the stay wire firmly on the ground along with RCC base plate
Eye Rod	
a) Material	MS as per IS 2062 ( Grade E 250)
b) Diameter	20 mm
c) Length	2100 mm

## 6.0 MARKING:

The unit shall be appropriately marked as "**PROPERTY OF TPCL, BHUBANESWAR**" and with the name of the vendor and year of manufacturing at suitable location.

## 7.0 TESTS

All routine, acceptance & type tests shall be carried out in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All components shall also be type tested as per the relevant standards.

Tests	IS to be referred
Visual test	As a routine test
Dimensional tests	As per the drawing
Hot dip galvanizing	IS 4759-1996
Determination of mass of zinc coating on zinc coated iron and steel	IS 4759-1996

## 8.0 TEST CERTIFICATES

The bidder shall furnish the test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at NABL accredited as per the relevant standards. Type test should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable 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.

## 9.0 PRE DISPATCH INSPECTION

Equipment shall be subjected to inspection by a duly authorized representative of 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 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.

- Test reports
- MDCC issued by TPCL.
- Invoice in duplicate
- Packing list
- Drawings & catalogue
- Guarantee / Warrantee card
- Delivery Challan
- 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 / contracts department.

Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

Document Title	Specification for Anchor rod	
Document No.	ENG-HV-49	Eff. Date:
Revision No.	00	Page 4 of 12

### 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 Company 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. In the event any defect is found by the Company up to a period of 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs.

### 12.0 PACKING

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

### 13.0 TENDER SAMPLE

Not Applicable.

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

### 15.0 MINIMUM TESTING FACILITIES

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

### 16.0 MANUFACTURING ACTIVITIES

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

### 17.0 SPARES, ACCESSORIES AND TOOLS

Bidder shall provide a list of recommended spares with quantity and unit prices for 3 years of operation after commissioning. The bidder shall provide a list of complete set of accessories and tools required for erection & maintenance along with the installation procedure.

### 18.0 DRAWINGS

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

- Completely filled-in Technical Parameters (refer Cl. 5)
- General description of the equipment and all components including brochures
- General arrangement drawings
- Type Test Certificates.
- Experience List
- Manufacturing schedule and test schedule.

After 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 TPCL.

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

Drawings/documents to be submitted after the award of the contract in English language:

Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

Document Title	Specification for Anchor rod	
Document No.	ENG-HV-49	Eff. Date:
Revision No.	00	Page 5 of 12

S.No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√
3	Instruction for Use		√	√
4	QA & QC Plan	√	√	√
5	Routine, Acceptance & Type Test Certificates	√	√	√

## 19.0 SCHEDULE OF DEVIATIONS

### SCHEDULE OF DEVIATIONS

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

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

S.No	Clause No.	Details of deviation with justifications

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

Seal of the Company:

Signature  
Designation

Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

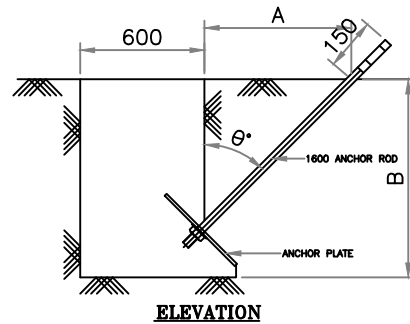
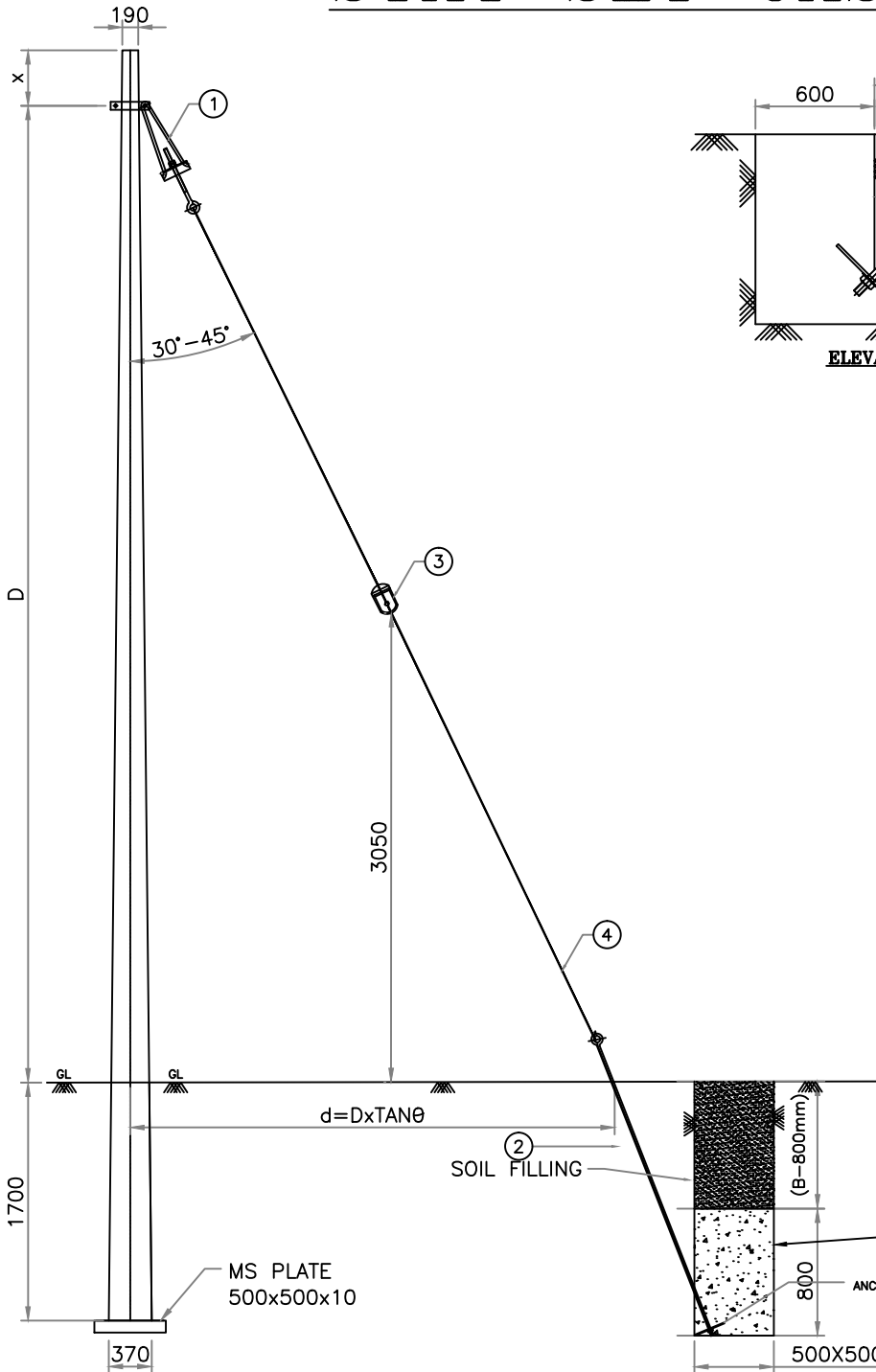


Document Title	Specification for Anchor rod	
Document No.	<b>ENG-HV-49</b>	Eff. Date:
Revision No.	00	Page 6 of 12

CONTROLLED and APPROVED

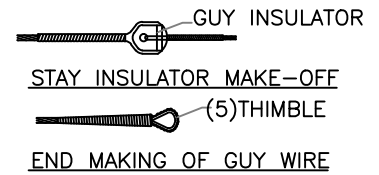
Initiator		HOG ( Plant Engineering)	
-----------	--	--------------------------	--

# STAY SET CASTING



$\theta$	30°	45°
A	750	1100
B	1500	1300

## GUY ASSEMBLY (CONVENTIONAL ARRANGEMENT)



CONCRETING TO BE DONE  
WHERE SOIL IS NOT FIRM

	<b>TPCODL, 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>Eff. Date: 01/06/2020</b>	
<b>Rev. No</b>	00	<b>Page 1 of 8</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

