NIT No.: TPCODL/P&S/100000190/2021-22

Procedure to Participate in Tender

Tender Enquiry No- TPCODL/P&S/1000000190/2021-22

Tender Enquiry No.	Work Description	Estimated Tender Cost (Rs. Cr.)	EMD (Rs.)	Tender Fee (Rs.)	Last Date for payment of Tender Fee
TPCODL/P&S/ 1000000190/21-22	LT Augmentation Works for Providing Supply to UEHHs under PMAY-G and BGJY schemes on Turnkey Basis	11.00	2,00,000	5,000	09.04.2022

* EMD is exempted for MSMEs registered in the State of Odisha.

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

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

Procedure to Participate in Tender.

Following steps are to be followed before “Last date for Payment of Tender Fee”:

1. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letter head indicating
   a. Tender Enquiry number
   b. Name of authorized person
   c. Contact number
   d. E-mail id
   e. Details of submission of Tender Fee
   f. GST Registration No
   g. Details of submission of Tender Fee
   h. MSME Certificate, wherever applicable
   i. Details of Bank Account for refund of EMD
   j. Postal Address for refund of EMD
2. Non-Refundable Tender Fee, as indicated in table above, to be submitted in the form of Direct Deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference/ Enquiry Number –

   Beneficiary Name: TP Central Odisha Distribution Ltd.
   Bank Name: STATE BANK OF INDIA
   Branch Name: IDCO Towers, Bhubaneshwar
   Address: P.O. - Sahidnagar, Janapath, Bhubaneswar.
   Branch Code: 7891
   Account No: 10835304915
   IFSC Code: SBIN0007891

E-mail with necessary attachment of 1 and 2 above to be sent to imran.ahmad@tpcentralodisha.com with copy to sudhakar.behera@tpcentralodisha.com before last date and time for payment of Tender Fee.

Interested bidders to submit Tender Fee and Authorization Letter before Last date and time as indicated above, after which link from TPCODL E-Tender system (Ariba) will be shared for further communication and bid submission.

Please note that all future correspondence regarding the tender, bid submission, due date extension, Pre-bid query, etc. will take place through TPCODL E-Tender system (Ariba) only. User manual to guide the bidders to submit the bid through E-Tender system (Ariba) is enclosed.

All communication shall be held only with the bidders who have carried out the above steps to participate in the Tender.

It is to be noted that once date of “Last date and time for Payment of Tender Participation Fee” is lapsed, no Bidder will be sent link from TPCODL E-Tender System (Ariba). Without this link, bidder will not be able to participate in the tender. Any last moment request to participate in tender will not be considered.

Further, all future corrigendum to the said tender will be uploaded in the Tender section on website https://www.tpcentralodisha.com.

NIT No.: TPCODL/P&S/100000190/2021-22

OPEN TENDER NOTIFICATION

FOR

LT Augmentation Works for Providing Supply to UNELECTRIFIED HOUSEHOLDS (UEHH) UNDER PMAY-G AND BIJU GRAMIN JYOTI YOJANA (BGJY) SCHEMES ON TURNKEY BASIS

Tender Enquiry No.: TPCODL/P&S/1000000190/21-22

Due Date for Bid Submission: 29.04.2022 [15:00 Hrs.]

TP Central Odisha Distribution Limited
2nd Floor, IDCO Towers, Janpath, Bhubaneswar – 751022

CONTENTS OF THE ENQUIRY

1.0 Event Information

1.1. Scope of work

Open Tenders are invited from interested Bidders entering into a Rate Contract valid for one year for the following:

S. No.	Description	EMD Amount (Rs.)	Tender Fee (Rs.)
1.	LT Augmentation Works for Providing Supply to UEHHs under PMAY-G and BGJY schemes on Turnkey Basis	2,00,000	5,000

Note: Tender Fee is inclusive of GST

1.2. Availability of Tender Documents

Please refer “Procedure to participate in the e-tender”.

1.3. Calendar of Events

(a)	Date of sale/ availability of tender documents from TPCODL Website	From 30.03.2022 onwards
(b)	Date by which Interested and Eligible Bidder to pay Tender Fee and confirm participation as mentioned in “Procedure to Participate in Tender”	09.04.2022
(c)	Last Date of receipt of pre-bid queries, if any	11.04.2022
(d)	Pre-Bid Meeting*	12.04.2022
(e)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	18.04.2022
(f)	Last date and time of receipt of Bids	29.04.2022; 15:00 Hours
(g)	Date & Time of opening technical bids & EMD (Envelope-1 & 2)	Participating Bidders will get mail intimation from TPCODL E-Tender system (Ariba) when their Technical Bids are opened.
(h)	Date & Time of opening of Price bid of qualified bidders	Bidders will get mail intimation from TPCODL E-tender system (Ariba) when their Price Bids are opened

**Pre-Bid Meeting Time and Venue details shall be shared later*

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 of requisite amount
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')
1.4.9 Documents for safety bid evaluation as per Appendix 13: CSM-F-9 Safety Bid Evaluation Criteria

Please note that in absence of any of the above documents, bid submitted by the 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 Requirement / Eligibility Criteria

1. The bidder should have average annual turnover of Rs. 1 Crore in last three financial years.

   (Audited balance sheet and Profit and loss account statement to be submitted).

2. Bidder should have successfully completed HT / LT electrification works with a cumulative order value of Rs 1 Crore during the last three financial years.

   (Order copies / completion certificates to be submitted)

3. Bidder should have Performance Certificates for satisfactory performance of having rendered similar services from at least one reputed company. The services against these issued certificates should have be carried out in last five years from the date of bid submission.

In case the bidder has a previous association with TPCODL or other Tata Power group companies for similar services, the performance feedback for that bidder by User Group of TPCODL or other Tata Power group companies shall only be considered irrespective of performance certificates issued by any other organization.

(Performance Certificate to be submitted)

4. Bidder has to furnish a copy of valid statutory Electrical License from ELBO, Govt. of Odisha to carryout tendered works. In case, the bidder has executed similar works in last 5 years, but does not possess Valid Electrical License, have to furnish an undertaking to submit the same within 30 days of submission of Bid. However, under such circumstances, the bidder should attach a copy of such application & treasury challan for fees deposited before the concerned Authority & copy of his expired license.

   (Copy of valid Electrical Contractor License issued by competent Authority, shall be submitted)

5. The bidder must have all statutory compliance like valid PAN no., ESI registration, EPF registration, GSTN, etc. In case bidder is not having these statutory compliances, the Bidder shall submit an undertaking that in case they are the successful bidder, same shall be obtained by them and shall be submitted to TPCODL before execution / award of contract.

   (Copy of above registrations / supporting documents to be submitted)

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 all-inclusive lowest cost for overall tender BOQ as calculated in Schedule of Items *[Annexure I].* TPCODL however, reserves right to split the order line item wise, division, circle and/or quantity wise amongst more than one Bidder. Hence, all bidders are advised to quote their most competitive rates against each line item.

- Bidder has to mandatorily quote against each item of Schedule of Items *[Annexure I].* Failing to do so, TPCODL may reject the bids. The line item offered rates will be taken for calculation of price quoted for each division as per the division wise BOQ for award of division wise contract.
- Generally, each successfully qualified BA shall be awarded 2 nos. of Divisions. TPCODL reserves the right to increase or decrease the award of divisions to the BAs as per field requirement, financial capability, execution capability, performance etc. The TPCODL reserves the right to allocate the division to successful BA as per its requirements. TPCODL reserves the right to cancel the RC /PO, forfeit the EMD / invoke PBG of any BA post award of RC/PO, in case of underperformance & reallocate the same work to other performing BA
- The bids will be evaluated on Safety Parameters as mentioned in Annexure-VIII. Bidders have to submit all the documents related to safety bid.

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. TPCODL shall respond to the clarification raised by various bidders and the replies will be sent to all participating bidders through TPCODL e-tender system (Ariba).

Bids shall be submitted in 3 (three) parts:

FIRST PART: "EMD" as applicable shall be submitted. The EMD shall be valid for 210 days from the due date of bid submission in the form of BG / 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

For Tender Fee and EMD submitted via online transfer, bidder to ensure that the same are carried out through separate transactions.

The EMD in the form of Bank Draft / BG /Bankers Pay Order shall be delivered at the following address in sealed envelope clearly indicating the tender reference / enquiry number, name of tender and bidder name:

Chief (Procurement & Stores)
TP Central Odisha Distribution Limited
2nd Floor, IDCO Towers, Janpath, Bhubaneswar-751022

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)
h) Project Implementation Plan including Level 2 Schedule for the project
i) Unpriced mentioning "Quoted/Not Quoted" against all line items (Prices should not be mentioned)

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

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.

THIRD 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.

SIGNING OF BID DOCUMENTS:

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

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

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with bid.

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

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

3.2 Contact Information

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

All communication will be done strictly with the bidder who have done the above step to participate in the Tender.

Communication Details:

Package Owner

Name: Imran Ahmad
Designation: HoG-Procurement (Commercial Services)
Contact No.: 9958294855
E-Mail ID: imran.ahmad@tpcentralodisha.com

Escalation Matrix

Name: Mr. Sudhakar Behera
Designation: Senior General Manager (Procurement)
Contact No.: 9437282663
E-Mail ID: sudhakar.behera@tpcentralodisha.com

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

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.

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

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. Participating Bidders will get mail intimation from TPCODL E-Tender system (Ariba) when their Technical Bids are opened. 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.

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 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. Participating Bidders will get mail intimation from TPCODL E-Tender system (Ariba) when their Technical Bids are opened. The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of TPCODL without any further correspondence in this regard.

4.6. 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 4.3 above. The decision to place Rate Contract / Purchase Order / LOI solely depends on TPCODL on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that TPCODL may deem relevant.

TPCODL reserves 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

- After finalization of tender, TPCODL shall place a Rate Contract on successful bidder(s). Rate contract shall be valid for a period of ONE year from the placement of Contract.
- Capacity for order handling within stipulated delivery period shall be submitted by the bidder with the technical bid and the same shall be considered by TPCODL for placement of Release Order (RO).
- Release Order (RO) shall be placed as per requirement of TPCODL. Rate shall remain FIRM till the validity of Rate Contract.
- All the costs pertaining to ROW is included in the scope of BA. Accordingly the BA needs to consider this cost while submitting their Price Bids. However, TPCODL shall reimburse any statutory Fees paid by the BA to any Govt. Agency for such clearance, subject to production of documentary evidence.
- Before commencement of work, BA may be required to conduct the detail survey for allotted work for further submission of the Survey Report to the Engineer-in-Charge for approval. Since such survey is in the scope of BA, the bidder may consider this while offering its Price Bid.
- BA shall deploy resources within 15 days from date of placement of Release Order.
- TPCODL reserves the right to make changes to the scope of work with a view to optimize on the overall cost to TPCODL. BA shall fully cooperate with TPCODL in making such changes with an aim for overall cost optimization. The revised charges for Contract shall be jointly agreed upon between TPCODL and BA in such scenario.
- Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 15 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.
- TPCODL reserves the rights to short close the issued Release Order / Rate contract, in case of any quality issues.

- All the terms and conditions of TPCODL General Conditions of Contract for Composite Orders shall be applicable.

7.2 Drawing Submission and Approval

The relevant drawings and GTPs need to be submitted by BA within two weeks of receipt of Rate Contract. 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.

Wherever TPCODL specifications are not available, relevant IS/IEC to be followed. All Drawings mentioned in the Tender Specification and other required for the completeness of the tender shall be submitted. Drawing submission process shall not be deemed complete of all the requirements are not complied during the submission of the same

7.3 Delivery Timelines

Release Orders shall be placed against the awarded post placement of Rate Contracts by TPCODL as and when the requirements arise. The awarded work is to be completed within 60 days or as prescribed in the Release Order from the date of issue.

7.4 Warranty Period

24 Months from Date of Commissioning & handover

7.5 Payment Terms

At end of each month, BA shall submit details of work completed and handed over to TPCODL in good condition within the month along with certification of acceptance by certified official. Associate shall submit the Bills/ Invoices for the certified works in the name of TPCODL to Invoice/Bill Desk (BIRD).

The payment shall be released within 30 days from the date of submission of certified bills/ invoices with complete details and fulfilment of statutory compliances and other requirements, if any.

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:

1) Chief Ethics Counselor – ravindra.singh@tpcentralodisha.com

8 Specification and standards

As per Annexure.

9 General Condition of Contract

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

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.

ANNEXURE I

SCHEDULE FOR ITEMS

Attached.

ANNEXURE II

TECHNICAL SPECIFICATIONS

Attached

ANNEXURE III

SCHEDULE OF DEVIATIONS

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

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

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

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

Seal of the Bidder:

Signature:

Name:

ANNEXURE IV

SCHEDULE OF COMMERCIAL SPECIFICATIONS

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

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1c.	Inclusive of GST	Yes / No (If Yes, indicate % rate)
1d.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of 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:

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

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

ANNEXURE VII

SCOPE OF WORK

To carry our site survey, supply and services for augmentation of LT network as per items mentioned in Annexure-I.

Division-wise BOQ is attached. The quantity mentioned is tentative and TPCODL reserves to modify the same as per organizational requirements. Payment shall be made as per actual quantity executed at site.

Guidelines for Geo Tagging of assets created under the Scheme up to DTR level.

While traversing in the field, the vendor MUST start from a Power Sub -Station (PSS)

Traversing along all the poles through the Segments of a feeder sequentially until the end of it, terminating at a DTR. To start with capturing of geo tagging data of assets created under the Scheme , onetime details for the selected Power Sub Station (PSS) needs to be recorded as below:-

1. Substation Name
2. Substation Code
3. Voltage (In/Out) (viz. 33/11 KV or 66/11 KV)
4. Number of Incoming feeders
5. Number of Outgoing feeders
6. DISCOM Name
7. District Name
8. Contact details of Field officer conducting the Geotagging
    a. Officer Name
    b. Designation
    c. Mobile Number

Vendor is required to create separate excel file (as per the template provided) for each Power Substation (PSS) including respective outgoing 11KV Feeders. The excel file for a PSS shall be saved as DISCOMNAME_DISTRICTNAME_ PSSNAME.xlsx. The Vendor to submit the excel file and PDF copy of excel duly signed by respective Field officer and Nodal officer.

Instruction to fill Excel Template:

Please refer to the sample Single Line Diagram attached.

1. In order to collect Geotagging data, the Field officer should start from the Power Sub Station (PSS). After capturing PSS coordinates, excel template would look as per the table 1 below:-

Asset Type (PSS / Pole / DTR)	Feeder Name	Feeder Code	Split (Y / N)	Segment -ID	GPS-No	Latitude	Longitude	Capacity
PSS	FNAme1	F0001	--	S1	1	17.068642	81.2317	--

Table 1

2. While traversing, the field officer need to collect coordinates of each point (i.e. pole/DTR). Of the feeder segment, (say Feeder ID - F0001, Segment – S1). In case of any split point, then Split (Yes/No) column needs to be filled as “Yes”. The excel template would look like Table 2 after Completing one segment of the feeder.