**CONTENTS**

- 1.0 SCOPE**
- 2.0 APPLICABLE STANDARDS**
- 3.0 CLIMATIC CONDITIONS OF INSTALLATION**
- 4.0 GENERAL TECHNICAL REQUIREMENTS**
- 5.0 GENERAL CONSTRUCTIONS**
- 6.0 MARKING**
- 7.0 TESTS**
- 8.0 TYPE TEST CERTIFICATES**
- 9.0 PRE-DISPATCH INSPECTION**
- 10.0 INSPECTION AFTER RECEIPT AT STORES**
- 11.0 GUARANTEE**
- 12.0 PACKING**
- 13.0 TENDER SAMPLE**
- 14.0 QUALITY CONTROL**
- 15.0 MINIMUM TESTING FACILITIES**
- 16.0 MANUFACTURING ACTIVITIES**
- 17.0 SPARES, ACCESSORIES AND TOOLS**
- 18.0 DRAWINGS AND DOCUMENTS**
- 19.0 GUARANTEED TECHNICAL PARTICULARS**
- 20.0 SCHEDULE OF DEVIATIONS**

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

<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>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 2 of 8</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

### 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.

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

<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>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 3 of 8</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

#### 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".

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

<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>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 4 of 8</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

## 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.

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

<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>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 5 of 8</b>	
<b>Prepared by:</b>	<b>Reviewed By:</b>	<b>Approved By:</b>	<b>Issued By:</b>

### 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.

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

<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>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>

#### 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
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details of Stay Wire.		√	√

Initiator		HoG (Engineering)	
-----------	--	-------------------	--



<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:      Eff. Date: Page 7 of 8 Issued By:

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	%	

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

	<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>Eff. Date:</b>	
<b>Rev. No</b>	00	<b>Page 8 of 8</b>	
<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:

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

Initiator		HoG (Engineering)	
-----------	--	-------------------	--

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 engg/Sangam/Jyoti/Good Luck/Mann/Ferro Gelva/salasar Techno/UCIC/Balakra fabricon/ VSP Enterprises
LED Lighting	Nichia, cree, seoul, osram, Philips, Bajaj
Pump	CGL / Kirloskar
RTU/Data Concentrator / Protection relays	Please refer latest revision of protection specification 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 <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





**CONTENTS**

<b>CLAUSE NO.</b>	<b>DESCRIPTION</b>
<b>1.0</b>	<b>ORGANIZATIONAL VALUES</b>
<b>2.0</b>	<b>ETHICS</b>
<b>3.0</b>	<b>CONTRACT PARAMETERS</b>
3.1	Issue/ Award of Contract
3.2	Contract Commencement Date
3.3	Contract Completion Date
3.4	Contract Period/Time
3.5	Contract Execution Completion Date
3.6	Contract Execution Period/Time
3.7	Contract Price /Value
3.8	Contract Document
3.9	Contract Language
3.10	Reverse Auction
<b>4.0</b>	<b>SCOPE OF WORK</b>
4.1	Technical Evaluation
4.2	Indemnity
4.3	Display of notice boards at work site
4.4	Disposal of waste at site
4.5	Deployment of workforce
4.6	Damage of Properties
4.7	Issuance of material
4.8	Company's right to use works
4.9	Rights of TPCODL to vary the scope work
<b>5.0</b>	<b>PRICES/RATES/TAXES</b>
5.1	For Supply part of Contract
5.2	For Service part of Contract
5.3	Changes in statutory Tax Structure

<b>CONTENTS</b>	
<b>CLAUSE NO.</b>	<b>DESCRIPTION</b>
<b>6.0</b>	<b>TERMS OF PAYMENT</b>
6.1	Pre-Requisites for Payment
6.2	Bills & Invoices
6.3	Payment & Statutory Deductions
6.4	Guidelines for Raising Running/Final Bills
6.5	Quantity Variation
6.6	Full and Final Payment
<b>7.0</b>	<b>MODE OF PAYMENT</b>
<b>8.0</b>	<b>SECURITY CUM PERFORMANCE DEPOSIT</b>
<b>9.0</b>	<b>STATUTORY COMPLIANCE</b>
9.1	Compliance to Various Acts
9.2	SA 8000
9.3	Affirmative Action
9.4	Compliance to Labour Laws
9.5	Compliance to C&D Waste Management Rules & Environment (Protection) Amendment Rules
<b>10.0</b>	<b>QUALITY</b>
10.1	Knowledge of Requirements
10.2	Material/Equipment/Works Quality
10.3	Adherence to Rules & Regulations
10.4	Specifications and Standards
<b>11.0</b>	<b>SAFETY</b>
<b>12.0</b>	<b>INSPECTION/PARTICIPATION</b>
12.1	Right to Carry Out Inspection
12.2	Facilitating Inspection
12.3	Third Party Nomination
12.4	Waiver of Inspections
12.5	Incorrect Inspection Call
<b>13.0</b>	<b>MDCC &amp; DELIVERY OF MATERIALS</b>
13.1	Material Dispatch Clearance Certificate

<b>CONTENTS</b>	
<b>CLAUSE NO.</b>	<b>DESCRIPTION</b>
13.2	Right to Rejection on Receipt
13.3	Consignee
13.4	Submission of Mandatory Documents on delivery
13.5	Dispatch and Delivery Instructions
<b>14.0</b>	<b>GUARANTEE</b>
14.1	Guarantee of Performance
14.2	Guarantee period
14.3	Failure in Guarantee period (GP)
14.4	Cost of repairs on failure in GP
14.5	Guarantee Period for Goods Outsourced
14.6	Latent Defect
14.7	Support beyond the Guarantee Period
<b>15.0</b>	<b>LIQUIDATED DAMAGES</b>
15.1	LD Waiver Request
15.2	Material Recovery
<b>16.0</b>	<b>ASSIGNMENT OR SUBCONTRACTING</b>
<b>17.0</b>	<b>UNLAWFUL ACTIVITIES</b>
<b>18.0</b>	<b>CONFIDENTIALITY</b>
18.1	Documents
18.2	Geographical Data
18.3	Associate's Processes
18.4	Exclusions
18.5	Violation
<b>19</b>	<b>INTELLECTUAL PROPERTY RIGHTS</b>
<b>20</b>	<b>INDEMNITY</b>
<b>21</b>	<b>LIABILITY &amp; LIMITATIONS</b>
21.1	Liability
21.2	Limitation of Liability
<b>22.0</b>	<b>FORCE MAJEURE</b>

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 4 of 104

<b>CONTENTS</b>	
<b>CLAUSE NO.</b>	<b>DESCRIPTION</b>
<b>23.0</b>	<b>SUSPENSION OF CONTRACT</b>
23.1	Suspension for Convenience
23.2	Suspension for Breach of Contract Conditions
23.3	Compensation in lieu of Suspension
<b>24.0</b>	<b>TERMINATION OF CONTRACTS</b>
24.1	Termination for default/breach of contract
24.2	Termination for convenience of associate
24.3	Termination for Convenience of TPCODL
<b>25.0</b>	<b>Dispute resolution and Arbitration</b>
25.1	Governing laws and jurisdiction
<b>26.0</b>	<b>ATTRIBUTES OF GCC</b>
26.1	Cancellation
26.2	Severability
26.3	Order of Priority
<b>27.0</b>	<b>INSURANCE</b>
<b>28.0</b>	<b>ERRORS AND OMISSIONS</b>
<b>29.0</b>	<b>TRANSFER OF TITLES</b>
<b>30.0</b>	<b>SUGGESTIONS &amp; FEEDBACK</b>
<b>31.0</b>	<b>CONTACT POINTS</b>
<b>32.0</b>	<b>LIST OF ANNEXURES</b>

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 5 of 104

## 1.0 ORGANIZATIONAL VALUES

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

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

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

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

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

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

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

## 2.0 ETHICS

In our effort towards Excellence and in Management of Business Ethics at TPCODL, an Ethics Management Team is constituted.