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
PSS	FName1	F0001	Y	S1	1	17.068642	81.231710	
Pole	FName1	F0001	N	S1	2	17.067492	81.230324	
DTR	FName1	F0001	N	S1	3	17.066178	81.228740	
Pole	FName1	F0001	Y	S1	4	17.066323	81.227106	
Pole	FName1	F0001	N	S1	5	17.066507	81.225035	
DTR	FName1	F0001	N	S1	6	17.066611	81.223852	

3. The Vendors shall move to the poles of Segment No. 2 of Feeder1, which is splitting at GPS no. 4 of segment S1. GPS No. 4 to be repeated for adding split segment. The asset table would look like this:

Asset-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
Pole	Fname	F0001	Y	S2	4	17.06632	81.227110	
Pole	Fname	F0001	Y	S2	7	17.06762	81.226600	
DTR	Fname	F0001	N	S2	8	17.06825	81.225380	

Then the line field officer of the Vendor shall move to the poles of Segment No. 3 of Feeder1, which is splitting at GPS no. 7 of S2. The asset table would look like this:-

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
Pole	Fname	F0001	Y	S3	7	17.06762	81.226600	
DTR	Fname	F0001	N	S3	9	17.06878	81.227193	

4. In this way, assets of all the 3 Segments of Feeder1 are captured and the table would look like:

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
PSS	Fname1	F0001	--	S1	1	17.068642	81.231710	
Pole	Fname1	F0001	N	S1	2	17.067492	81.230324	
DTR	Fname1	F0001	N	S1	3	17.066178	81.228740	
Pole	Fname1	F0001	Y	S1	4	17.066323	81.227106	
Pole	Fname1	F0001	N	S1	5	17.066572	81.225035	
DTR	Fname1	F0001	N	S1	6	17.066611	81.223852	

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
Pole	Fname1	F0001	Y	S2	7	17.066320	81.227110	
Pole	Fname1	F0001	Y	S2	8	17.067620	81.226600	
DTR	Fname1	F0001	N	S2	9	17.068250	81.225380	
Pole	Fname1	F0001	Y	S3	10	17.067620	81.226600	
DTR	Fname1	F0001	N	S3	11	17.068780	81.227193	

5. Similarly, the field Officer of the Vendor shall move to the First Segment of Second feeder (PSS entry to be repeated for each feeder) and the table would look like:-

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
PSS	Fname2	F0002	Y	S1	1	17.068640	81.231710	
Pole	Fname2	F0002	N	S1	2	17.066018	81.231510	
Pole	Fname2	F0002	Y	S1	3	17.064518	81.230274	
DTR	Fname2	F0002	N	S1	4	17.063609	81.227993	

Similarly, the field officer shall move to the second Segment of Second Feeder, which is splitting at GPS no.3 of R1.The asset table would look like this:-

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
Pole	Fname2	F0002	Y	S2	3	17.064518	81.230274	
Pole	Fname2	F0002	N	S3	4	17.063461	81.230524	
DTR	Fname2	F0002	N	S4	5	17.062927	81.231534	

In this way, assets of all the segments of second feeders of the PSS are captured and table would be like this:-

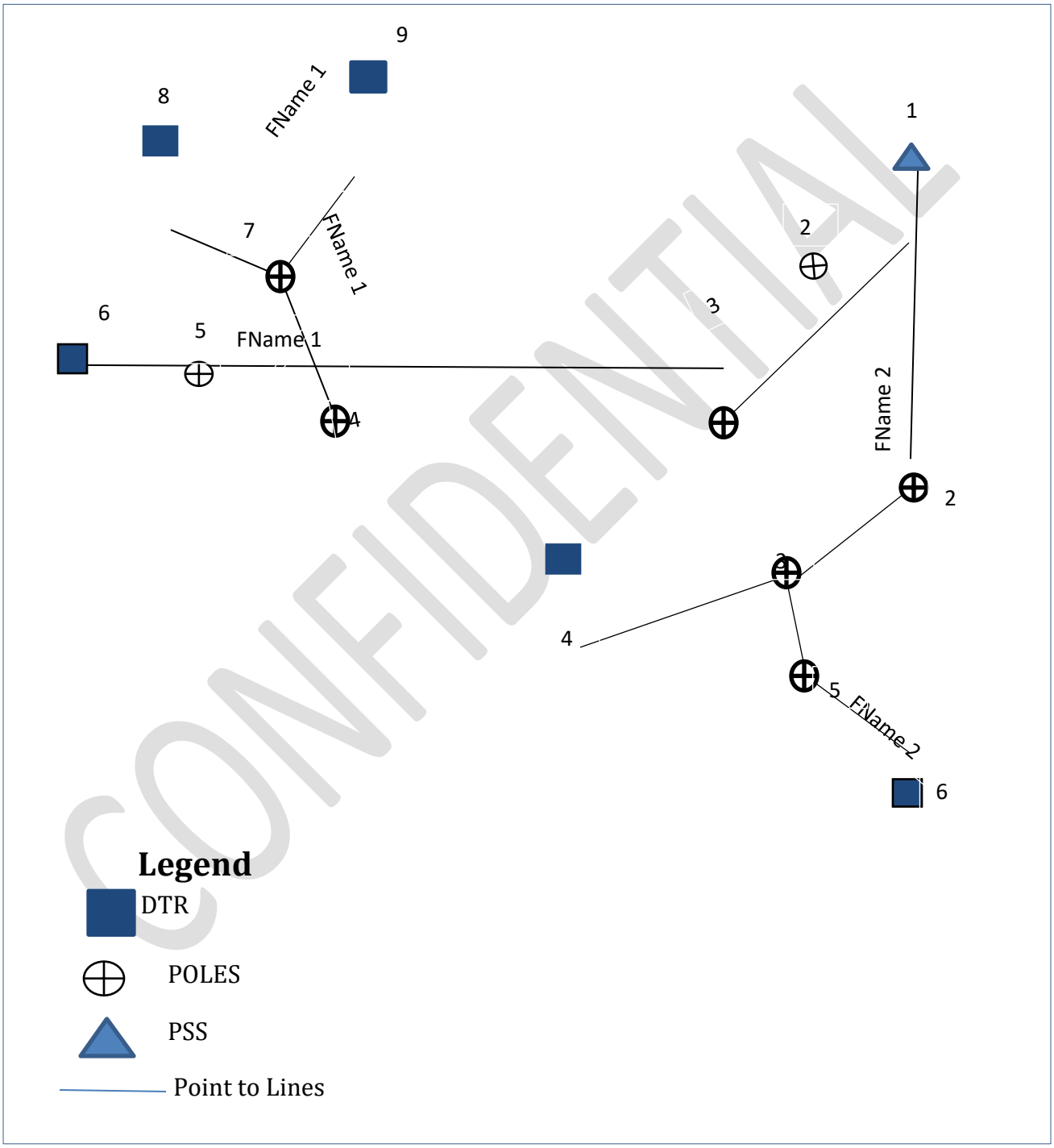
Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
PSS	Fname2	F0002	Y	S1	1	17.068642	81.231710	
Pole	Fname2	F0002	N	S1	2	17.066018	81.231510	
Pole	Fname2	F0002	Y	S1	3	17.064518	81.230274	
DTR	Fname2	F0002	N	S1	4	17.063609	81.227993	
Pole	Fname2	F0002	Y	S2	3	17.064518	81.230274	
Pole	Fname2	F0002	N	S2	4	17.063461	81.230524	
DTR	Fname2	F0002	N	S2	5	17.062927	81.231534	

Final excel template for one PSS with respective outgoing 11 KV Feeder would look like this:-

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
PSS	Fname1	F0001	--	S1	1	17.068642	81.231710	
Pole	Fname1	F0001	N	S1	2	17.067492	81.230324	
DTR	Fname1	F0001	N	S1	3	17.066178	81.228740	
Pole	Fname1	F0001	Y	S1	4	17.066323	81.227106	
Pole	Fname1	F0001	N	S1	5	17.066507	81.225035	
DTR	Fname1	F0001	N	S1	6	17.066611	81.223852	
Pole	Fname1	F0001	Y	S2	4	17.066320	81.227110	

Assett-Type	Feeder Name	Feeder Code	Split (Yes / No)	Seg_ID	GPS No	Latiude	Longitude	Capacity
Pole	Fname1	F0001	Y	S2	7	17.067620	81.226600	
DTR	Fname1	F0001	N	S2	8	17.068250	81.225380	
Pole	Fname1	F0001	Y	S3	7	17.067620	81.226600	
DTR	Fname2	F0002	N	S3	9	17.068780	81.227193	
PSS	Fname2	F0002	Y	S1	1	17.068642	81.231710	
Pole	Fname2	F0002	N	S1	2	17.066018	81.231510	
Pole	Fname2	F0002	Y	S1	3	17.064518	81.230274	
DTR	Fname2	F0002	N	S1	4	17.063609	81.227993	
Pole	Fname2	F0002	Y	S2	3	17.064518	81.230274	
Pole	Fname2	F0002	N	S2	4	17.063461	81.230524	
DTR	Fname2	F0002	N	S2	5	17.062927	81.231534	

The above excel sheet should be filled by the BA & after counter signature of the conceded SDO / DM should be furnished to Corporate Nodal Officer along with the single line diagram as per the sample below:



Quality Control Mechanism & Inspection Plan

OVERVIEW OF METHODOLOGY

1.In order to ensure proper Quality of materials as well as in installations in Govt. Aided Scheme, the following comprehensive Quality Control Mechanism (QCM) has been developed and to be meticulously adhered to by TPCODL and BAs (Turnkey contractors) for ensuring creation of Quality Infrastructure under the project.

TIER-I

The E & Q Team under Head- NEG & EQ designated as Project Implementing Agency's Quality Control Coordinator (PQCC). PIA shall prepare a detailed Quality Assurance Program, which should ensure quality checks as below:-

a) **TURNKEY CONTRACTOR**

- Inspections of all material as per MQP/Drawings/Technical Specifications
- All villages to be inspected as per FQP basing on REC construction Manual and Standards.
- All 33/11 kV sub stations for quality of material as per MQP/Drawings/Technical Specifications and works in the field asper FQP.
- 100% verification of Service BPL connections to UEHHs.

b) **PROJECT IMPLEMENTING AGENCY (TPCODL)**

- Inspections of material as stipulated in MQP for all major materials/equipment i.e PSC Poles, Conductors/Cables, DTR, LA and LTDBs. For other items, inspections/testing/ witnessing of acceptance tests shall be as per Drawings/Technical Specifications.
- All villages to be inspected as per FQP.
- All 33/11 kV sub stations for quality of material as per MQP/Drawings/Technical Specifications and works in the field as per FQP.
- 100% verification of service connections to Households.

c) **THIRD PARTY INSPCTION AGENCY (TPIA)**

- 10% randomly selected inspections as per MQP for Distribution transformers, conductors, energy meters and poles at pre-shipment stage at vendors' works/testing labs.
- 50 % Villages on random sampling basis including 100% verification of HH connections in 10% of 50% of villages inspected i.e. 5% villages and in each of the remaining villages inspected i.e. 45% villages, at least 5 HH connections shall be verified **randomly selected from the list of connections provided till the date of inspection.**
- 33/11 kV sub stations for quality of works in the field on random sampling basis
- 100 % new sub stations along with associated HT/LT lines.
- 50 % augmentation of sub stations.

QUALITY CONTROL METHODOLOGY

2.1. Tier – I quality control involves parallel quality control checks by the turnkey contractor,PIA & Independent Third party inspection agency (TPIA).

2.2 The Project Implementing agency shall be responsible for quality checks through turnkey contractor & independent third party inspection agency. PIA Quality Control Coordinator (PQCC) nominated by PIA, shall be responsible for ensuring implementation of all quality control checks under the first tier. PQCC shall be the nodal officer for any information regarding inspection, testing and quality control under first tier.

2.3. PQCC shall ensure inspection of material to be supplied by various sub-vendors, at their works, in line with Manufacturing Quality Plans (MQP) as finalized & agreed by PIA with turnkey contractor. He shall inform the third party inspection agency & REC quality coordinator (RQCC) of all the programs of testing of equipment at sub-vendors works so that RQCC can also depute their representatives for witnessing pre-dispatch inspection at the manufacturer's works on sample-basis. In exceptional cases, where due to no availability of inspector from PIA/TPIA/RQCC, witnessing of testing may be waived by PIA and inform to RQCC. However, testing shall be carried out in line with MQP/IS/Specification and report shall be submitted to PQCC for approval.

2.4. Quality in the field shall be controlled in line with the Field quality plans (FQP) to be finalized & agreed by PIA with turnkey contractor.

2.5. PQCC shall be the custodian of all manufacturing and field-quality plans. He shall ensure that field-quality plan is available at all project sites, so that PIA/turnkey contractor/TPIA shall carryout testing and checks as per field quality plan. The site personnel shall maintain proper records of testing and checks made by them. The same shall be made available to RQCC & NQM whenever required. The PQCC shall ensure that Quality Control Manual and all the guidelines are strictly followed.

Turnkey contractor's set up for Quality Assurance and Audit

3.1 The turnkey contractor shall be primarily responsible for ensuring the quality of material supplied & quality of works at site.

3.2 He shall submit all MQP and FQP to PQCC for approval and establish a proper procedure to ensure checks as indicated in MQP & FQP for the materials.

3.3 Turnkey contractor shall designate an experienced & qualified engineer as quality Engineer (QE) who shall be responsible for ensuring that all the quality checks required are carried-out and shall ensure to keep proper records for quality maintained at site.

3.4 Quality Assurance shall be undertaken in the following areas of the project implementation:-

a) Quality of material/equipment being supplied.

b) Quality of works in the field.

3.5 Quality of material/equipment being supplied:- For ensuring quality of material /equipment, the following system/procedure shall be adopted:-

3.5.1:- A standard manufacturing quality plan shall be agreed with the turnkey contractor for every equipment/material as which shall include the Stage Inspection during the process of manufacturing, sourcing of raw-materials, quality checks of raw-material, testing of final product –both type tests and routine/acceptance tests.

3.5.2 The turnkey contractor shall select the sub-vendors of various equipment based on a process, which ensures quality material in the project.

3.5.3 QE shall ensure the presence of their qualified representative during routine/acceptance tests, either at manufacturer's premises or at independent laboratories.

3.5.4 The type tests of DTR, Cable & LA shall be carried out only at CPRI/ERDA laboratories and for other materials, CPRI / ERDA or at any Govt. testing laboratories. Manufacturers may carry out type tests at their works however in such cases testing shall be carried out in presence of representative of **TPIA or RQCC or PQCC**.

3.5.5 All the major materials shall be tested before dispatch in line with MQP/Drawings/Technical specifications.

3.5.6 Assurance of Quality at field- The turnkey contractor shall establish a procedure for quality checks during execution of the project by finalizing field quality plans (FQP) with the PIA. The detailed field quality plan shall be made available and the same shall be explained to all the field engineers & supervisors of the Turnkey contractor.

The Turnkey contractor shall submit quality audit reports, on periodic basis to the PIA. Following checks shall be carried out in the field:

- All villages to be inspected as per FQP
- All 33/11kV sub-stations for quality of material as per MQP/Drawings/Technical Specifications and works in the field as per FQP.
- 100% verification of HH connections.
- 100 % verification of materials at site prior to utilisation.

3.6 PIA's set up for Quality Assurance and Audit

3.6.1 PIA shall also depute its own teams to undertake quality audit for material and field execution. PIA shall be fully responsible for ensuring the quality of material supplied & quality of works at site. He shall put in place a proper procedure to ensure checks as per MQP & FQP.

3.6.2 PIA shall designate an experienced & qualified engineer as Quality Control Coordinator (PQCC) along with a dedicated team who shall be responsible for ensuring that all the quality checks are carried-out and shall ensure to keep proper records for quality maintained at site.

3.6.3 Third-party inspection agency, RQCC and NQM shall be given free access to all technical records by PIA through PQCC.

3.6.4 Quality Assurance shall be undertaken in the following areas of the project implementation:-

a) Quality of material/equipment being supplied.

b) Quality of works in the field.

3.7.Quality of material/equipment being supplied- For ensuring quality of material /equipment, the following system/procedure shall be adopted:-

3.7.1 A standard manufacturing quality plan shall be agreed with the vendors for every major equipment/material as listed in Appendix-I which shall include the Stage Inspection during the process of manufacturing, sourcing of raw-materials, quality checks of raw-material, testing of final product –both type tests and routine/acceptance tests.

3.7.2 The turnkey contractor shall select the sub-vendors of various equipment based on a process, which ensures quality material in the project. All sub-vendors shall be approved by PIA.

3.7.3 PQCC shall ensure presence of their qualified representative during routine/acceptance tests, either at manufacturer's premises or at independent laboratories.

3.7.4 The type tests of DTR, Cable & LA shall be carried out only at CPRI/ERDA laboratories and for other materials, CPRI / ERDA or at any Govt. testing laboratories. Manufacturers may carry out type tests at their works however in such cases testing shall be carried out in presence of representative of **TPIA or RQCC or PQCC**.

3.7.5 All materials shall be tested before dispatch in line with MQP/Drawings/Technical specifications.

3.8. Assurance of Quality at field- The PIA shall establish a procedure for quality checks during execution of the project by finalizing field quality plans (FQP) with the turn-key contractor. The detailed field quality plan shall be made available and the same shall be explained to all the field engineers & supervisors of PIA. The field quality document shall clearly describe requirements for various raw materials used like steel, cement and sand etc.

3.8.1 Following checks shall be carried out in the field:

• All villages to be inspected as per FQP.

• All 11 kV sub stations with associated HT/LT lines for quality of material as per MQP/Drawings/Technical Specifications and works in the field as per FQP.

• 100% verification of Service connections to HHs.

3.8.2. Proper records shall be maintained at field office of PIA for all the checks and tests made by the PIA and TPIA and will be shown to RQM during their inspection, if asked for.

3.9. Third Party inspection agency (TPIA) shall be engaged by Govt / OPTCL for carrying out independent quality checks. Their responsibility will be to inspect material at manufacturers' works before dispatch and to ensure that the works in the field are carried-out as per norms and standard engineering practices in line with the manufacturing and field quality plans. TPIA shall depute their personnel on receipt of notice from PQCC.

3.9.1 Quality of material/equipment being supplied.

PIA shall ensure presence of their qualified representative in 10% randomly selected inspections as per MQP for Distribution transformers, conductors, energy meters, poles and insulators at pre-shipment stage at vendors 'works/testing labs.

3.9.2 Assurance of Quality at field- The detailed field quality plan shall be made available and the same shall be explained to all the field engineers & E&Q Team.

Quality of works shall be verified with reference to FQP.

Reports of Field Quality checks shall be supported by photographs.

The PQCC shall submit a report certifying satisfactory quality assurance for every project on completion of all quality checks.

3.9.3. Wherever works carried out are found unsatisfactory, compliance with respect to rectification shall be submitted by PQCC to PIA and the same may be re-inspected by TPIA, if required. Recurrent adverse reports about quality of works in any project will entail withholding of release of funds.

3.10. The turn-key contractor shall make necessary arrangements at site for checking of earth-resistance, conductor size, route-length etc.

3.11 PQCC shall submit a monthly report about the progress and quality checks carried-out.

4.0 FIELD INSPECTION

4.1 Contractor shall fill the Format-A, Format-B and Format-C as enclosed in Annexure and may get verified by representative of PIA/TPIA/RQM/NQM whoever be available.

4.2 Turnkey Contractor shall furnish all records of Quality of material/equipment and inspection report of Field checks performed during execution/installation by him to PQCC. The record must include at least followings:-

a) FQP
b) List of sub-vendors
c) Acceptance tests report of equipment
d) Type tests reports of equipment
e) Routine tests reports of equipment
f) Field inspections reports as per FQP and in FORMAT-A, B and C

4.3 PQCC shall maintain the records of tests witnessed by them and furnish report in Format-D.

5.0 GUIDELINES FOR QUALITY CONTROL DURING CONSTRUCTION

5.1 Documents required - The supervision and inspection shall be carried out based on the following documents to be provided by the project implementing agency (PIA) :-

(i) Approved route map with pole schedule.
(ii) Quality assurance plan agreed upon by the PIA and the executing agency (turnkey contractor)
(iii) Contract documents/Letter of award & special conditions of the contract
(iv) Technical specifications of the turnkey contract, for supply and erection of all equipment and materials.
(v) Sanctioned detailed project report (DPR) for the project district with all revisions/ modifications.
(vi) Relevant drawings/ blue prints, area distribution maps and schematic diagrams.
(vii) REC Specifications and Construction Standards.
(viii) Booklet of the Amendments to REC Specification and Construction Standards
(ix) CEA construction standard Regulatuions.
(x) L2 network/bar chart/PERT network

5.2 PROJECT MONITORING & SUPERVISION

5.2.1 Physical verification: Physical verification has to be carried out in project villages, in each sanctioned project, in which electrification works & HH services have been reported by the PIA to have been completed or carried out.

5.2.2 Monitoring teams: The project is to be monitored by a dedicated monitoring team. The verification will be based on the village wise progress reported which will be provided periodically at the end of each month by the Divisions / Project Team.

TABLE-I EQUIPMENT SPECIFICATIONS

Sl. No.	Particulars	REC Code	BIS code
A.	**Pre-stressed cement concrete poles [PCC]**		
1	For 11 KV and LT overhead lines	15/1979	IS: 1678/2905/7321
2	For 33 KV overhead lines	24/1987	IS: 1678/2905/7321
3	High tensile steel wires for PCC poles	62/1993	IS: 6003 or 1785
B.	**Bare conductors, insulated cables & wires**		
1	Bare Conductors – ACSR & AAC	1/1993	IS: 398
2	Bare Conductors – AAAC	33/1994	IS: 398
3	Aerial bunched cables (ABC) for 11 KV lines	64/1993	IS: 7098/8130/ 398/ ST-3 of IEC 502
4	11 KV XLPE cables	63/1993	IS: 7098/8130
5	Aerial bunched cables (ABC) for LT lines–1.1 KV	32/1984	IS: 10810/8130/6474/ 398
6	PVC insulated LT cables for LT services & DTs-1.1KV	26/1983	IS: 694/4288/1554
7	PVC insulated LT cables with embedded bearer wirefor LT services -1.1KV	27/1983	IS: 694/4288/1554
8	Galvanised iron wires	45/1988	IS: 280/7887/4826
9	Galvanised iron stay wires	46/1988	IS: 2141/4826/6594/
C.	**Distribution & Power transformers**		
1	11 KV/433-250 volts for 16 & 25 KVA with amorphous metal core	70/1993	IS: 1180/2026
2	Single phase distribution transformers (P to N) & (Pto P)	78/2007 & Amd.-I	IS: 1180/2026
3	Transformer oil for power & distribution transfr.	39/1993	IS: 335/1866
4	33/11 KV step-down power transformers	7/1993	IS: 2026/2099/3347
5	On load tap changers for 33/11 KV transformers	17/1981	IS: 8468/2026
D.	**Insulators & fittings**		
1	Porcelain insulators & fittings for 11 KV O/h lines	3/1993	IS: 731/3188/2486

2	Preformed helically formed fittings	25/1983	IS: 12048/2486/2004
3	Porcelain insulators & fittings for LT O/h lines	4/1979	IS: 1445/7935/1445/7935
4	Porcelain insulators & fittings for 33 KV O/h lines	13/1979	IS: 731/2486
5	Composite insulators	77/2007	

Sl. No.	Particulars	REC Code	BIS code
E.	**Circuit breakers, Lightning Arrestors, isolators switches, CT/PT etc**		
1	11 KV vacuum circuit breakers	22/1983 &Amnd.-I	IS: 13118/3156/ 2705
2	11 KV auto reclosers	38/1987	IS: 2516/2705/ ANSI IEEE C37.60
3	11 KV lightning arrestors	10/1976	IS: 3070
4	11 KV drop out fuse cutouts for DTs	53/1987	IS: 9385/2633/1364
5	11 KV air-break switches	43/1987	IS: 9920
6	33 KV vacuum circuit breakers	12/1993 &Amnd.-I	IS: 13118/3156/2705
7	33 KV lightning arrestors	16/1981	IS: 3070
8	33 KV switch isolators	52/1987	IS: 9920/2544/5350/ 4736/1161
9	33 KV load break switches	54/1993	IS: 9920/5561/4736/ 1161
10	LT circuit breakers	18/1983	IS: 2516
11	Miniature circuit breaker (MCB)	61/1993	IS: 8828
12	11 KV current transformers	59/1993	IS: 2705
13	11 KV voltage transformers	60/1993	IS: 3156
14	Danger Boards	57/1993	IS: 5/2551/8709
15	Ni-Cd. Battery & Battery Chargers for 33kV S/S	34/2008	

Quality Control Manual

FORMAT-A

Format For Field Quality For Village With All Associated Hamlets/Mauza/Dhani/Thanda Etc.
(To Be Filled By Contractor)

Site Inspection Report			Report No.	
Site Inspection Was Carried Out On			Report Date	
Project Details				
Contractor				
Block				
Village With All Associated Hamlets/Mauza/Dhani/Thanda Etc.				
Census Code				
Sl.No.	**Applicable Standard/Manual**	**Item/Job Description**	**Confirm Compliance**	**Deviations/ Corrective Actions**
A1- LT & 11kV Lines A1-POLES				
1	REC Construction Manual and Standards	Pole-Concreting wherever applicable	Yes/NO	
2	REC Construction Manual and Standards	Base Plate	Yes/NO	
3	REC Construction Manual and Standards	Earthing	Yes/NO	
4	REC Construction Manual and Standards	Numbering, Anticlimbing,devices & Danger Plate for DT pole & wherever applicable	Yes/NO	

A2-POLE ACCESSORIES & HARDWARES				
1	REC Construction Manual and Standards	**Mounting of Pole- Hardware's & accessories**	Yes/NO	
A3-STAY SET Yes/NO				
1	REC Construction Manual and Standards	Provision as per contract and standards	Yes/NO	
2	REC Construction Manual and Standards	Proper Tightening	Yes/NO	
3 REC Construction Manual and Standards Stay Set, Turn buckle & concreting -proper installation Yes/NO A4-JUMPERING				
1		P.G. Clamps-provision & proper installation	Yes/NO	
B. DISTRIBUTION TRANSFORMER				
1	REC Construction Manual and Standards	a. Mounting	Yes/NO	
2	REC Construction Manual and Standards	b.Termination through bi-mettalic clamps	Yes/NO	
3	REC Construction Manual and Standards	c.Jumpering	Yes/NO	

4	REC Construction Manual and Standards	d.Earthing Yes/NO	Yes/NO	
5	REC Construction Manual and Standards	Pre-commissioning checks	Yes/NO	
C- TPMO/GO/AP SWITH				
1	REC Construction Manual and Standards	Earthing & switch operation	Yes/NO	
2	REC Construction Manual and Standards	Jumpering from TPMO switch to drop out fuse for Trf.	Yes/NO	
D-METERING DISTRIBUTION LT PANEL /SERVICE CONNECTION Yes/NO				
1	REC Construction Manual and Standards	Termination of LT cable, Bearer wire and support at house	Yes/NO	
		Energy meter & earthing	Yes/NO	
2	REC Construction Manual and Standards	AB Cable with piercing connector	Yes/NO	

Signed By

Representative of Turnkey Contractor

Representative of PQCC if checked

Quality Control Manual

FORMAT-B

FORMAT FOR FIELD QUALITY OF SUBSTATIONS (TO BE FILLED BY CONTRACTOR)

Site Inspection Report			Report No.	
Site Inspection Was Carried Out On			Report Date	
Inspecting Officer				
Project Details				
Contractor				
Substation Location				
Sl. No.	REC Tech Specs	Item/Job Description	Confirm Compliance	Deviations/ Corrective Actions
33kv/11kV Substation				
1	REC Construction Manual and Standards	Earthing	Yes/NO	
2	REC Construction Manual and Standards	Civil Works	Yes/NO	
3	REC Construction Manual and Standards	Construction and general layout	Yes/NO	
4	REC Construction Manual and Standards	Safety clearances as per IE rule.	Yes/NO	
5	REC Construction Manual and Standards	Bimettalic terminal connecters for transformer connections	Yes/NO	
6	REC Construction Manual and Standards	Operation	Yes/NO	

Signed By

Representative of Turnkey Contractor

Representative of PQCC if checked

Quality Control Manual

FORMAT-C

CONTRACTOR's FORMAT BOQ FOR VILLAGES with all associated Hamlets/Mauza/Dhani/Thanda etc. (TO BE FILLED BY CONTRACTOR)

SITE INSPECTION REPORT			REPORT NO.	
SITE INSPECTION WAS CARRIED OUT ON			REPORT DATE	
PROJECT DETAILS				
CONTRACTOR				
BLOCK				
VILLAGE				
CENSUS CODE				
S.No.	Name of material/Items	Unit	Provision as per Approved drg.	Quantity at site
(i)	PCC Poles			
	a) Single Pole			
	1. 8.5 Meter	No.		
	2. 9.5 Meter	No.		
	3. 11.0 Meter	No.		
	4. Strut Pole	No.		
	b) Double Pole			
(ii)	LT & 11 KV Conductor			

	length (ACSR/AAAC/			
	Length			
	a) Main Line & Size	Mtr./mm		
	b) Spur Line & Size	Mtr./mm		
(iii)	LT Cable Length	Mtr.		
(iv)	Insulator (11 KV)			
	a) Disc.	No.		
	(b)Pin	No.		
	Insulator (LT)			
	a) Disc.	No.		
	(b)Pin	No.		
(v)	Ligthening arrester	No.		
(vi)	Distribution Transfm.			
	a) 10 kVA No.			
	b)16 kVA No.			
	c) 25 kVA No.			
(vii)	Stay set	No.		
(viii)	Service connections	No.		