The main objective of the Ethics Management Team is to:

1. Record, address and allay the issues and concerns on ethics raised by different stakeholders like employees, consumers, vendors, Associates etc. by initiating immediate corrective actions.
2. Ensure proper communication of the ethics policies and guidelines through prominent displays at all offices of TPCODL and through printed declarations in all concerned documents where external stakeholders are involved.
3. Ensure proper framework of policies as preventive measures against any ethics violation recorded by them.
4. Prepare and submit MIS of all issues and concerns, corrective and preventive actions on monthly basis to the top management for their information.

All members of Team TPCODL, Associates and Stakeholders are requested to 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 6 of 104

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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 7 of 104

- 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 8 of 104

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> No Material Rejections in last 2 years Deduction of 3 marks for each PO/ RO (for same product category) with major rejections in last 2 years. (Major rejection shall be considered when material is taken back by the vendor for rectification and the quantity of rejected material is more than 10%).	12
<b>A.1.</b>	b. <u>For Service Part:</u> No violation of statutory compliances in last 1 year. Deduction of 2 marks for each instance of violation in last 1 year.	12
	c. <u>Safety</u> Deduction of 2 marks for each instance of safety violation in last 1 year. Deduction of 4 marks for each reported Non-Fatal Accident in last 1 year. In case of any reported fatal accident: <b>ZERO MARKS</b>	16
<b>A.2.</b>	<b>Timely Execution of Contracts</b> 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> 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> <u>For Supply Part:</u> Factory Visit and Evaluation. <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 TPCODL. 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> 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> 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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 10 of 104

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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 11 of 104

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**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 12 of 104

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

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

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

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

### **5.2 For Service part of Contract**

The Prices and Rates are inclusive of cost of materials supplied as per contract terms and for which MDCC is issued by TPCODL and to the extent required for completion of works, cost of service executed as per schedule of quantities, cost of testing as per contract terms, cost of documentations including all relevant test certificates and other supportive documents to be furnished as per contract terms. The rates shall remain firm till actual completion of contract.

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

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

### **5.3 Changes in Statutory Tax Structure**

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

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

### **6.0 TERMS OF PAYMENT**

- A. 5% of the Release Order/ Purchase Order price shall be paid as initial interest free advance on fulfillment of the following by the Associate:
  - a) Acceptance of PO/ LOI.
  - b) Submission of advance payment BG of 15% of the Release Order/ Purchase Order price which shall remain valid till the advance is fully adjusted.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 13 of 104

- 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 14 of 104

- 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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 15 of 104

## 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 16 of 104

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



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 17 of 104

**\*\*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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 18 of 104

## **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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 19 of 104

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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 20 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 21 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 22 of 104

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

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

### 13.5 Dispatch and Delivery Instructions

S. No.	Instructions
1	Purchase order/ Release order no. shall be mentioned on invoice and on material
2	TPCODL material code and material description shall be mentioned in invoice and on material.
3	"Property of TPCODL" shall be embossed on material.
4	The material shall be properly sealed and packed in standard packing as per purchase order terms & conditions.
5	The weight and quantity of material shall be mentioned wherever applicable
6	The material supplied shall be co-related with the packing list.
7	The name plate detail on equipment shall include Material code, Material description, specification detail of material [as applicable], Serial No. Year of manufacturing, PO/RO no. and date, "PROPERTY OF TPCODL, Bhubaneswar", Guarantee period and Associate's name.
8	In case of manual unloading, supplier / transporter shall deploy sufficient Labour for unloading the material at TPCODL central store. For heavy item(s), crane will be provided by TPCODL [unloading cost will be recovered from the associate].
9	The driver should have valid License and one helper in truck. All the documents of truck like registration papers, PUC etc should be available in Truck.
10	BA representative should accompany the material and get it unloaded / stacked in his presence wherever possible.

## 14.0 GUARANTEE

### 14.1 Guarantee of Performance

Associates shall stand guarantee that the equipment and material supplied/service or work rendered under the contract is free from design, manufacturing, material, construction, erection & installation and workmanship & quality defects and is capable of its due, rated and intended quality performance, as an integrated product delivered under the contract. for a specific period termed as Guarantee Period(as elaborated elsewhere in this clause) The

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 23 of 104

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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 24 of 104

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



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 25 of 104

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**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 26 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 27 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 28 of 104

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.

Doc. Title	<b>GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS</b>	
Rev. No	0	Page 29 of 104

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:

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 30 of 104

- 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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 31 of 104

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**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 32 of 104

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**



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 33 of 104

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:

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 34 of 104

### 31.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be lodged by log on to our website [www.tpcentralodisha.com](http://www.tpcentralodisha.com)

### 32.0 LIST OF ANNEXURES

S. No.	Subject	Annexure
1.	Performa for Bid Security Bank Guarantee	A
2.	Performa for Advance Payment Bank Guarantee	B
3.	Performa for Performance Bank Guarantee (CP cum EP)	C
4.	Performa for No Demand Certificate by Associate	D
5.	Performa for Indemnification on Statutory Compliance	E
6.	Performa For Application For Issuance of Consolidated TDS Certificate	F
7.	HR Service Level Agreement	G
8.	Under taking for competence of workmen	H
9.	Business Associate Feedback Form	I
10.	Acceptance Form For Participation In Reverse Auction Event	J
11.	NEFT or RTGS payment request form	K
12.	Contractor Safety Management System	L
13.	Vendor Appraisal Form	M
14.	Manufacturers Authorization Form	N



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 36 of 104

**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 Company Limited**  
**Bhubaneswar**

**Advance Payment B.G.No.....**

**Contract No.....dated.....**

1. You have entered into a Contract No \_\_\_\_\_ with M/s. \_\_\_\_\_ (hereinafter referred to as "the Vendor") for the supply and delivery of \_\_\_\_\_ (hereinafter referred to as" the said Equipment") for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of the said contract, you have agreed to make an advance payment of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) being \_\_\_\_\_% (\_\_\_\_\_percent) of the total value of the contract on "the Vendor" furnishing you with an irrevocable, unconditional and acceptable bank guarantee to be valid till the date of receipt of "the said equipment" covered by your above mentioned contract. For this purpose you have agreed to accept our guarantee.
3. In consideration thereof, we, \_\_\_\_\_ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) being \_\_\_\_\_% (\_\_\_\_\_percent) of the total value of the contract on receipt of your intimating that "the Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.
4. You shall have the right to file / make your claim on us under the guarantee for a further period of 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 37 of 104

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 |

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 38 of 104

**ANNEXURE- C**

**PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)**

**(On Rs.100/- Stamp Paper)**

**Note:**

- (a) Format shall be followed in toto
- (b) Claim period of one month must be kept up
- (c) The guarantee to be accompanied by the covering letter from the bank confirming the signature to the guarantee

-----  
-----

**TP Central Odisha Company Limited**

**Bhubaneswar**

**CP cum EP BG No.....**

**Order/Contract No.....dated.....**

1. You have entered into a Contract No \_\_\_\_\_ with M/s. \_\_\_\_\_ (hereinafter referred to as "the Vendor") for the supply cum erection / civil work of \_\_\_\_\_ (hereinafter referred to as "the said Equipment") for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of the said contract, "the Vendor" agreed to furnish you with an irrevocable, unconditional and acceptable bank guarantee for 10% of the value of contract and to be valid till the end of Guarantee period plus one month towards "Contract cum Equipment performance". For this purpose you have agreed to accept the guarantee.
3. In consideration thereof, we, \_\_\_\_\_ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) being \_\_\_\_\_% (\_\_\_\_\_ percent) of the total value of the contract on receipt of your intimating that "the Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.
4. You shall have the right to file / make your claim on us under the guarantee for a **further period of 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 39 of 104

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     |

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 40 of 104

**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)**



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 41 of 104

**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)**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 42 of 104

**ANNEXURE-F**

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

To be printed on the letterhead

To,

TP Central Odisha Company Limited,

Bhubaneswar

**Sub: Application for issuance of Consolidated TDS Certificate for the FY \_\_\_\_\_**

Dear Sir,

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

For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

**ATTACH THE COPY OF PAN CARD**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 43 of 104

## **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:**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 44 of 104

- 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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 45 of 104

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).