Signed By

Representative of Turnkey Contractor

Representative of PQCC if checked

Representative of TPIA /RQM/NQM if checked

ANNEXURE VIIa

PREFERENTIAL NORMS FOR PROCUREMENT FROM MSMES REGISTERED IN THE STATE OF ODISHA

1. Tender Fees

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

2. Earnest Money Deposit (EMD)

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

3. Qualification Requirement for Open Tenders

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

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

4. Reservation for MSME

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

5. Performance Bank Guarantees

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

ANNEXURE VIII
GENERAL CONDITIONS OF CONTRACT

Attached: General Conditions of Contract for Composite Orders

ANNEXURE IX

SAFETY POLICY AND SAFETY TERMS AND CONDITIONS

1. Objective

The Tata Power engages contractor workforce to execute, run and maintain various operating sites and facilities across locations for various business verticals including Generation, Transmission, Distribution and Renewable. The activities range from project execution, operation, maintenance to facilities management.

The management of contractor safety represents a significant challenge for management. Tata Power has a responsibility to ensure that contractors are provided with enough information and support to enable them to conduct their roles safely and without endangering health and safety of their own workforce or that of our staff.

To ensure reduction in reportable injuries and achieve goal of zero accidents, first edition of contractor safety code of conduct was launched successfully in the year 2014. Since last four years after the launch of CSCC, Tata Power could achieve the objective of reduction in reportable injuries and fatalities.

Over the period, as the system was being matured, a need was felt to make second revision of the CSCC process. Objective of second revision is improve existing CSCC system and make it user friendly.

2. **Scope:** This procedure applies to all operating and project sites of The Tata Power Company Ltd and Group companies including new businesses like EV charging, Home Automation etc.

3. **Definitions**

3.1. **Order Manager:** Order Manager is the Tata Power representative, who has the ownership of the given job.

3.2. **Site Safety Management Plan**: It is the safety plan agreed between Contractor and Tata Power. It will contain the entire job specific safety requirement and will be signed by the contractor.

3.3. **Contractor**: An individual or a company that provides services to Tata Power under a signed contract.

3.4. **Emergency:** a serious, unexpected or dangerous situation requiring immediate action, which may result in loss of revenue/property, business discontinuity. In case of Emergency*, services may be procured by selecting the qualified vendor based on the vendor category without the safety bid evaluation. It must be approved by MB level and above.

3.5. **Expert Service jobs:** Jobs which needs expert services of contractor which does not involve direct exposure to the potential risk or work which involves only supervisory work such as expert for turbine overhaul, expert for boiler overhaul, expert for pump and motor, expert for compressor overhaul.

3.6. **Head of the Division:** Business in charge of the division who is overall custodian of the generating station or transmission division or distribution division.

3.7. **Category A Vendor: Vendor** eligible to carry out Very High & High risk (as per Tata Power Hazard Identification and Risk Analysis Procedure) and /or Long-Term Contract related to operation and maintenance (O&M) of plant. Vendors must fulfil the requirement specified for Category A in Appendix 12-CSMF-5 of this document.

3.8. **Category B Vendor:** Vendors eligible to carry out technical jobs, that are classified under Medium /low risk. Vendors must fulfil the requirement specified for Category B in Appendix 12-CSMF-5 of this document.

3.9. **Category C Vendor:** Vendors eligible for to carry out low or very low risk administrative and office jobs. For this he must fulfil the requirement specified for Category C in Appendix 12-CSMF-5 of this document.

3.10. **Category D Vendor: All** Consultants, Medical Practitioners or vendors taking job from Tata Power and working from their own premises (e.g. motor rewinding at vendor's shop floor, equipment sent for repair to vendor's works etc.) are classified as Category D Vendor

3.11. **High Risk Jobs: A Job or its activities are considered as Very High or High Risk when Order manager apply the "Tata Power Hazard Identification and Risk Analysis" procedure and found safety risk associated with are under Very High or High category. Indicative lists of jobs are given in appendix 15 of this document.**

3.12. **Medium Risk Jobs: Jobs or its activities are considered as medium risk when Order manager apply "Tata Power Hazard Identification and Risk Analysis" procedure and found the same as Medium Risk.**

3.13. **Low Risk Jobs: Any job or its activities are considered as Low or Very low risk while Order manager, calculate it by applying "Tata Power Hazard Identification and Risk Analysis" procedure and found it under Low or Very Low category.**

3.14. Long Duration Jobs: When the duration of job is 12 months or more, it is considered as Long duration job

3.15. High Value Jobs: When the value of the job contract is Rs. One Crore or more it will be considered as High value job**.**

4. Responsibilities

4.1 Order Manager: Order Manager is the Tata Power representative, who is responsible for:

4.1.1 Finalizing the Site Safety Management Plan along with Contractor, Safety Concurrences Group, Divisional Safety Head and Expert (External or Internal) if required.
4.1.2 Supervise and ensure work is carried out as per the Site Safety Management Plan including agreed Risk Assessment (HIRA/JSA) and Method Statement.
4.1.3 Conduct audit and evaluate Safety Performance of contractor.
4.1.4 Ensure contractors adhere to all statutory provisions.
4.1.5 In case any deviation is needed in agreed safety management plan or in CSCC process for execution of job, Management of Change procedure will be applicable, and approval may be obtained from divisional head /Cluster head.

4.2 Contractor: The person, entity or organisation who is executing the job for Tata Power under a contractual agreement and will be responsible for the following

4.2.1 To follow all Tata Power Critical Safety Procedure, Rules and guidelines given in Safety Terms and Conditions
4.2.2 Undertake job as per Site Safety Management Plan CSM-F10 and method statements agreed with Tata Power.
4.2.3 Raise any concerns with regard to their work and its safety with the Tata Power Order Manager.
4.2.4 Report all injuries, near misses, unsafe acts/conditions, and occurrences to the Tata Power Order Manager immediately.
4.2.5 Ensure that all sub-contractors follow the Tata Power Safety Procedure and agreed Site Safety Management Plan CSM-F10.
4.2.6 To follow all statutory requirements as per the laws of the land.
4.2.7 All vendors applying for A category jobs or submitting quote for high risk jobs shall obtain certificates of ISO 9001, ISO14001 and ISO45001 before submitting quote for high risk Jobs.

4.3 Safety Concurrence Group: It is Cross Functional Team constituted by Corporate Safety Team, which will have representatives from Execution department, Divisional safety and Corporate / Divisional contracts. SCG will be responsible for the following

4.3.1 Assessment of Safety Potential of new vendor before registration as per CSM-F1-Safety Category Qualification Form.
4.3.2 Safety Evaluation of the bids as per evaluation format CSM-F-9 Safety Bid Evaluation Criteria
4.3.3 Finalization of the Site Safety Management Plan CSM-F-10 submitted by the contractor.
4.3.4 Corporate Safety Team / Cluster Safety Head will be part of SCG during Safety Bid Evaluation for following types of jobs
4.3.4.1 High-Risk jobs to be carried out in Annual Overhaul / Major Shutdowns and Outages.
4.3.4.2 Capex jobs of High-Risk Category

5.1 Vendor Registration

For Vendor Registration, Corporate Contract will issue following documents for evaluation of contractor's safety capability

1) CSM-F1 –Safety Category Qualification Form
2) Safety Terms and Conditions

The document Safety Terms and Conditions provides the information about Tata Power safety System to the contractor. Contractor will submit the CSM-F1- Safety Category Qualification Form with all relevant details and documents to Vendor Registration Initiator, which will in turn forward it to Safety Concurrence Group (SCG) for evaluation. The SCG will evaluate the details submitted by the contractor based on a predetermined criteria CSM-F-5 Safety Potential Evaluation Criteria for Vendor Registration and will determine the category (Category A/B/C/D) for which the contractor will be registered. As mentioned in the above criteria, a site visit may also be organized by SCG prior to registration under Category A and B. In case, the contractor does not qualify the safety criteria, the contractor will not be registered. However, he may apply afresh for registration after 6 months. Please refer Appendix 1: Process Flow Chart for Vendor Registration.

5.2 Bid evaluation

At the time of placing the Purchase Requisition (PR), Order Manager is required to declare the risk involved in the of the job (i.e. High Risk / Medium Risk / Low Risk jobs, based on the RPN in HIRA. If the Job is "High Risk" or "Long Duration", then RFQ will be attached with following documents:

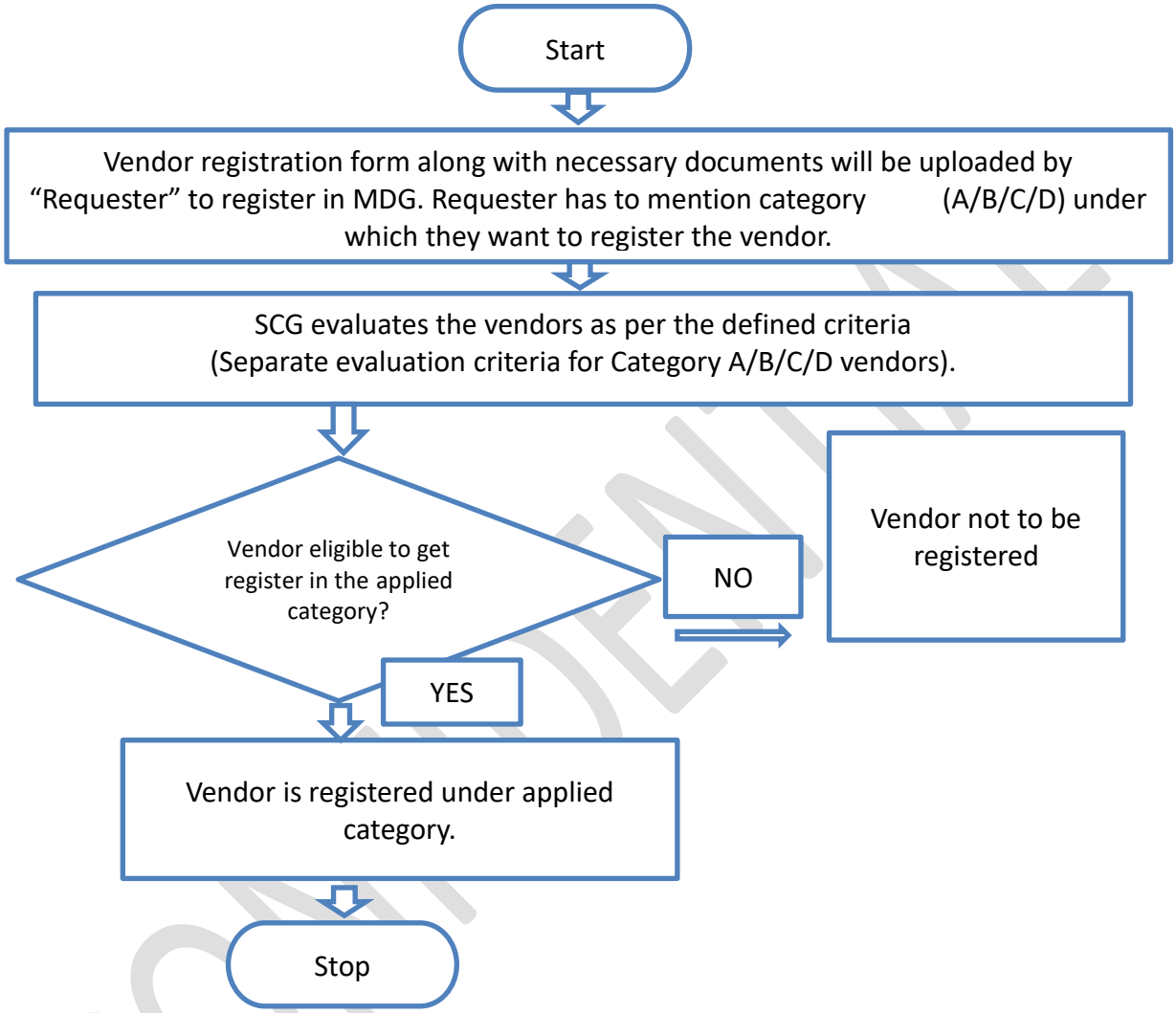
1) CSM-F7- Blank Safety Competency Form
2) CSM-F8 PPE requirements
3) Safety Terms and Conditions
4) Job Specific Safety Requirement (Educational and Professional Qualification, Skill & Experience Manpower, Tools and Tackles (e.g. man lifter, use of drone, use & availability of rescue kit), Work Methodology etc.)

Otherwise the RFQ will be attached only with Safety Terms and Conditions. Long term and low value jobs (see definition) are exempted from the CSCC process.
Corporate Contracts will collect duly filledCSM-F7 Safety Competency Form along with the bid. All other stakeholders will also put their efforts to get all relevant safety data during meeting / discussions with the vendor. SCG will evaluate the document as per the CSM-F9 Safety bid evaluation criteria. If any specific condition related to Contract is required to convey to contractor, Site safety team will attach the same as Annexure for specific conditions of job and submit it to contract team along with safety bid evaluation form. Commercial bid of contractor will be considered for evaluation by contract team only if contractor is qualified in safety bid. Site Safety Management Plan, defining the complete procedure of executing the job at site will be signed by the contractor and SCG after mutual agreement. CC will attach a copy of site safety Management Plan and any specific condition of contract along with PO to the successful bidder. Please refer Appendix 6: Process Flow Chart for issuing RFQ and PO significant health and safety risk associated with it.

5.3 Safety Performance Evaluation

During the time of job execution, regular site inspection will be carried out by the Tata Power officials and violations will be dealt as per CSM–F4 Safety Violation Penalty Criteria. Apart from this, monthly safety performance of the contractor will be evaluated based on the predetermined criteria as per CSM-F11 safety Performance Score and monthly score will be maintained by the Order Manager. Certain percentage of each running bill will be retained as Safety Retention amount and will be released on the basis of Safety Performance Score at certain intervals as defined in CSM- F-3- Safety Performance Evaluation Criteria. Please refer Appendix 10: Process Flow Chart for Safety Performance Evaluation. Percentage of retention amount is mentioned in safety terms and conditions.

Appendix 1: Process Flow Chart for Vendor Registration



Appendix 2: CSM-F-1 Safety Category Qualification form

1. "**Safety Category Qualification Form**" is part of vendor registration form. It needs to be filled by the contractor at the time of Registration and should submitted to Requester / order manager with all relevant documents.
2. The same will be evaluated by Safety Concurrence Group of the Division (SCG) as per the criteria given in CSM-F-5.
3. Information provided by contractor will be verified during site visit.

Safety Category Qualification Form

Please consider my application for

Category A Vendor: Vendor eligible to carry out Very High- and High-risk O&M jobs
Category B Vendor: Vendors eligible to carry out technical jobs, classified as Medium / low ris
Category C Vendor: Vendors eligible for to carry out low or very low risk administrative and office job
Category D vendor: All Consultants, Medical Practitioners or vendors taking job from Tata Power and working from their own premises.

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

Signature :
Name and Designation :
Stamp of Organization :

Appendix 3: Safety Terms and Conditions

Please refer the attached document Safety Terms and Conditions.

Appendix 4: CSM- F-3- Safety Performance Evaluation Criteria

1. A certain percentage of the bill value will be retained against every running bill as safety performance retention. The amount will be released with the last invoice or every six-month based on Safety Performance Score of contractors. The retention amount will be calculated based on contract value as below.