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 46 of 104

- 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

GENERAL CONDITIONS OF CONTRACT

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 47 of 104

**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)**



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 49 of 104

**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:

GENERAL CONDITIONS OF CONTRACT

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 50 of 104

**Form XI**

**Undertaking**

With reference to the contract job awarded by M/s TP Central Odisha Company Limited to M/s \_\_\_\_\_ vide work order No. \_\_\_\_\_ dated \_\_\_\_\_

I \_\_\_\_\_ on behalf of

M/s \_\_\_\_\_ hereby undertake:

1. that the dues in respect of the workmen/ employee(s) engaged by us for the said contract, payable as per the provisions of relevant statute pertaining to

- i. wages/ salary
- ii. PF & ESI, Bhubaneswar Labour Fund
- iii. All other statutory obligation

has been paid /settled in full and no amount/ compliance is due/ pending.

2. That in case any dispute / claim is raised by the concerned workers i.r.o. any dues / payments, M/s \_\_\_\_\_ will settle the same on it's own and such liability will be borne by M/s \_\_\_\_\_

3. That M/s \_\_\_\_\_ hereby indemnify M/s TPCODL from any future liability i.r.o. any statutory obligation in respect of said contract.

Date:

\_\_\_\_\_  
( )  
Authorized Signatory

For M/s \_\_\_\_\_

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 51 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 53 of 104

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

(iv) Crèches : \_\_\_\_\_

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

**Signature of contractor**

Place \_\_\_\_\_

Date \_\_\_\_\_

GENERAL CONDITIONS OF CONTRACT

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 54 of 104

**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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 55 of 104

**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/ 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/ Suggestion
		Do Not Agree	Slightly in Agreement	In Fair Agreement	Mostly in Agreement	Fully Agree	
11	TPCODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	BIRD (Bill Inward Receipt Desk) initiative has improved payment disbursement process						
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPCODL never defaults on contractual terms						
15	In TPCODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPCODL Employees follow Ethical behaviour						

**SECTION - B**

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

SN	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPCODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	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/ 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
---	---	---	---	---	---	---	---	---	----

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 60 of 104

### **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!!

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 61 of 104

## 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**



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 63 of 104

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.



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 65 of 104

### 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, AML, MRG, etc. – *Annex3.6*
- 4.7 Maintenance and Operation of Street Light. – *Annexure 3.7*

1. *Please note that hydra cranes used by any dept should be ACE Model No. FX 150 ACE SX 150, Escorts Model No. TRX 1550 or contemporary. Use of old generation hydra cranes like ACE 14XW or ACE 12 XW, etc are prohibited.*

**(Details as per Annexure attached)**

**Note:** *For minor contracts, the BA shall assign the duties of Safety Representative to the Work Supervisor. Work Supervisor will deliver all duties and responsibilities of Safety Supervisor as detailed in this document.*

The Business Associate (BA) having major contract will appointing Safety supervisor, engineer / manager for the TPCODL work. The BA shall make all necessary arrangements for getting their workforce safety trained and competency checked from the concerned official of TPCODL before deployment in the field. BA Cell shall recommend the suitability after competency checked by Engineer In-charge and SAFETY group (or his representative) of TPCODL. After getting the clearance from concerned official, BA cell and receiving temporary I-card issued by TPCODL, Business Associate shall commence the working.

Safety Representative of Business Associates will formally become the nodal point for safety concerns for TPCODL. **BA shall not frequently transfer or terminate the services of any of the safety representatives appointed for TPCODL work site. BA needs to ensure**

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 66 of 104

**that Safety representative is available at all points of time; failing which the work being carried out in the interim (period when Safety representative is not available) shall be treated as working under improper supervision and due penal provisions shall be initiated against the BA.** BA will be required to provide all applicable infrastructure and power to ensure smooth working of the safety representative to maintain a sound safety management system. **In all contracts safety representative will not be assigned any other activity at site apart from the works related to safety management. The duties are detailed in clause 5.5 of this document.** TPCODL will be auditing the facilities provided to the BA's safety team time to time.

The Safety Representative of the BA shall be required to meet and follow the instructions of the Engineer In-charge and SAFETY Group of TPCODL. He shall be responsible for providing the MIS and/or any other relevant information, as and when desired, within the stipulated time frame as per the requirements of TPCODL. Any non-conformance to safety will lead to the negative marking or issue of safety violation challan/ tokens which shall affect the monthly evaluation and performance of BA.

All contracts where BA has to depute vehicle for their staff and equipment to move from one location to other, the BA shall ensure that vehicle complies all required statutory clearances and requirement as per The Motor Vehicle Act, 1988 as well as TPCODL Road Safety Policy and are in good & safe state of working.

## **5. QUALIFICATION AND EXPERIENCE OF THE SAFETY AND SITE PERSONNEL**

Qualification and experience required for the safety and site personnel are as following:

**5.1 Safety Supervisor:** It is mandatory that educational qualification of safety supervisor be ITI (of relevant trade) / Diploma (Any branch of engineering) and he has a working experience on electrical system / relevant field of work at least 5 yrs for ITI and 3 years for Diploma holder. Having formal experience of the safety systems will be an added advantage

**5.2 Safety Engineer:** It is mandatory that educational qualification of safety engineer be at least Diploma (relevant branch) and he has working experience on electrical system of at least 3 yrs. Having the formal experience of the safety systems will be an added advantage.

**5.3 Safety Manager:** The educational qualification of safety manager should be graduate engineer with working experience on electrical system / network of at least 3 yrs. OR Diploma in Industrial Safety with working experience of 05 years including at least 02 years on electrical network.

However, clause 5.1, 5.2 and 5.3 are not applicable for minor contracts. In such cases, BA shall assign the duties of Safety Representative to the Work Supervisor. Work Supervisor will deliver required duties of Safety Representative (as per clause 5.5) in addition to other duties without diluting the importance of safety.

**5.4 Site Skilled Personnel:** For all responsibility related to site activities and operations, the BA shall employ only qualified and skilled persons and shall comply the provisions of section 19 & 29 of Central Electricity Authority (Measures relating to safety and electric supply) Regulations, 2010. Persons holding valid approvals only by any Government approved agency or a competency assessment panel or a team set up by TPCODL

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 67 of 104

shall be allowed to perform the High Risk / High Hazard activities (refer page 1). The skill / qualification required for the electrician and electrical supervisor are given in *annexure 5*. The contracts related to maintenance of Distribution Network, Distribution Projects, EHV Projects, maintenance of Sub-Transmission Network, MMG & EAG, maintenance and operation of street lights, shall preferably have at least 20 per cent of ITI qualified electricians in the first year of the contract. This figure shall preferably be incremented by 15 per cent every subsequent year.

*Note: For the competency assessment may please refer the work instructions. An employee shall have to necessarily undergo the competency assessment check once in every eighteen months.*

#### 5.5 Requirements from the Safety Representative(s) of the Business Associate:

- 5.5.1 Safety training of 2 hrs/employee/month and one day of safety induction training to all new employees joining the BA will be conducted by the BA as per Safety training modules of TPCODL.
- 5.5.2 Safety Talk / tool box talk before start of shift to BA employees.
- 5.5.3 Ensuring the availability & proper usage of the standard safety equipment (PPE)
- 5.5.4 Periodic inspection of PPE to ensure their serviceability and maintaining the 10% buffer stock of standard PPEs.
- 5.5.5 Ensuring the adherence to standard operating procedures of TPCODL as mentioned in TPCODL Safety standard and O & M and concerned function's manual.
- 5.5.6 Safety inspections / audits as per the process of TPCODL
- 5.5.7 Working in close coordination SAFETY Group of TPCODL.
- 5.5.8 Reporting of unsafe acts, unsafe conditions, near miss, incident or accident to Engineer In-Charge and SAFETY Group of TPCODL immediately after its occurrence.
- 5.5.9 Regular HIRA at site and comply the control measures as stated in the detailed HIRA as per the *annexure 2*. Also deployment of JSA based checklist shall be ensured.
- 5.5.10 Ensuring compliance with safety and other laws as may be applicable and providing for safety assurance.