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

2. The evaluation criteria include Lead Indicators such as CFSA (Contractor Field safety Audit) score, percentage of workers trained in TPSDI, inspection of critical equipment. Lag indicators such as Fatalities, LWDC and man days lost.
3. The retention amount saved will go to a separate Safety Improvement Fund.
4. For the contract value of more than Rs 1 Cr or contract duration more than 12 months, the retention amount shall be released half yearly based on safety performance. For all remaining contracts, the retention amount will be released with the final bill.
5. Long term jobs with low value (Less than Rs. 1 Cr.) are exempted from the safety retention. Invoice of these type of jobs can be cleared without safety retention.
6. In case of job stoppage due to safety violations / unsafe observations at the site, no time extension shall be given to the contractor, if such delays are attributable to contractor.
7. In case of fatality, limb loss or loss of property, vendor must pay for liability, legal, statutory and additional mutually agreed settlement charges imposed by the appointed committee. This charge is over and above the retention amount.
8. The committee will finalize an amount between 5 -50 lakhs based on factors such as advise by statutory authorities, contract value and impact of accident etc.
9. Safety performance bonus 1% (limiting to 50 lakhs) of the invoice value will be considered at the end of the job if the contractual safety performance score 100%.
10. During the progress of the work, concerned Supervisor/Engineer will visit and inspect the work site regularly and evaluate the safety performance of the contractor based on matrix attached herewith and apply the Consequence management policy as applicable.
11. Order Manager, divisional chief and SBU head have the authority to terminate the contract in case of three consecutive serious violations.

Safety Performance Evaluation report- CSM-F-3

	Lead Indicators	**Unit Of measurement**	**Target**	**weight age**
1	% of Employee certified in TPSDI/Authorized agency	%	50%	10
2	CFSA score (Annexure 6.1)	Average Severity of Violations	1.49	20
3	Monthly inspection completed by contractor for Critical Equipment, lifting Tools & Tackles and hand tools used at site as per Tata Power Checklist	%	80	5
4	Revalidation of Condition of tools, tackles and equipment by Order Manger.	%	100	15
	Lag Indicators			
1	Number of Fatalities	No.	0	30
2	Number of Lost workday case (LWDC)	No.	0	10
3	Man-days Lost	No.	0	10

Appendix 5: CSM- F-4 Safety Violation Penalty Criteria

Penalty shall be imposed on the contractors under the following circumstances for breaching the contractual agreements:

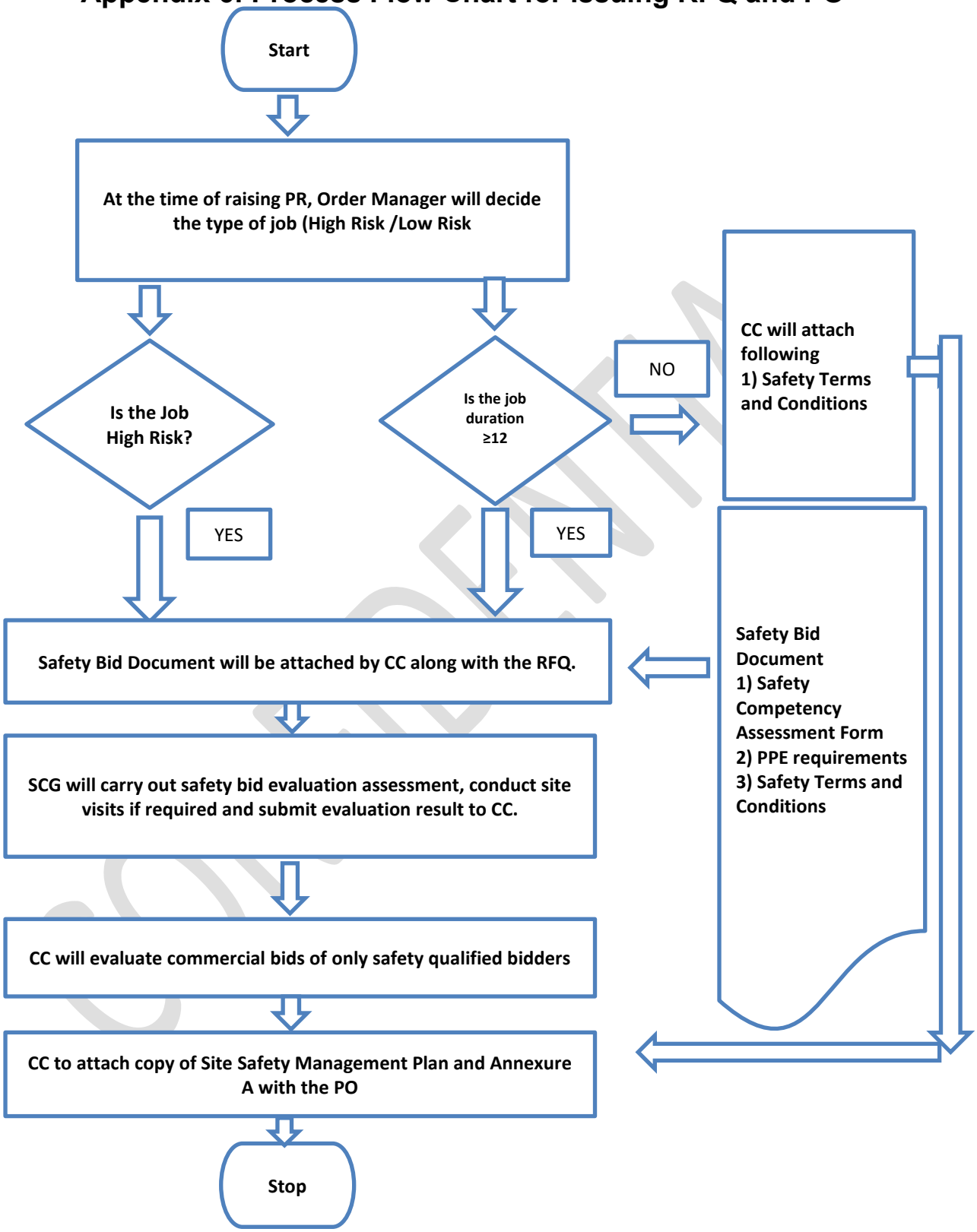
S No	Description of violation	Severit	Penalty
1.	Working without Permit	5	5000/-
2.	Untrained (TPSDI) worker on high-risk jobs.	5	5000/-
3.	Unhygienic/Bad condition of PPE	2	250/-
4.	Not following Tata Power Procedure & Standard	4	2000/-
5.	Unsafe Act/Condition of Severity 4	4	2000/-
6.	Unsafe Act/Condition of Severity 5	5	5000/-
7.	No Earthling of Electrical equipment	5	5000/-
8.	Damaged welding cable	5	5000/
9.	Violation of Positive Isolation Procedure (LOTO Not followed)	5	5000/
10.	ELCB of more than 30 mA/ELCB not working	5	5000/
11.	On/Off switch of welding m/c not working	5	5000/
12.	Electric cable tied with metal wire	5	5000/
13.	Leakage found DA hose / cylinder	5	5000/
14.	Use of LPG	5	5000/
15.	Use of IC engine based Three-wheeler at the work site.	5	5000/
16.	Starting the job without Toolbox Talk	5	5000/
17.	Spatter falling on DA hose / Gas-line/ pathways / Equipment	5	5000/
18.	No safety latch in crane hook	5	5000/
19.	Load raised or swung over people or occupied areas of buildings	5	5000/
20.	Persons standing in swing area of construction equipment.	5	5000/
21.	Using damaged slings.	5	5000/
22.	Unstable scaffolding/nonstandard Scaffolding in use	5	5000/
23.	Handrails and mid-rails are missing	5	5000/
24.	Safety Harness not anchored with lifeline/fixed structure	5	5000/
25.	Fall arrestor not provided/ Not being used.	5	5000/
26.	Double lifeline not used for working at height	5	5000/
27.	No rubber mat in Electrical Distribution (DB) room	4	2000/-
28.	Water found accumulated in Electrical Distribution room/near welding machine.	4	2000/
29.	Inserting electric cables into socket, without using plug.	4	2000/
30.	Use of damaged electrical cable/two core cables.	4	2000/
31.	Inflammable material found in Distribution Room / welding areas.	4	2000/
32.	Loose material falling into excavated pit	4	2000/
33.	Water logging into excavated pit /trenches	4	2000/
34.	No / inadequate Barricade	4	2000/
35.	Undercut / cave-in found on sides of excavated pits	4	2000/

36.	Grinding wheel/ Coupling/ Piling winch/other rotating parts without guard	4	2000/
37.	The HMV/Mobile Crane operator does not have a valid HMV driving license.	4	2000/
38.	The loading area is not leveled properly.	4	2000/
39.	Ladder not anchored at top	4	2000/
40.	Opening found in working platform of scaffolding/floor	4	2000/
41.	Inadequate illumination at the working area	4	2000/
42.	Loose material lying on Gantry, platform	4	2000/
43.	Cleaning with Compressed Air.	3	500/-
44.	Gas Cylinders using without cap.	3	500/
45.	Gas Cylinders stored without securing	3	500/
46.	Bringing inside any other chemicals, apart from approved by Safety dept.	3	500/
47.	Using drum for sitting or accessing height.	3	500/
48.	Misusing emergency facilities like fire hydrant line/ hose box/ spray system/ eye wash etc.	3	500/
49.	No provision of Safety net where falling materials or tools may occurs	3	500/
50.	Taking electrical supply from non-designated outlet (other than socket).	3	500/
51.	Restricted gangways due to unwanted materials.	3	500/
52.	Not reporting incident.	3	500/
53.	Entering into restricted area like switch yard/ hazardous storage	3	500/
54.	Work without supervision	3	500/
55.	Parking of vehicle without applying wheel choke at right front-front and left rear-rear wheels other than passenger cars.	3	500/
56.	Heavy Vehicle without helper or co-driver.	3	500/
57.	Not wearing florescent safety jacket at site.	3	500/
58.	People travelling in load body of vehicle.	3	500/
59.	Parking of vehicles at non designated area.	3	500/
60.	Shifting heavy materials without guide ropes.	3	500/
61.	Using other than 24V lamp inside the confined space/Use of other than 24V lamps.	3	500/
62.	Angular loading/ lifting with Crane or hoist.	3	500/
63.	By passing the limit switch/ Safety Interlock.	3	500/
64.	Housekeeping activities on road without proper barricade.	3	500/
65.	Trying to board or alit from running vehicle.	3	500/
66.	Cylinder Valves of Gas cylinders not closed when not in use.	3	500/
67.	Flash-back arrester not used.	3	500/
68.	Hand Trolley wheel found damaged.	3	500/

69.	Guy ropes of required length on both sides of object are not used during movement with load.	3	5/ 00/
70.	Scotch block/wedge not provided, when the vehicle is parked.	3	500/
71.	Suitable Trolley not provided to hold the cylinders.	3	500/
72.	Locked First Aid box	3	500/
73.	Caution boards, danger signs (luminescent /red) along with emergency contact number are not found displayed.	3	500/
74.	Person found jumping barricading tape	3	500/
75.	Stacking of pipes, pile casing, drums without chock blocks/wedges	3	500/
76.	The terrain on which Heavy Equipment/Machinery moves is not reasonably hard.	3	500/
77.	Without Safety Helmet at working sites	4	250/-
78.	Without Crash Helmet (on bikes)	4	500/-
79.	Without Full body double lanyard Safety Harness (for work at height)	5	5000/-
80.	Without Hand gloves - Material Handling, Welding, Cutting,	4	100/-
81.	Without Safety goggles/ face shield - Welding/Cutting /Grinding	5	5000/-
82.	Handling Chemical without PVC Apron	5	5000/-
83.	Smoking in prohibited area (Closed Go-downs, Storage of flammable material, Storage of Gas cylinders)	5	1000/-
84.	Sleeping at Workplace	3	100/-
85.	Driving beyond speed limit	3	1000/-
86.	Seat Belt While Driving (for front seat passengers and driver)	3	500/-
87.	Driving without license	4	1000/-
88.	Heavy Commercial vehicles without reverse horn	3	500/-
89.	Nonfunctional Head light/ taillight and side indicators	3	100/-
90.	Using Mobile Phone During Driving	5	5000/-
91.	Poor visibility of registration number/ without registration number	3	100/-
92.	Broken/ without Side view mirror	3	100/-
93.	Over speeding above specified limit	3	500/-
94.	Broken/ Without Pressure gauge on Oxygen/ LPG / Acetylene cylinder.	3	500/-
95.	Without Flash back arrestor on Industrial Acetylene & Oxygen cylinders.	5	5000/-
96.	Spillage of hazardous material/chemicals during transportation	4	2000/-
97.	Electrical equipment without Earthing/ ELCB/ Double Insulation Cable.	5	5000/-
98.	Lifting Tools & Tackles used without/ expired Test Certificates.	5	5000/-
99.	Housekeeping repeatedly not maintained		

100.	• First Time	3	Warning
101.	• Second Time	4	1000/-
102.	• Third Time	5	5000/-
103.	Serious Violation of House Keeping (after 1st or 2nd warning to be decided by Project Manager depending on the severity)	5	Rs.10000/- and above
104.	Repeat Violation of same nature	5	5 X Penalty for Violation
105.	Appointment of subcontractor without his Safety Bid Evaluation and/or without the permission of engineer in charge or Order manager.	5	5% of Contract Value

Appendix 6: Process Flow Chart for issuing RFQ and PO



Appendix 7: CSM-F-7 Safety Competency Form (Template)

Name of the Vendor/Bidder : -

Name of the Sub Vendor (If job is given to Sub Vendor) : -

Description of the Job : -

Request for Quotation (RFQ) No. :-

Vendor/Bidder to mandatorily provide the below safety competency related information.

1. Proposed Manpower Deployment Schedule: -

Category of Manpower Deployed	Minimum Qualification & Experience	Proposed Numbers against each category month-wise			
		Month 1	Month 2	…	Month n
Project Manager					
Site-In-Charge (Site Manager)					
Shift-in-Charge					
Safety Officers					
Supervisors					
Technicians					
a……					
b……..					
Highly Skilled Workmen					
a……					
b……..					
Skilled Workmen					
Semi-Skilled Workmen					
Unskilled Workmen					
Total Manpower					

Instructions to Bidder to fill:

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

Direct bidder employee
Partly Direct / Partly sub-contracted
Sub-Contracted

3. Against each of the category, bidder to indicate the minimum qualification and experience of the proposed manpower.
4. Rows can be added to also identify other specialised manpower e.g. specific details to be included for high risk activities operators
5. Columns can be extended to the actual duration of Site activities.
6. Bidder to note that if operations is in shifts, then Shift-in-charge / safety officers are required for each shift of operation.

2. List of Tools, Tackles, Machines and Equipment: -

Bidder/ Vendor to provide the list of tools, tackles, equipment **to be used during the job / project execution**. Bidder/Vendor to ensure that all the lifting tools and tackles, pressure

vessels are duly certified by the competent person authorised by the Chief Inspector of Factories of the respective state prior to start of the job

Sr. No.	Description of Tools / Tackles	Capacity / Rating	Quantity	Make	Remarks
1					
2					
3					
4					
5					
6					
7					
...					