#### 5.6 Training and Syllabus: The BA shall not deploy any person at work place / site or send newly recruited personnel directly to concerned official for competency assessment without Safety Induction Training.

5.6.1 All new BA employees have to necessarily undergo one and half days Safety training and Competency assessment at training centre of BA cell. This training will be conducted once in a week. After the completion of Safety training & Competency assessment I-card will be issued to all competent BA employees

5.6.2 BA is expected to initially train and judge the capability of the workman at his own end before further recommending the workmen for Competency assessment. If any BA workman sent for competency assessment. In case any BA workman fails in the Competency test at concerned official, it will be deemed that BA has not imparted sufficient training at his end and actual cost of training ₹ 7500/ BA employee/ failed attempt will be recovered.

5.6.3 The workers who have imparted Safety Training and issued I-Cards of TPCODL, are not deployed at TPCODL worksites/ voluntarily left the job by workers/ used somewhere else other than TPCODL by the BA, in that case Management reserves the rights to intervene and recover the actual cost of training i.e. ₹ 7500/BA employee. (*Exempted for attrition rate of BA workers less than or equal to 10% of total workforce deployed at TPCODL*)

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 68 of 104

5.7 It is desired that Safety representative of the BA to impart the general safety training to each employee of duration 2 hrs per month. The training will be organized at BA level and the record to be sent to engineer in-charge and SAFETY group of TPCODL every month. Please refer schedule and syllabus in *annexure 6*.

**List of Personal Protective Equipment (PPE) and Maintenance schedule:** BA shall commence the project or any work only when the required PPE are made available to the team of employees involved in the work. Each PPE of BA shall be checked / inspected by the safety representative / supervisor at zone before the work start or as prescribed in the list. Safety representative shall regularly check the healthiness of each PPE allocated to lineman. Suitable record shall be maintained at zone. Defective PPE shall be immediately replaced or within 24 hours by the BA. In no case linemen or any other official of BA may be allowed to work with defective PPE. It is preferred that BA ensures minimum stock of each PPE at zone for immediate replacement with defective one. The PPE shall be IS / BS / CE marked and exactly as per the standard or specification mentioned in the *annexure 7*. Working without PPE / non-standard PPE shall be treated as safety violation and penalty as stated in section 6.0 of this document. If TPCODL finds that BA has not provided the adequate / appropriate PPE to their staff, TPCODL reserves the rights to stop the work and call the BA to provide appropriate PPEs at the risk. If the BA fails to provide the required PPEs at the risk then the same shall be provided by TPCODL at the actual cost of the PPE. The amount shall be charged to BA and same shall be first recovered from the current bill of BA or any future payment to be made to BA. In the event of any balance amount still left for recovery, the same shall be adjusted against retention amount or by invoking bank guarantee submitted by BA.

**5.8 Safety Audit / Inspection & HIRA:** The BA shall get the required safety inspection / audit conducted by his technical team comprising of safety representative as per the *annexure 8*. The safety representative will be required to conduct the HIRA (Hazard Identification and Risk Assessment) as per *annexure 2* of the process and work undertaken at least two times in a year or every time if a new process / activity / machine is introduced or whenever an accident take place. The risk identified to be addressed suitably with –

- Engineering Control
- Management Control, and
- Personal Protective Equipment.

The safety representative of BA shall inform and educate for the identified risk and hazard control methods to employees, supervisor and engineer as well as the engineer in-charge and SAFETY group of TPCODL.

**5.9 Safety Performance and Safety MIS:** The BA shall maintain good practice of safety all through the contract duration. Safety shall always be of paramount importance during the contract period. Safety performance will be monitored on yearly basis throughout the period and no relaxation will be given for bad performance. BA with good track record and excellent performance will be rewarded suitably as per clause 6.0 of this document. The BA has to provide monthly "Performance Report – Safety" to engineer in-charge and SAFETY group TPCODL this shall be part of monthly bill along with training details. Performa of the report is enclosed as *annexure 9*.

**5.10 Pre – Employment Medical Check-up and Fitness of employees engaged for the critical works:** The BA shall submit the health fitness certificate for all those workers involved in climbing the pole or working at height for following diseases:

5.10.2 Epilepsy

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 69 of 104

- 5.10.3 Colour blindness
- 5.10.4 Deafness
- 5.10.5 Vertigo & height phobia

Every year BA will give an undertaking stating that all the employees are fit to work and have not developed aforesaid diseases. The Record of such medical check-ups shall be submitted to BA Cell before issue of temporary identity card. The records shall be maintained at BA Cell. All such medical check-ups shall be repeated once in a year for all workers involved in climbing the pole or working on electrical network.

## 6. REWARD AND PUNITIVE MEASURES

**6.1** To support the enforcement of good SHE & DM practices by the Business Associate and to eliminate repeated or continuing safety violations, use of appropriate reward and punitive measures shall be made. Each unsafe act or violation of the safety guidelines as described in the Safety Manual of the TPCODL will be audit criteria of this system. Broadly the measures identified are following:

- 6.1.1 Working without PPE/ Safety Gadgets
- 6.1.2 Working without proper tools and tackles, barricading, Poor condition of Crane / Hydra / Vehicle, using without certification / Licence, Incompetent driver/ Helper
- 6.1.3 Working without creation of effective safety zone
- 6.1.4 Improper Supervision at worksite, Lineman/ Supervisor working without competency
- 6.1.5 Working without adherence to PTW process or authorization/ not adherence to SOPs / W.I. of TPCODL.
- 6.1.6 Improper Working at height equal to or above 1.8 mtrs without taking proper fall protection measures/ Poor condition of Ladder

### 6.2 Measures of Reward and Punitive Measures

The Engineer In-Charge, NSO, SC, ASOs, CSI / SIs and SHE &DM group will conduct the surprise audits of the work / project and if any non-conformance is found the same will be booked and entered in the format "Safety Violation Record" *annexure 10*. The flow of the information is given below:

Safety Violation Escalation & Monitoring process	
Action	Responsibility
Safety Violation form has been filled and counter foil sent to SAFETY team for information. The main form is to be given to BA supervisor / Engineer in-charge. <i>(Automatically generated if Site audit done through Mobile App.)</i>	Engineer In-charge/ NSO / SC / SAFETY Group /CSI/ ASO/ Any authorised TPCODL official.
↓	
Entry of the violation in the master record and sending the information to concerned Manager, HoG, HoD, Head and Chief (O &S). <i>(Automatically generated if Site audit done through Mobile App.)</i>	SAFETY Group
↓	
Forwarding the information Centralized Account Payable (CAPS) for amount deduction from the current bill of the BA,	Engineer In-charge

<i>if any.</i>	
↓	
HoG (Safety – II) & HoG (Safety & Quality – Commercial) and CAPS to generate the MIS of the violations and the amount deducted.	SAFETY Group
↓	
The pool of the amount generated after the deduction to be utilized in safety welfare of BA employees.	SAFETY Group with approval of CFO/Chief (O & S) /CEO&MD

The safety violations have been rated from 1 to 5 (figure 6.3) as per the gravity of the violation. If the same violation is repeated it may escalate into a higher penalty. If a particular Business Associate employee violates safety norms three times, he shall not be allowed to work in TPCODL for a period of one year from the date of the 3<sup>rd</sup> violation.

### 6.3 Safety Violation Escalation Matrix

#### 6.3.1

Consequence of Safety Violation Observed (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.)	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 (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 SAFETY group for the further necessary action against the BA. **The cumulative nos. of Safety Violations pertaining to any particular BA shall be calculated on yearly basis.**

Safety violations resulting in incident / accident will be treated as per gravity of the injury / fatality and its impact as well as type i.e. minor or Major. Consequences of incident / accident are shown in the matrix (figure 6.3(2) for major and 6.3(3) for minor) below. In case of any accident, findings and recommendations of Accident Enquiry Committee will be final and binding and will supersede the arbitration clause of GCC.

Consequence Of an Incident / Accident (In case of <b>MAJOR</b> contract)		Incident / Accident				Action Required
Sl. No	Type of the injury	1st	2nd	3rd	4th	
1	Slight injury (First Aid Case)	<b>F</b> (Strengthening of process through continuous improvement in the work procedure)				Take risk reduction 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/-			
<b>Figure 6.3 (2) - Penalty Matrix for Incident / Accident in Major Contracts</b>						

(For example: In major contracts, if there is first incidence of major injury say bone injury (Cat. 3) where worker was hospitalized for more than 48 hrs then a penalty of amount Rs.20000/- will be deducted from the current bill produced for the payment. This penalty will be similar for first two incidents. However, it will increment to next higher category i.e. Rs. 50,000/- on subsequent incidents as per the above matrix)

Consequence Of an Incident / Accident (In case of <u>MINOR</u> contract)		Incident / Accident				Action Required
Sl. No	Type of the injury	1st	2nd	3rd	4th	
1	Slight injury (First Aid Case)	<b>L</b> (Strengthening of process through continuous improvement in the work procedure)				Take risk reduction 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 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.



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 73 of 104

## **II. For Permanent Partial Disablement and Temporary Total Disablement**

The compensation in this case will be as per provisions of the Employees' Compensation Act, 1923 or Employees' State Insurance Act, 1948, as applicable.

Accordingly, the BA shall obtain a suitable Insurance Policy on award of Contract and submit documentary evidence of the policy to the BA Cell before commencement of work. The BA shall ensure that the Insurance policy is active at all times and all employees are covered in all respects till the conclusion of contract period or till working with TPCODL. The BA shall submit a copy of the policy after periodic renewals to the BA Cell.

However, on occurrence of such unfortunate incident, if it is found that the victim(s) is/are not covered under any insurance policy, the BA shall be liable to pay the entire sum of Rs. 10 lakhs from his own resources.

Further, in case of an accident resulting in Death or Permanent / Total Disablement while on duty, the appointed BA Nodal Officer will ensure that the BA complies with all statutory provisions and benefits i.e. PF, Compensation, Gratuity etc., and that all these are made available to the employees' nominee(s) as per the stipulated timelines.

**6.3.3** TPCODL rewards the BA with good track record of safety management. It is proposed that BA complying with Contractors Safety Management, Safety Manual and Safety process will be rewarded suitably as per the procedure, rule and regulations of the TPCODL. In any case major accident is reported during an assessment period BA will not be eligible for this reward scheme. Assessment of contracts will be once in year. Generally the assessment cycle is calendar year and guidelines will be declared time to time.

### **Abbreviations Used in the Document**

TPCODL	TP Central Odisha Company Limited
BA	Business Associate
HIRA	Hazard Identification & Risk Assessment
JSA	Job Safety Analysis
EHV	Extra High Voltage
SAFETY	Safety, Occupation Health, Environment & Disaster Management
MMG	Meter Management Group
EAG	Energy Audit Group
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures
CSI/SI	Circle Safety In-charge / Safety In-charge
ASO	Area Safety Officer
NSO	Nodal Safety Officer
SC	Safety Coordinator
HoG / HoD	Head of Group / Head of Department
AGM / GM / VP	Assistant General Manager / General Manager / Vice President

Doc. Title	<b>GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS</b>	
Rev. No	0	Page 74 of 104

CFO / Chief (O & S)/ CEO & MD	Chief Finance Officer / Chief (Operating & Safety) / Chief Executive Officer & Managing Director
COS	Corporate Operation Services
CAP	Centralized Account Payable System
PTW	Permit To Work
GCC	General Conditions of Contract.

- END -

GENERAL CONDITIONS OF CONTRACT

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 75 of 104

**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> - If yes provide a copy of the policy, if No please refer Note 1.	1			
<i>Does the company have an Safety Management system</i>				
- <b>Does the company have an Safety Management system</b> - If yes provide details, if No please refer Note 1.	1			
<i>Is there a company Safety Management System manual or plan?</i>				
- <b>Is there a company Safety Management System manual or plan?</b> - If yes provide a copy of the content page(s), if No please refer Note 1.	2			
<i>Are Safety and occupational health responsibilities clearly identified for all levels of Management and staff?</i>				
- <b>Are Safety and occupational health responsibilities clearly identified for all levels of Management and staff?</b> - 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> - 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> - If yes provide a copy (format)	1			
- <b>Is there a documented incident or accident investigation procedure?</b>  - If yes provide a copy of a standard incident report form, if No please refer Note 2.  - Comments	1			
<i>Safety Training</i>				
- <b>Describe how occupational health and safety training is conducted in your company</b>  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>  - 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>  -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>  - 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> - If yes provide details	1			
- <b>Has the company ever been convicted of an occupational health and safety offence?</b> - If yes provide details	NO Marks (Negative mark ONE for each case)			
- Has there been any major accident of employee at TPCODL site in past	NO Marks (Negative mark ONE for each case)			
- Has there been any fatal accident of employee at TPCODL site in past. - (Note: Bid evaluation committee has to take cognizance of the incident and shall evaluate the bid only after formal approval of competent authority i.e. CTO. - In case of yes please refer Note 4.	NO Mark (Negative mark FIVE for each case)			
Minimum of 75% marks is required for qualification.		Total Marks achieved		
<i>Company Reference</i>				
1. Name of company 2. Name of company				

**Note**

1: If company does not have formal procedure on Safety Management System than vendor may submit proposed Safety road map along with safety action plan and brief safety policy on his letter head signed by head of the organization.

2: The vendor may submit the same in the Safety Action Plan.

3: The vendor may utilize the same format of TPCODL or on request SAFETY group will assist the vendor in developing the audit system. For other points also vendor may take the assistance of SAFETY group for development of Safety management system.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 78 of 104

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>



Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 81 of 104

Specific Task/Activity	Potential Hazards/Consequences	Class of Risk	Control Measures
------------------------	--------------------------------	---------------	------------------

*Note: This information for the general indication purpose. The detailed risk assessment shall be conducted before start of the work by the authorized representative of the BA. The report of same shall be submitted to engineer in-charge along with annexure 4 of the CSM document.*

### Guidelines for filling the Risk Assessment Form

- *Specific Task/Activity* - The documentation of each major task associated with the contract.
- *Potential Hazards* - The identification of hazards associated with each activity or task to be carried out.
- *Class of Risk* - Each hazard should be evaluated as a level of risk, described as Risk Class 1, 2 or 3 defined above.
- *Control Measure* - The identification and documentation of actions required to eliminate or reduce the hazards that could lead to accident or injury.

Hazard / Risks shall be classified according to the following schedule:

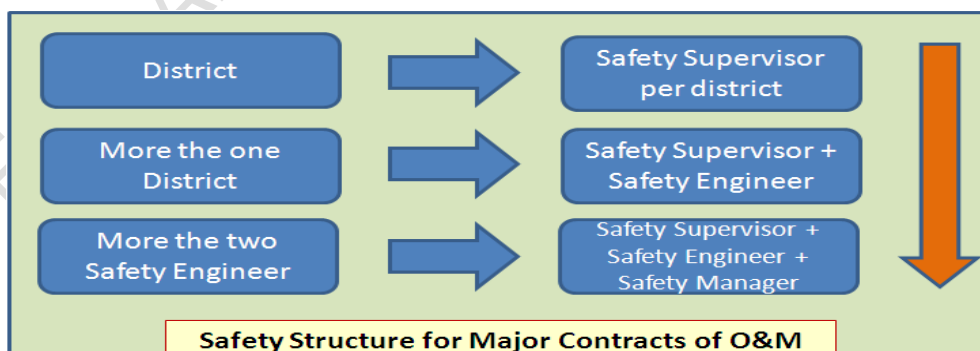
- Class 1: Potential to cause injury treatable with first aid
- Class 2: Potential to cause death or permanent injury
- Class 3: Potential to cause more than one or more lost time injuries.