3. Safety Records:

Bidder to provide the details of fatalities and lost workday cases (LWDC), occurred in last three years (data to be provided for the last completed FY and preceding 2 years).

Description	Safety Data for Last 3 Years		
	ar 1 (Last FY)	Year 2	Year 3
	20__ - __	20__ - __	20__ - __
Fatalities (Nos.)			
Lost Workday Cases (Nos.)			

In case of no fatalities, LWDC during any year, the form may be filled stating NIL against the respective year. Bidders are encouraged to also submit the RCA / incident investigation reports and the learning's implemented out of the above reported incidents

4. Job Safety Plan/ Method Statement:

Bidder to provide / enclose a detailed Site/Job Safety Plan along with a Method statement detailing the execution philosophy (how the bidder intends to execute the Job/Project), identifying all key activities which are required to be performed by the contractor at Site. Bidder to also list down all high-risk activities and provide the Hazard Identification and Risk Assessment (HIRA) for all such high-risk activities involved in the site work.

(Use Method Statement template attached as annexure A and sample as attachment B)

5. Management System Certification: -

Sr.	Certification	Yes / No	If Yes, ar of Certification	If No, et date for Certification
	ISO 9001			
	ISO 14001			
	OSHAS 18001 / ISO 45001			
	Any other (please specify……..)			
Note: Please attach certificates to support above. In case not accredited for above but applied for, application letters may be attached.				

Appendix 8: CSM-F-8 PPE requirements

The Contractor shall ensure that the following PPE of Approved standards shall be available at all time and shall be used by his employees with no exception whatsoever.

1	All contractor's employees at site	Safety Florescent Jacket (orange color), Safety helmet & safety shoes with Composite or steel toe cap
2	Workers mixing asphalt, cement, lime / concrete	Safety goggle & protective Hand gloves and footwear, Nose mask.
3	Welders / Grinders	Welding screen/goggles, safety shoes, leather hand gloves, aprons, leg guard
4	Stone breaker	Protective goggle, hearing protection, anti-vibration hand gloves and Protective clothing.
5	Electricians	Rubber hand gloves & Electrical resistant shoes.
6	Workers engaged in insulation using glass wool etc.	Respiratory mask & leather Hand gloves, goggles.
	Workers engaged in coal handling plant, ash handling plant and working in high dust area.	Dust mask, Hand gloves, protective goggles.
7	Workers working at a height of 1.8 Meter or above.	Double lanyard full body harness, fall arrestor and safety net made of reinforced nylon fiber ropes firmly supported with steel structures

• PPE shall be conforming to BIS/DGMS/DIN specifications, in good condition and shall be comfortable to his employees, when used.

Appendix 9: CSM- F-10 Site Safety Management Plan / Method Statement

Site Safety Plan / Method Statement (Template)

This Method Statement describes the specific safe working methods which will be used to carry out the described work. It gives details of work procedure with control measures to counter health and safety issues related to this work. The listed content of this Method Statement can be changed/modified subjected to job scope / specifications, but task specific method statement once finalized & approved, that should not be modified during work execution without permission from the approving authority.

Project/Job Name			
Scope of work: -			
Drawing References: -			
Detail of Sub contractors involved: -			
Method Statement Prepared By: - Designation: - (e.g. Site Manager)		Signature	Date

1.0 Introduction (*Describe purpose of the work, give details of type and scope of work being carried out);*

2.0 Location of Work (*Give site address and precise location on site where work is to be carried out.)*

3.0 Safety Document /Specific Approval Required (Details of any safety documents or specific approval i.e. Client specific approval required to undertake the work)

5.0 Role & Responsibilities of Personnel/Parties Involved in activities: -Clearly define role and responsibilities of all personnel involved in activity i.e. Site management staff including subcontractors' parties- Main contractor Project/Site Manager, Sub Contractor Site Manager, Project Engineer, Safety officer, Competent Supervisory Staff)

6.0 Working/Activity Description: - It *is important that all operatives should have clear idea of those operational sequences and responsible supervisor must verify their competency prior to their engagement in operation.*

6.1 Pre-Working Checks

6.2 Resources (Equipment, tools including manpower) Details *i.e. Equipment and Tools, specific operational equipment, test kits, lifting resources, Details of materials to be used in operation, including any reference to COSHH assessments in case of use of any chemicals, Details of the manpower allocated to the task, e.g. titles, qualifications, competences, direct manpower, contractors. Details of plant, tools and equipment to be used for the work, including the availability of relevant statutory documents, checks or inspections etc. Details of fencing, barriers, cones, chains, dangers notices, warning signs etc.*

Tools required for work:

Sr.No	Tools /Equipment /Machine	UOM	Required Qty.	Remark
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

6.4 Operational Sequence of work*: - Full description of the work, setting out the methodology in a sequential manner, including any reference to any identified operational restraints. Also refer here sec. 5.0 responsibilities part for every step of work sequence).*

Sr.No	Activity	Details of job sequence	Risk Involved	Control Checks

1.				
2.				
3				
4				
5.				

6.7 Final Checks & restoration of work area after completion of work :- *Those checks to be carried out by responsible supervisor in witness of his line hierarchy by use of specific checklist of certain operational checks and once those completed satisfactory, PTW (if applicable) to be closed and isolation arrangements to be restored by removing barricades/cautionary tags.*

7.0 Task Specific Hazards: - *Refer to Task Specific Risk Assessment and attach in appendix*

Attachment: - Specific Risk Assessment

In addition, please provide below control measures in risk assessment *(as applicable).*

Fall Protection Measures: (Where Work at height cannot be avoided)							
Control Measures for Electrical Hazards							
Others Hazard if any (please provide details)							
Hazardous Substances to be used in job : (Attach MSDS if required)							
	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No	Yes /No

7.0 Emergency Provisions: -*Relevant operational possibility of a programme in the case of emergency situation i.e. electrical supply restoration. In addition emergency response provisions i.e. first aiders, fire fighting, and first aid arrangements, nearest onsite/offsite emergency response also to be considered during emergency planning.*

8.0 "5S issues" / Waste Disposal/ Housekeeping and Environmental issues: -*Details waste disposal processes and or housekeeping activities, Details of environmental impacts and control measures.*

9.0 Personal Protective Equipment (PPE):- (*Tick on PPE requirements for the task/Job*

Required Personnel Protective Equipment:	 Safety Boots	 Hard Hats	 Safety Gloves	 Hearing Protection	 Eye Protection	 Respiratory Protection	Other: 1. Hi-Viz 2. Coveralls 3.

10.0 First Aid facilities and Nearby Hospitals Details

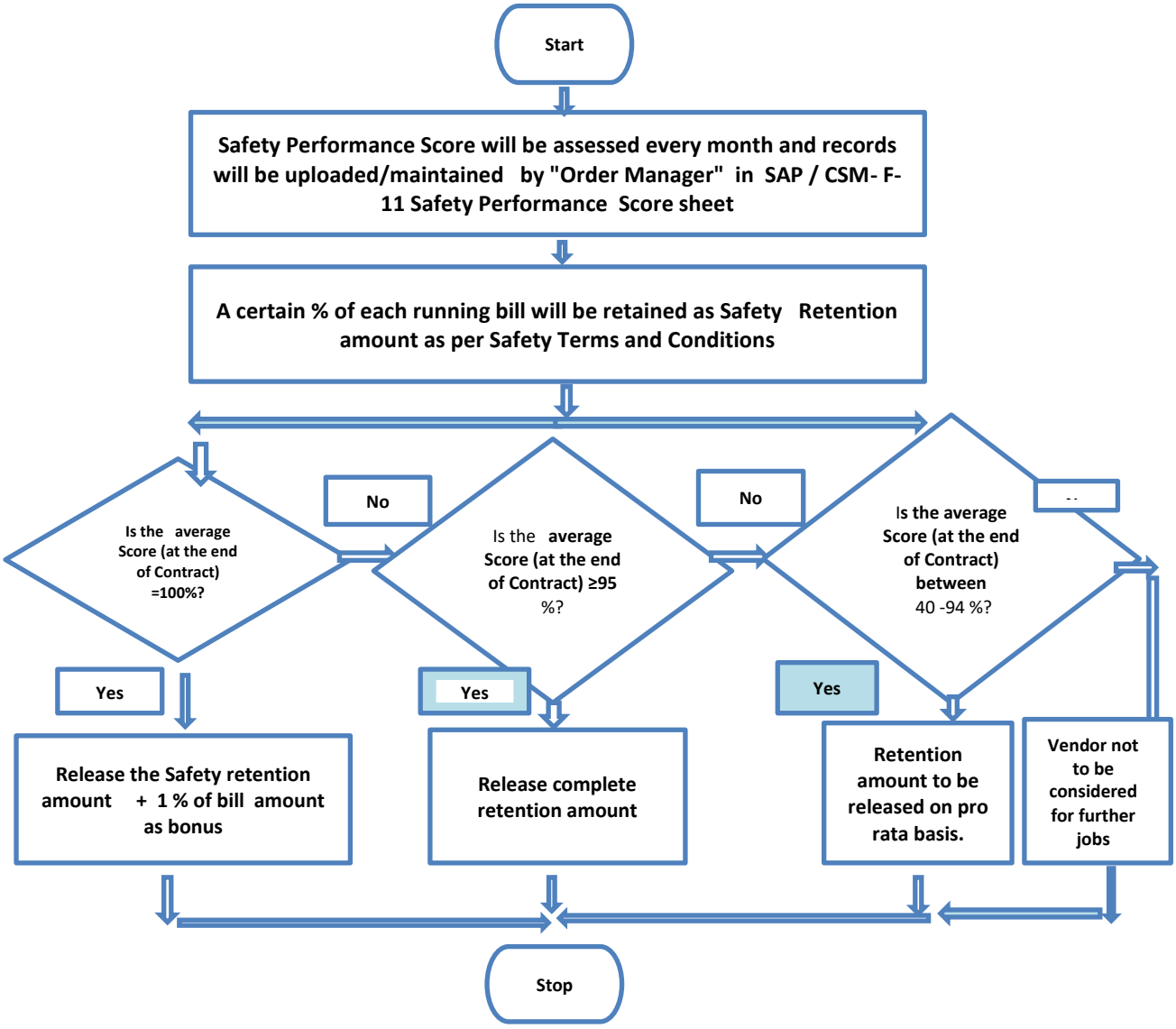
	First Aid Facilities:	Name of On-Site First Aider:	
		First Aid Box Location:	
		Location of Nearest Hospital:	

11.0 Occupational Health, Fitness and COVID-19 related Preparedness:

1. Please give a brief writeup / methodology of your organization planned to avoid impact of the COVID-19 pandemic at Tata Power working site.

2. Please give brief details of occupational health and hygiene related interventions planned by your organisation to ensure good health and fitness of workforce at Tata Power site.

Appendix 10: Process Flow Chart for Safety Performance Evaluation



Appendix 11: CSM- F-11 Safety Performance Score

S. No	Parameter	Unit of Measurement	Target	Weightage	Actual Performance	Actual Score
Lead Indicator						
1	% of Employee certified in TPSDI/Authorized agency	Number	50%	10		
2	CFSA score (Annexure 6.1)	Average Severity of Violations	1.49	20		
3	Monthly inspection completed for Critical Equipment, lifting Tools & Tackles and hand tools used at site	Number	80%	10		
4	Condition of critical tools, tackles and equipment	Number	100%	10		
Lag Indicator						
1	Number of Fatalities	No	0	30		
2	Number of Lost workday case (LWDC) (reportable)	No	0	10		
3	Man-days Lost	Man-days	0	10		
					Final Score	
					Invoice Value	
					Amount to be released	

Safety Performance Evaluation Criteria

Lead Indicators

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

Lag Indicators

Number of Fatalities	0	>0	
Score	30	0	
Number of LWDC (reportable)	0	>0	
Score	10	0	
Number of man days lost	0	1 to 5	>5
Score	10	5	0

Appendix 12: CSM-F-5 Safety Potential Evaluation Criteria for Vendor Registration

At the time of vendor registration, vendor will be registered under 3 categories

1) **Category A**- Vendors eligible to carry out High risk Jobs
2) **Category B**- Vendors eligible to carry out technical jobs that are low risk
3) **Category C**- Vendors eligible to carry out administrative and office jobs
4) **Category D**- Outsourced Jobs / Consultants /Medical Practitioners / Suppliers etc

For vendors to be registered under **Category A**, a safety potential evaluation will be carried out based on following parameters.

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 45001/ OHSAS 18001/ Certification?	30		
2	During site visit check for safety adequacy at site	30		Annexure - 12.1
3	Check the Safety statistics of Contractor	10		Annexure - 12.2
4	Check the Safety orientation & training process of Contractor	15		Annexure 12.3
5	Check the organizational structure for safety professionals & engineers / supervisors.	10		Annexure - 12.4
6	Certified/skilled workers as a percentage of overall workforce	5		
	Total	100		

Evaluation Criteria for Category B

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 9001 certification?	30		
2	During site visit check for safety adequacy at site	30		Annexure -12.1
3	Check the Safety statistics of Contractor	10		Annexure -12.2
4	Check the Safety orientation & training process of Contractor	15		Annexure -12.3

5	Check the organizational structure for safety professionals & engineers / supervisors.	10		Annexure -12.4
6	Certified/skilled workers as a percentage of overall workforce	5		
	Total	100		

Evaluation Criteria for Category C

Sr. No	Description	Weightage (%)	Actual Score	Remarks
1	Does the contractor have a valid ISO 9001 certification?	40		
2	Check the Safety statistics of Contractor	40		Annexure - 12.2
3	Check the Safety orientation & training process of Contractor	20		Annexure - 12.3
	Total	100		

Annexure 12.1: Evaluation Criteria for Category D:

Category D does not require any evaluation as it is for outsourced job outside the Tata Power company premise.

Annexure 12.2

Check List – Adequacy of Safety Statistics of Service Provider			Actual Marks obtained	Remarks
1	Check the safety statistics for last 3 years (LTIFR and LTISR)	Statistics available: Marks 5 Statistics not available: 0		
2	Check the trend LTIFR for last 3 years	LTIFR value / Marks 0 to 0.2 / 5 0.21 to 0.3 / 2.5 >0.3 / 0		
3	Check the trend of LTISR last 3 years	LTISR value / Marks 0 to 2 / 5 2 to 3 / 2.5 >3 / 0		
4	Has there been any Prosecution/Conviction for any contravention with regard to Safety & Health provisions under the Factories Act /Electricity Act/ BOCW Act and Rules framed there under?	Marks No Prosecution: 10 Prosecution: 0 To be provided in written on letter head		
	Total	**25**		

Annexure 12.3

Check List – Adequacy of Safety orientation & training process of Service provider			Actual Marks obtained
1	Records of safety trainings provided to safety officer/supervisor/workmen during last 1 year as percentage(%) of total employed by service provider	**Safety Officer** / Marks ≥80% of employees / 5 50 to 79 % of employee / 2.5 <50% / 0	
		Safety Supervisor / Marks ≥80% of employees / 10 50 to 79 % of employee / 6 <50% / 0	
		Workmen / Marks ≥80% of employees / 10 50 to 79 % of employee / 6 <50% / 0	
	Total	25	

Annexure 12.4

Check List – Adequacy of organizational structure for safety professionals & engineers / supervisors.			Actual Marks obtained
1	Check availability of number of safety officers from government recognized institute as per workforce strength.	Marks 1 in 50 employees / 10 1 in 100 employee / 6 Any other / 0	
3	Check availability of qualified workforce from government recognized institute/TPSDI.	Marks 100% of safety officers qualified / 5 50 – 99% of safety officers qualified / 3 <50 / 0	
	Total	15	

Appendix 13: CSM-F-9 Safety Bid Evaluation Criteria

The User has to select whether the job is high risk/ long duration at time of raising the PR.

1) The decision whether job is "**high risk** "or not has to be made by order manager on the basis of Risk involved (Risk Priority Number in HIRA) of the Jobs. An indicative list of high-risk jobs is attached as annexure
2) If a technical job is of low risk with estimated duration of the contract is 1 year or more the job should be treated as "**long duration**".
3) All Safety bids will be evaluated by Safety Concurrence Group. Structure of SCG will be declared by Corporate safety. Corporate safety team will audit bid evaluation process of a few selected jobs and Quality of evaluated safety Bids.
4) Records of jobs sent by for Safety Bid evaluation shall be maintained by Corporate Contract team in existing tracing sheet along with other jobs.
5) For Safety Bid Evaluation will be based on following parameters.

		Minimum Requirement	**Weightage (%)**	**Score Obtained**
Manpower	**Safety Officer (1 per 500 workers)**	**Qualification-** Officer shall possess Advance Diploma In Industrial Safety by state technical board. **Experience**- Minimum 1-year experience in relevant field as mentioned in the job in PR.	5	
	Safety Supervisor (1 per work site up to max. 50 workers)	**Qualification-** Supervisor shall possess ITI/ Diploma in relevant field. **Experience**- Minimum 2-year experience in relevant field as mentioned in the job in PR. **Training** – Trained and certified by TPSDI or equivalent institute in relevant safety procedures. **Note:** On request of the contractor/Users -TPDSI should vet & certify the skilled & experienced Technician if Technical Qualification is not adequate.	5	
	Technician (Skilled workers as electrician, rigger, fitter, welder, cable jointer, line men etc)	**Experience**- Minimum 2 year experience in relevant field as mentioned in the job in PR. **Training** – Trained and certified by TPSDI or equivalent institute in relevant safety procedures.	5	

Tools & Tackles	Equipment / Machines/ Tools & Tackles(lifting and shifting tools)	The list of Equipment /Machines / Tools and tackles to be used for job to be submitted by the contractor. Evaluation of the list will be carried out based on 1) Suitability as per the relevant job 2) Make and age of the tools from authorized agencies defined by the user. 3) Certification by the competent authority of respective state.	30	
Safety Records	Safety Records	Safety Records for last 3 years (as per vendor or as per our knowledge) – Recommendation?	15	
Safety Plan	HIRA/Contract Job Safety Plan	Adequacy of HIRA and Job Safety Plan with respect to relevant job. More weight age will be given to vendor for using mechanized work and advanced tools and equipment	20	
Accredited Bodies certificate	ISO-9001	ISO-9001	2	
	ISO-14001	ISO-14001	3	
	OHSAS 18001 ISO 45000	OHSAS 18001/ISO 45000	15	
		Total Score		

6) Vendor entitled to carry out the job only when qualified for the safety evaluation as follows:
   Contractor is qualified in safety bid only if his total score is more than 70% in all category 1 jobs such as high risk/long duration.
7) The Corporate Contract has to ensure that the vendor provides the filled “Safety Competency Form” along with the quotation.
8) Corporate Contract will forward the Safety Competency Form received from the contractor to the Safety Concurrence Group for evaluation.
9) In case SCG wants to visit the site, the Safety Competency will be based on evaluation at the time of site visit Annexure 13.1

Annexure -13.1:

Checklist to be used: During site visit to check the adequacy Safety systems.			
		Observation	Score* (1-5)
1	Check the adequacy of safety policy and Safety Management system of the contractor.		
2	Does the contractor have written down safety procedures?		

3	Check the records of Near miss, unsafe act, unsafe conditions and incidents.		
4	Check the organization setup to implement the safety systems at site (safety officer, safety supervisor)		
5	Check whether safety meeting and toolbox talk carried out regularly and records maintained or not.		
6	Is the process of incident investigation adequate or not?		
7	Verify incident reporting and recording system		
8	Check the usage of equipment/tools and tackles.		
9	Check for housekeeping at site		
10	Check the use of PPEs and general behavior of workforce towards safety		
	Total Score		
	Site Visit Score		

Score*- rating on the scale of 1-5 to be given based on the observations on site. Score of 1 is the lowest and core of 5 is the highest.

Appendix 14: CSM-F-11.1 CFSA Format

CONTRACTOR FIELD SAFETY AUDIT						
Project Name :						
Date:						
Description of Severity rating:			**Audit Team:**			
	1 = Untidy area, minor issues, sets poor example					
	2 = Restricted access, unacceptable trash, disorderly					
	3 = Rule or procedure violation, potential injury					
	4 = Unsafe condition, serious injury potential					
	5 = Immediate serious injury potential, stop activity immediately and correct		**Audit Time:**			10:00hrs -11:30 hrs
			Weather:			cloudy
	Description	**Responsible**	**Number Personnel Observed**	**Violations**	**Remarks**	Leading Indicators

		Engineer	Contractors	Good Citizens	Violators	Number of Violations	Severity	Violations x Severity		4 & 5	PPE	Unsafe Act	Unsafe Condition
Area													
1													
	Sub Totals			**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**
	% of Observed People Working Safely												
	Number of Violations												
	Average Severity of Violations												
	Number of Severity 4 & 5 Violations												
	% of 4 & 5 Violations												
	Approximate Number of Workers Observed												
	Number of People on Site												
	% of Workers Observed												

Appendix 15: Indicative List of High-Risk Jobs

To access the exhaustive list of High-risk jobs, please refer the following documents

1) High Risk Jobs- Generation
2) High Risk Jobs- T&D
3) High Risk Jobs- Renewable

Indicative List of High-Risk Jobs -Generation Cluster						
Sl. No.	**Jobs**					
1	Demolition / Painting of Chimney					
2	Survey Sounding Jobs in Sea					
3	Dredging at Coal Birth Jetty					
4	Maintenance / Testing and Replacement of Extra High Voltage (132 KV etc.) Switchyard equipment					
5	Maintenance of EOT Cranes					
6	Deep excavation (5 feet or more) near existing buildings /Structure s					
7	Working inside confined spaces (entry through manhole)					
8	Operation Maintenance of elevators					
9	Working on Live control Circuits for identification of faults					
10	Cable laying and termination Jobs					

Indicative List of High-Risk Jobs - T&D Cluster						
Sl. No.	**Jobs**					
1	Transmission Line Tower Erection on columns, near live lines, In congested areas, In creeks, In the Sea					
2	Conductor Stringing on Tower Using Tensioner & Puller in the area such as Line Crossing, Near Live lines, Congested Areas, Road Crossing, Bridge Crossing, Railway line Crossing, In creeks ,In the Sea					
3	Cable Pulling by Using winch Machine in City and Rural Areas					
4	Hot Washing of HT and Extra HT lines, Towers and switchyards equipment					
5	Installation of Lifts					
6	Installation of EOT Cranes					
7	Tower Dismantling					
8	Working on H Frame /Pole mounted Transformers					
9	Excavation in operational Area heaving power cables in receiving station					
10	Identification and spiking of cable / disconnection of cables from poles					

Indicative List of High-Risk Jobs - Renewable Cluster					
Sl. No.	**Jobs**				
1	Working on Electrical Panels				
2	Hi Potting of Equipment				
3	Battery commissioning and maintenance				
4	Working on the nasal of Wind Turbine				
5	Working on live electrical switchyard, material Handling and Equipment installation				
6	Roof Top Solar Panels Installation and maintenance				
7	Working in live Electrical Switchyard, Material Handling, equipment installation				
8	All maintenance activities that requires climbing on Towers /Structures / Transformer/ GODs				
9	Loading and Unloading of Solar Panels on trucks				
10	Structural Repair /Dismantling work at height.				

ANNEXURE 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.

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: 15th June, 2018

TATA POWER
Lighting up Lives!

CORPORATE SUSTAINABILITY POLICY

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

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

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

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

Annexure-I Price Bid Format
(Tender no. TPCODL/P&S/1000000190/21-22)

S. No.	Description	Unit	Quantity	HSN / SAC Code	Unit Rate (Rs.)	Appl. Taxes & Duties	All Inclusive Unit Rate (Rs.)	Total All Inclusive Value (Rs.)
			A		B	C	D = B + C	E = A x D
	Supply							
1	200Kg PSC pole 8 Mtr long	Nos.	10,201					
2	Suspension Clamp with EYE hook for ABC	Pair	7,142					
3	Eye Hook for AB cable	Nos.	6,122					
4	Pole clamp for Eye hook (AB Cable)	Pair	12,241					
5	Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	11,901					
6	LT Conductor dead end clamp(ABC)	Nos.	6,122					
7	Insulated Piercing connector Type-A -main 16 to 95 sq.mm & Tap-16 to 95 sq.mm	Nos.	10,201					
8	LT Stay Set 16mm	Set	3,058					
9	LT Stay insulator (110 x 75) mm	Nos.	3,058					
10	LT Stay Clamp (1.40 Kg / Pair)	kg	6,120					
11	7/12 SWG G I stay wire (10Kg. / Set)	kg	36,720					
12	Earthing Coil	Nos.	8,159					
13	1x35+1x25mm2 AB cable	km	338					
14	3x35+1x25mm2 AB cable	km	15					
15	3x50+1x35mm2 AB cable	km	4					
16	Nuts & Bolts of Assorted size	kg	10,200					
	Sub-Total (A) Supply							
	Services							
17	Installation/Erection of 8 MTR PSC Pole including loading and unloading, transportation from site/tent upto 10 Kms., Includes excavation and concreting ratio 1:1:5:3 (500mmX500mmX1500mm) = 0.375Cu.mtr. The scope also includes providing of all civil material for concreting . Transportation, loading and unloading of Pole from Nearest division/store/site office to site(maximum upto 10KM), Scope of work also includes 5 days curing & REC Standards	No.	10,201					
18	Fixing of stay set with 0.5Cum cement concrete foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal with all labor and material except stay set , stay wire , stay insulator.	Set	3,058					
19	Installation of GI pole Clamp(50X8 flat) for fixing Eyehook	Pair	12,241					
20	Installation of Dead end clamp all necessary nutbolt for fixing of different size of LT ABC Cable	No.	6,122					

S. No.	Description	Unit	Quantity	HSN / SAC Code	Unit Rate (Rs.)	Appl. Taxes & Duties	All Inclusive Unit Rate (Rs.)	Total All Inclusive Value (Rs.)
			A		B	C	D = B + C	E = A x D
21	Installation of suspension clamp with EYE HOOK or Suspension clamp with Bracket with all necessary nutbolt for fixing different size of LT ABC Cable	No.	7,142					
22	Erection and Testing of Coil Earthing	Nos.	8,159					
23	Stringing of LT AB Cable 1x35+1x25mm2 AB cable	K.M	338					
24	Stringing of LT AB Cable 3x35+1x25mm2 AB cable	K.M	15					
25	Stringing of LT AB Cable 3x50+1x35mm2 AB cable	K.M	4					
26	Installation of Insulated Piercing Connector for AB Cable	Nos.	10,201					
27	Installation of Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	11,901					
Sub-Total (B) Services								
Grand Total (C) = Supply (A) + Services (B)								

Authorized Signatory

NOTE:

- The bidders are advised to quote prices strictly in the format attached. Break-Up of prices for line-items to be provided in format given.
- 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 prices shall be FOR TPCODL Locations.
- The bidders shall quote against each of the line items as indicated below. The quantity as mentioned above neither implies nor guarantees any minimum deployment thereunder. The above quantity is based on TPCODL estimates. It is indicative only and is not binding on TPCODL for fulfillment. Actual quantities may vary as per TPCODL's requirements.

BOQ (Divisionwise) for LT Network Augmention

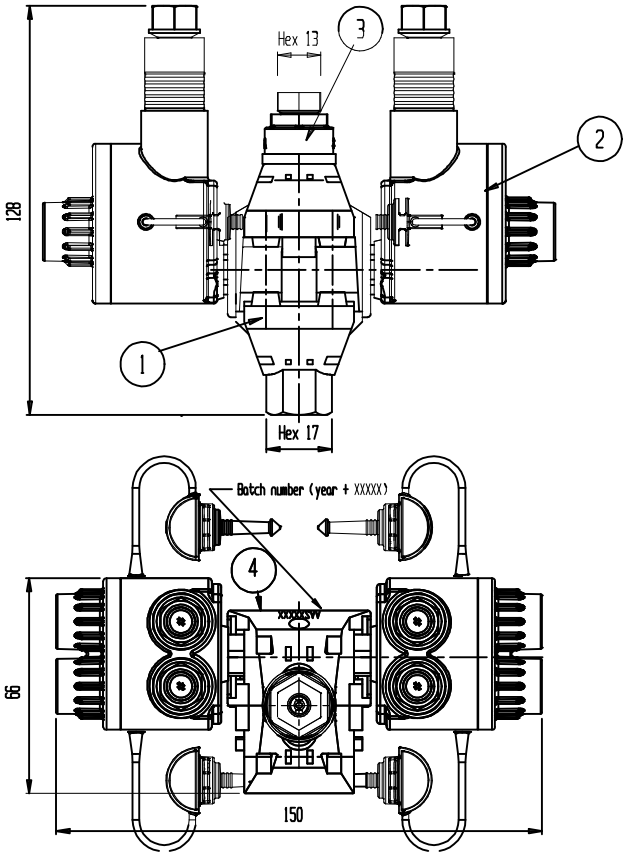
S. No.	Description of Materials	UoM	BED, BBSR	NED, NIMAPARA	KhED, Khurda	PED, Puri	NyED, Nayagarh	BaED, Balugaon	CDD-II, Cuttack
1	200Kg PSC pole 8Mtr long	Nos.	51	263	1,975	1,045	1,457	264	20
2	Suspension Clamp with EYE hook for ABC	Pair	36	184	1,383	731	1,020	185	14
3	Eye Hook for AB cable	Nos.	31	158	1,185	627	874	158	12
4	Pole clamp for Eye hook (AB Cable)	Pair	61	315	2,370	1,254	1,748	317	24
5	Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	59	307	2,304	1,219	1,700	308	23
6	LT Conductor dead end clamp(ABC)	Nos.	31	158	1,185	627	874	158	12
7	Insulated Piercing connector Type-A -main 16 to 95 sq.mm & Tap-16 to 95 sq.mm	Nos.	51	263	1,975	1,045	1,457	264	20
8	LT Stay Set 16mm	Set	15	79	593	313	437	79	6
9	LT Stay insulator (110 x 75) mm	Nos.	15	79	593	313	437	79	6
10	LT Stay Clamp (1.40 Kg / Pair)	kg	31	158	1,185	627	874	158	12
11	7/12 SWG G I stay wire (10Kg. / Set)	kg	183	946	7,111	3,761	5,244	950	71
12	Earthing Coil	Nos.	41	210	1,580	836	1,165	211	16
13	1x35+1x25mm2 AB cable	km	2	8	67	33	51	9	1
14	3x35+1x25mm2 AB cable	km	-	1	2	3	-	-	-
15	3x50+1x35mm2 AB cable	km	-	-	0	-	-	-	-
16	Nuts & Bolts of Assorted size	kg	51	263	1,975	1,045	1,457	264	20
17	Installation/Erection of 8 MTR PSC Pole including loading and unloading, transportation from site/tent upto 10 Kms., Includes excavation and concreting ratio 1:1:5:3 (500mmX500mmX1500mm) =	No.	51	263	1,975	1,045	1,457	264	20
18	Fixing of stay set with 0.5Cum cement concrete foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal with all labor and material except stay set , stay wire , stay insulator.	Set	15	79	593	313	437	79	6
19	Installation of GI pole Clamp(50X8 flat) for fixing Eyehook	Pair	61	315	2,370	1,254	1,748	317	24
20	Installation of Dead end clamp all necessary nutbolt for fixing of different size of LT ABC Cable	No.	31	158	1,185	627	874	158	12
21	Installation of suspension clamp with EYE HOOK or Suspension clamp with Bracket with all necessary nutbolt for fixing different size of LT ABC Cable	No.	36	184	1,383	731	1,020	185	14
22	Erection and Testing of Coil Earthing	Nos.	41	210	1,580	836	1,165	211	16
23	Stringing of LT AB Cable 1x35+1x25mm2 AB cable	K.M	2	8	67	33	51	9	1
24	Stringing of LT AB Cable 3x35+1x25mm2 AB cable	K.M	-	1	2	3	-	-	-
25	Stringing of LT AB Cable 3x50+1x35mm2 AB cable	K.M	-	-	0	-	-	-	-
26	Installation of Insulated Piercing Connector for AB Cable	Nos.	51	263	1,975	1,045	1,457	264	20
27	Installation of Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	59	307	2,304	1,219	1,700	308	23