### Annexure 3.1 (Refer Para 4.0)

#### General Safety Conditions for the Maintenance of Distribution Network Contracts:

A BA awarded a contract (O&M) work of maintenance of distribution network will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in *annexure 7*.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in a district. In case the BA has been awarded work in more than one district, then the following safety structure will be adopted.

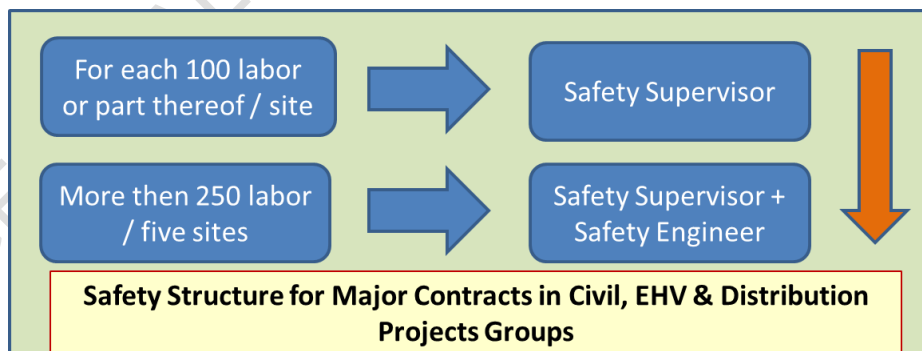


### Annexure 3.2 (Refer Para 4.0)

#### General Safety Conditions for the Distribution Projects Major Contracts:

A BA awarded a major contract work of TS&P in area of a circle will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1.
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in the area. In case the BA has been awarded work in more than one circle, then the following safety structure will be adopted.

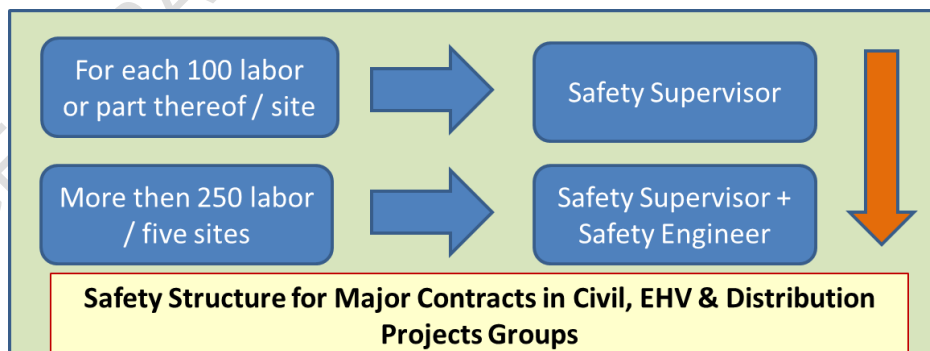


### Annexure 3.3 (Refer Para 4.0)

#### General Safety Conditions for the major EHV Projects Contracts:

A BA awarded a major contract work of EHV projects will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system in the area. In case the BA has been awarded work in more than one circle, then the following safety structure will be adopted.
- BA shall refer Construction Safety Manual in TPCODL Safety Manual for details.



**Annexure 3.4 (Refer Para 4.0)**

**General Safety Conditions for the Maintenance of Sub – Transmission Network Contracts:**

A BA awarded a major contract work of maintenance of sub – transmission network in area of a power system will be required to fulfil the following conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Coordinator for managing a complete safety management system in the area. In case the BA has been awarded work in more than one area power system, then the following safety structure will be adopted.



### Annexure 3.5 (Refer Para 4.0)

#### General Safety Conditions for the major contract work in Civil / Generation Projects:

A BA awarded a major contract work of / in civil or Generation project will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor (for workforce upto 100 at site) / a safety engineer (for workforce upto 250 at site) / safety manager (for more than two safety engineers) for managing a complete safety management system at the project site. In case the BA has been awarded more than one major contracts, then the following safety structure will be adopted.
- BA shall refer Construction Safety Manual in TPCODL Safety Manual for details.



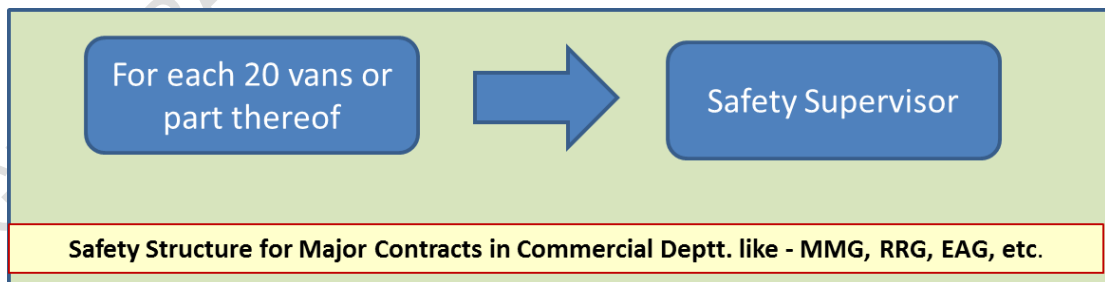
Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 87 of 104

**Annexure 3.6 (Refer Para 4.0)**

**General Safety Conditions for the major contract work in Commercial Department like - MMG, RRG, EAG, etc.:**

A BA awarded a major contract work in meter management group & energy auditing group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment (PPE) as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- BA shall ensure to depute a Safety Supervisor for managing a complete safety management system for the work as per the following safety structure.
- The BA for the RRG work shall depute one Safety supervisor.





**Annexure 3.7 (Refer Para 4.0)**

**General Safety Conditions for the major contract work in O&M of street light group:**

A BA awarded a major contract work in operation and maintenance of street light group will be required to fulfil the following safety conditions:

- BA shall provide Safety Policy and safety objectives of their company.
- BA shall comply with all statutory requirements like: applicable acts, regulations, codes of practice, OHSAS Standards, etc.
- BA shall provide the filled safety management questionnaire as per Annexure 1
- BA shall conduct a job risk assessment and provide information as per Annexure 2
- BA shall abide by Safety manuals, guidelines of TPCODL.
- BA shall provide its organisation structure & responsibilities in terms of Safety Management to TPCODL.
- BA shall document the work practices and procedures in terms of Safety Management.
- BA shall ensure safety training and induction program for the employees
- BA shall conduct safety audits & inspections as per TPCODL procedures provided by SAFETY group.
- BA shall provide and ensure the proper usage of the safety equipment PPE as per the TPCODL approved list in annexure 7.
- BA shall ensure periodic inspection of PPE to ensure its serviceability as per the specification given by TPCODL.
- BA shall ensure the adherence to standard operating procedures or guidelines laid down by TPCODL.
- BA shall ensure reporting of any unsafe act, unsafe conditions, near miss, incident or accident to engineer in-charge and SAFETY team of TPCODL.
- BA shall provide safety performance and Safety MIS (*annexure 9*) to engineer in-charge and SAFETY group periodically. Based on any non-confirmation to the safety procedures and guidelines, BA is liable to be negatively marked for his performance and suitable penalty will be imposed.
- Each BA shall ensure to depute a Safety Supervisor for managing a complete safety management system for the work awarded as per the below structure.





Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 89 of 104

### **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 Company Limited (TPCODL) so as enable TPCODL to achieve its goal of Zero On site incidences.
3. That the Contractor shall be fully responsible for ensuring occupational health and safety of its employees, representatives, agents as well as of its subcontractor's employees, at all times during the discharge of their respective obligations under the contract including any methods adopted for performance of their tasks / work.
4. That Contractor shall ensure ,at its own expense to arrange for and procure, implement all requisite accident prevention tools, first aid boxes, personal protective equipment, fire extinguisher, safety training, Material Safety Data Sheet, pre-employment medical test, etc. for operations & activities including as & when so specified by TPCODL specifically. , failing which TPCODL shall be entitled, but not obliged, to provide the same and recover the actual cost thereof from the Contractor's payments.
5. That the Contractor shall engage adequate and competent Safety – Supervisor / Engineer / Manager / Skilled persons at site as per the Para 5 (Qualification and experience of safety personnel) and Annexure 3 of Contract Safety Management.
6. That the Contractor shall engage the competent Site – Supervisor with each group of workers for safe and correct workmanship, proper co-ordination of material and site work as per contract.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 90 of 104

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 91 of 104

**Annexure 5 (Refer Para 5.4)**

**SKILL / QUALIFICATION REQUIRED FOR ELECTRICIAN AND ELECTRICAL SUPERVISOR**

**Skill / Qualifications Required for Electrician (*Certificate of Competency Class-II*):**

1. Formal education in ITI – Wireman/ Electrician trade.

OR

2. Working experience of minimum three years of practical wiring.

OR

3. Have completed three years apprenticeship course through Apprenticeship Advisor, Govt. of Odisha / other state Govt. in the trade of Lineman / Wireman / Electrician.
4. A candidate must have attained the age of Eighteen years.

**Skill / Qualifications Required for Electrical Supervisor (*Certificate of Competency Class-I*):**

1. Have at least five years' experience of practical wiring after passing the certificate of competency class-II i.e. electrician.

OR

2. Recognized Degree or Diploma or equivalent qualification in Electrical Engineering from any Technical institute / College or University recognized by the Board.

AND

Must have completed the training/job in rectifying the common defects in electrical line and power installation for a period of one and three years after passing Degree or Diploma respectively

OR

3. Possessing the valid certificate of certificate of competency class – 1 (Electrical Supervisor)

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 92 of 104

## **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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 93 of 104

- 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.

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 94 of 104

**Annexure 7 (Refer Para 5.7)**




**LIST OF PERSONAL PROTECTIVE EQUIPMENT AND TESTING FREQUENCY**

Sl. No.	Name of PPE	IS / EN Standard	Testing Frequency	Remarks	Ref Brand & Model
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298 (Part-2)	Monthly and visual check every day for any crack or damage in the leather or sole.		BATA (Model No.- Endura L/C)  Liberty (Model No. – 7198-01 HT Barton Black – Warrior)
02	HDPE Safety helmet with chin strap and ratchet type for adjustment.	IS:2925-1984	Monthly and visual check every day for any crack in shell.		Karam (PN Safetech )  Joseph Leslie  Accent Industries  Honeywell
03	Full body harness (Safety belt)	EN 361	Monthly and visual check every day of the bends and the harness.		Karam (PN Safetech )  Joseph Leslie  Accent Industries
04	Electrical Safety Gloves	EN: 60903 CE marked	Weekly and visual check for any crack and blow test before every work.	Manufactured not beyond 12 months.	Make Sparian / Sumitech / CATU supplied with inner cotton glove with over glove of split leather.
05	Full face visor with safety helmet	EN: 166 CE marked (Visor)	Monthly and visual check every day for any crack in shell.	Clear acrylic visor attached with safety helmet.	Karam (PN Safetech )  Joseph Leslie  Accent Industries  Honeywell
06	Fire Proof jacket for chest protection		Monthly and visual check every day.		
07	Safety Chain for shorting cum earthing.	As per TPCODL standard	Weekly and visual check before every work.	Made of brass, Total length – 5.5 meters and made of 12 SWG.	

Note:

1. Any other Personal Protection Equipment required beyond above list will be according to BIS or EN Standards.
2. All Personal Protection Equipment will be checked by the engineer in-charge or SAFETY group of TPCODL.
3. Safety Representative of the BA has to maintain the record of the availability, condition and checking of the PPEs.
4. All tools required as per the contract must be according to respective IS / EN standards.
5. TPCODL may revise or add the above list of PPE and their specifications as and when feel necessary. The information about new specifications /models will be circulated by the Engineer In-charge (EIC), which shall adhere by the business associated in the shortest possible time. The EIC shall issue a memo / instruction to BA with timeline for implementation. Any delay will be treated as non- compliance / safety violations. Refer picture of each PPE given in next page.

**Pictures of PPE for reference purpose.**

Sl. No.	Name of PPE	IS / EN Standard	Picture
01	Leather Safety Shoes (Color – Black) with PU toe cap.	IS:15298(Part-2) and with test report of electrical resistance.	
02	HDPE Safety helmet with chin strap and ratchet type for adjustment.	IS:2925-1984	
03	Full body harness (Safety belt)  The straps at shoulder and thigh shall have full pad for comfort. The back shall be so designed that harness straps do not tangle with each other.	EN 361:2002 EN 358 : 2000 IS: 3521:1991/2002	

04	Electrical Safety Gloves – Composite type Soft electrical gloves as per size of individual.	EN: 60903 CE marked	
05	Full face visor with safety helmet	EN: 166 CE marked (Visor)	
06	Fire Proof jacket for chest protection		
07	Safety Chain for shorting cum earthing.	As per TPCODL standard	
08	Reflective jacket to each workmen	As per TPCODL standard	

*Note : Picture shown are for indicative purpose only. Actual product may differ.*



**Annexure 8 (Refer Para 5.8) LIST OF AUDITS TO BE CONDUCTED**

Audits	Responsibility	Freq.	Ref. Doc.
Permit to Work & Field Audit	BA Safety Representative	Weekly	F04 (COR P - 12)
Tool Bag & PPE's Audit		Weekly	F06 (COR P - 12)
First Aid Box Maintenance Record		Fortnightly	F08 (COR P - 12)
Fire Extinguisher Record <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:

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 99 of 104

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 SAFETY 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.*

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 100 of 104

**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) Partnership, Pvt. Ltd., Public Ltd. etc. :
	1.3	YEAR OF ESTABLISHMENT :
	1.4	LOCATION OF OFFICE POSTAL ADDRESS TELEGRAPHIC ADDRESSES, TELEX NO. 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 NO.OF YEARS EXPERIENCE IN RELATED FIELDS) :
	8.2	NO.OF DRAUGHTSMEN :
	8.3	COLLABORATION DETAILS (IF ANY) :
		8.3.1 DATE OF COLLABORATION :
		8.3.2 NAME OF COLLABORATOR :

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 101 of 104

		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 ORANISATIONAL DETAILS</b>		

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 103 of 104

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) IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED</b>	
17.0	<b>ORGANIZATIONAL DETAILS</b> 1. PF NO 2. ESI NO 3. INSURANCE FOR WORK MAN COMPENSATION ACT NO 4. ELECTRICAL CONTRACT LIC NO 5. ITCC / PAN NO 6. SALES TAX NO 7. WC TAX REG. NO	:
18.0	<b>DOCUMENTS TO BE ENCLOSED:</b> 1. FACTORY LICENSE 2. ANNUAL REPORT FOR LAST THREE YEARS 3. TYPE TEST REPORT FOR THE ITEM 4. PAST EXPERIENCE REPORTS 5. ISO CERTIFICATE –QMS, EMS, OHAS, SA 6. REGISTRATION OF SALES TAX 7. COPY OF TIN NO. 8. COPY OF SERVICE TAX NO. 9. REGISTRATION OF CENTRAL EXCISE 10. COPY OF INCOME TAX CLEARANCE. 11. COPY OF PF REGISTRATION 12. COPY OF ESI REGISTRATION 13. COPY OF INSURANCE FOR WORK MAN COMPENSATION ACT NO 14. COPY OF ELECTRICAL CONTRACT LIC NO 15. COPY OF PAN NO 16. COPY OF WC TAX REGISTRATION 17. DOCUMENTS IN SUPPORT OF SC/ST RELAXATION AT S.NO.16.0 18. GST Registration No	

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

- **Proprietorship/ Single Ownership Firm:** Proprietor of the firm should be from SC/ST community. Governing document shall be Proprietorship Deed.
- **Partnership Firm:** Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed.
- **Private Limited Company:** Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

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

Doc. Title	GENERAL CONDITIONS OF CONTRACT - COMPOSITE WORKS	
Rev. No	0	Page 104 of 104

**ANNEXURE-N**

**MANUFACTURER AUTHORIZATION FORM**

*(To be submitted on OEM's Letter Head)*

Date: .....

Tender Enquiry No.: .....

To,  
Chief (Procurement & Stores)  
TP Central Odisha Company 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