BOQ (Divisionwise) for LT Network Augmention

S. No.	Description of Materials	UoM	CED, Cuttack	AED, Athagarh	SED, Salipur	DED, Dhenkanal	TED, Chainpal	AnED, Angul	KED-I, KENDRAPA
1	200Kg PSC pole 8Mtr long	Nos.	269	560	91	570	797	1,008	818
2	Suspension Clamp with EYE hook for ABC	Pair	188	392	64	399	558	706	572
3	Eye Hook for AB cable	Nos.	161	336	55	342	478	605	491
4	Pole clamp for Eye hook (AB Cable)	Pair	323	672	110	684	957	1,210	981
5	Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	314	653	107	665	930	1,176	954
6	LT Conductor dead end clamp(ABC)	Nos.	161	336	55	342	478	605	491
7	Insulated Piercing connector Type-A -main 16 to 95 sq.mm & Tap-16 to 95 sq.mm	Nos.	269	560	91	570	797	1,008	818
8	LT Stay Set 16mm	Set	81	168	27	171	239	302	245
9	LT Stay insulator (110 x 75) mm	Nos.	81	168	27	171	239	302	245
10	LT Stay Clamp (1.40 Kg / Pair)	kg	161	336	55	342	478	605	491
11	7/12 SWG G I stay wire (10Kg. / Set)	kg	968	2,015	329	2,051	2,871	3,629	2,944
12	Earthing Coil	Nos.	215	448	73	456	638	806	654
13	1x35+1x25mm2 AB cable	km	9	19	3	20	28	35	20
14	3x35+1x25mm2 AB cable	km	-	1	-	-	-	-	4
15	3x50+1x35mm2 AB cable	km	-	-	-	-	-	-	4
16	Nuts & Bolts of Assorted size	kg	269	560	91	570	797	1,008	818
17	Installation/Erection of 8 MTR PSC Pole including loading and unloading, transportation from site/tent upto 10 Kms., Includes excavation and concreting ratio 1:1:5:3 (500mmX500mmX1500mm) =	No.	269	560	91	570	797	1,008	818
18	Fixing of stay set with 0.5Cum cement concrete foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal with all labor and material except stay set , stay wire , stay insulator.	Set	81	168	27	171	239	302	245
19	Installation of GI pole Clamp(50X8 flat) for fixing Eyehook	Pair	323	672	110	684	957	1,210	981
20	Installation of Dead end clamp all necessary nutbolt for fixing of different size of LT ABC Cable	No.	161	336	55	342	478	605	491
21	Installation of suspension clamp with EYE HOOK or Suspension clamp with Bracket with all necessary nutbolt for fixing different size of LT ABC Cable	No.	188	392	64	399	558	706	572
22	Erection and Testing of Coil Earthing	Nos.	215	448	73	456	638	806	654
23	Stringing of LT AB Cable 1x35+1x25mm2 AB cable	K.M	9	19	3	20	28	35	20
24	Stringing of LT AB Cable 3x35+1x25mm2 AB cable	K.M	-	1	-	-	-	-	4
25	Stringing of LT AB Cable 3x50+1x35mm2 AB cable	K.M	-	-	-	-	-	-	4
26	Installation of Insulated Piercing Connector for AB Cable	Nos.	269	560	91	570	797	1,008	818
27	Installation of Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	314	653	107	665	930	1,176	954

BOQ (Divisionwise) for LT Network Augmention

S. No.	Description of Materials	UoM	KED-II, Marshaghai	JED-Jagatsinghp	PED, Paradeep
1	200Kg PSC pole 8Mtr long	Nos.	501	184	328
2	Suspension Clamp with EYE hook for ABC	Pair	351	129	230
3	Eye Hook for AB cable	Nos.	301	111	197
4	Pole clamp for Eye hook (AB Cable)	Pair	601	221	393
5	Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	584	215	383
6	LT Conductor dead end clamp(ABC)	Nos.	301	111	197
7	Insulated Piercing connector Type-A -main 16 to 95 sq.mm & Tap-16 to 95 sq.mm	Nos.	501	184	328
8	LT Stay Set 16mm	Set	150	55	98
9	LT Stay insulator (110 x 75) mm	Nos.	150	55	98
10	LT Stay Clamp (1.40 Kg / Pair)	kg	301	111	197
11	7/12 SWG G I stay wire (10Kg. / Set)	kg	1,803	663	1,180
12	Earthing Coil	Nos.	401	147	262
13	1x35+1x25mm2 AB cable	km	18	4	11
14	3x35+1x25mm2 AB cable	km	-	3	-
15	3x50+1x35mm2 AB cable	km	-	-	-
16	Nuts & Bolts of Assorted size	kg	501	184	328
17	Installation/Erection of 8 MTR PSC Pole including loading and unloading, transportation from site/tent upto 10 Kms., Includes excavation and concreting ratio 1:1:5:3 (500mmX500mmX1500mm) =	No.	501	184	328
18	Fixing of stay set with 0.5Cum cement concrete foundation 1:3:6 size (900mmx600mmx900mm) using 40mm BHG metal with all labor and material except stay set , stay wire , stay insulator.	Set	150	55	98
19	Installation of GI pole Clamp(50X8 flat) for fixing Eyehook	Pair	601	221	393
20	Installation of Dead end clamp all necessary nutbolt for fixing of different size of LT ABC Cable	No.	301	111	197
21	Installation of suspension clamp with EYE HOOK or Suspension clamp with Bracket with all necessary nutbolt for fixing different size of LT ABC Cable	No.	351	129	230
22	Erection and Testing of Coil Earthing	Nos.	401	147	262
23	Stringing of LT AB Cable 1x35+1x25mm2 AB cable	K.M	18	4	11
24	Stringing of LT AB Cable 3x35+1x25mm2 AB cable	K.M	-	3	-
25	Stringing of LT AB Cable 3x50+1x35mm2 AB cable	K.M	-	-	-
26	Installation of Insulated Piercing Connector for AB Cable	Nos.	501	184	328
27	Installation of Neutral Connector Type B suitable for Main 35 to 70 sq.mm AAAC & Tap-2.5 to 10 sq.mm Service cable cover by black weather resistant insulation cover	Nos.	584	215	383



Rep	Qty.	Description	Material
1	1	Central part	Assembly Drawing
2	1	Plug	Assembly Drawing
3	1	Shearhead	Ploycarbonate GF- natural
4	1	Making	Colour White

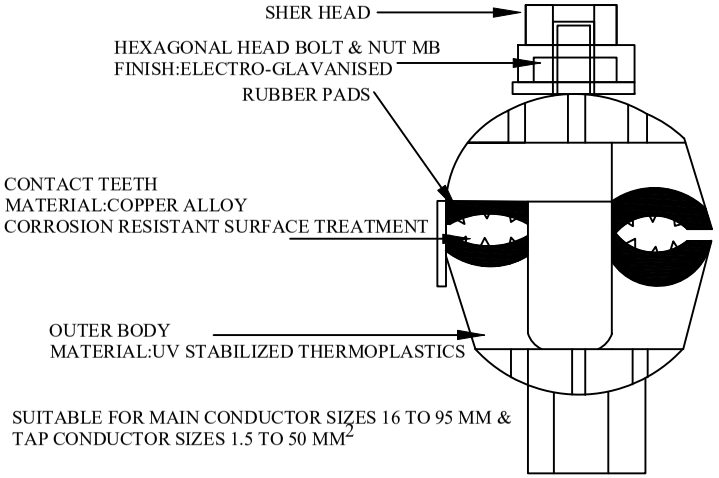
FOR TENDER PURPOSE ONLY

Rural Electrification Corporation Ltd.

PROJECT:
Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

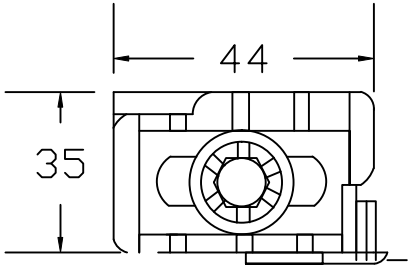
TITLE
MUTIPORT INSULATION PIERCING CONNECTOR
STRIPPING / PIERCING

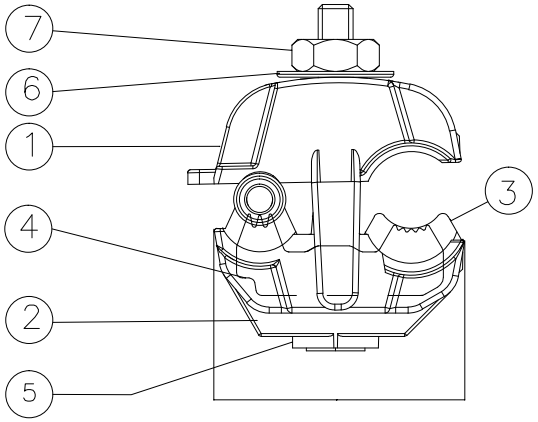
REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT	SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
R0						A4	1:100	REC/DDUGJY/LT-ACC-ABC/05A	1 OF 1	0

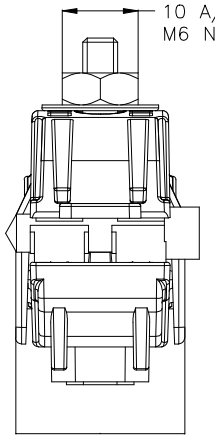


SUITABLE FOR MAIN CONDUCTOR SIZES 16 TO 95 MM & TAP CONDUCTOR SIZES 1.5 TO 50 MM^2

TOLERANCE : ± 5% FOR ALL DIMENSIONS







CABLE RANGE:
SUITABLE FOR 10 TO 95 SQ.MM MAIN (Bare/Insulated)
& 1.5 TO 10 SQ.MM TAP(Bare/Insulated)

WEIGHT: "W" Grams (Approx)

RATED TIGHTENING TORQUE: "X" Nm

REP	QTY	DESCRIPITION	MATERIAL
7	1	NUT M6	STEEL
6	1	WASHER	STEEL
5	1	SCREW	STEEL
4	2	BLADE	AL ALLOY
3	1	SEAL	T.P.ELASTOMER
2	1	LOWER BODY	THERMO PLASTIC - BLACK
1	1	UPPER BODY	THERMO PLASTIC - BLACK

All dimensions are in mm.

FOR TENDER PURPOSE ONLY

REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana(DDUGJY)

TITLE: INSULATION PIERCING CONNECTOR

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-ACC-ABC/05B	1 OF 1	0

44 GS Stay Sets (16 mm AND 20 mm)

1. 16MM DIA STAY SETS (GALVANIZED)

The stay sets (Line Guy set) will consist of the following components:-

a) **ANCHOR ROD WITH ONE WASHER AND NUT**: Overall length of rod should be 1800 mm to be made out of 16 mm dia GS Rod, one end threaded upto 40mm length with a pitch of 5 threads per cm and provided with one square GS washer of size 40x40x1.6mm and one GS hexagonal nut conforming to IS:1367:1967 & IS:1363:1967. Both washer and nut to suit threaded rod of 16mm dia. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality welding.

b) **ANCHOR PLATE SIZE 200x200x6MM**: To be made out of GS plate of 6mm thickness. The anchor plate should have at its centre 18mm dia hole.

c) **TURN BUCKLE & EYE BOLT WITH 2 NUTS**: To be made of 16mm dia GS Rod having an overall length of 450 mm, one end of the rod to be threaded upto 300 mm length with a pitch of 5 threads per cm and provided with two GS Hexagonal nuts of suitable size conforming to IS:1363:1967 & IS:1367:1967. The other end of rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality welding.

d) **BOW WITH WELDED ANGLE**: To be made out of 16mm dia GS rod. The finished bow shall have an overall length of 995mm and height of 450 mm, the apex or top of the bow shall be bent at an angle of 10 R. The other end shall be welded with proper and good quality welding to a GS angle 180mm long having a dimension of 50x50x6mm. The angle shall have 3 holes of 18mm dia each.

e) **THIMBLE**: To be made on 1.5 mm thick GS sheet into a size of 75x22x40mm and shape as per standard shall be supplied.

f) **Galvanizing**: The complete assembly shall be hot dip galvanized.

g) **WELDING:** The minimum strength of welding provided on various components of 16mm dia stay sets shall be 3100 kg. Minimum 6 mm fillet weld or its equivalent weld area should be deposited in all positions of the job i.e. at any point of the weld length. The welding shall be conforming to relevant IS: 823/1964 or its latest amendment. Minimum length of weld to be provided at various places in the stay sets shall be indicated by the bidder. Welding if, found short in lengths as per final approved drawings shall be rejected.

h) **THREADING:** The threads on the Anchor Rod, Eye Bolt & Nuts shall be as per specification IS: 4218:1967 (ISO Metric Screw Threads). The nuts shall be conforming to the requirement of IS: 1367:1967 & have dimensions as per IS; 163:1967. The mechanical property requirement of fasteners shall conform to property clause 4.6 each for anchor rod & Eye bolt and property clause 4 for nuts as per IS: 1367:1967.

AVERAGE WEIGHT OF FINISHED 16MM STAY SETS 7.702 KG. (MINIMUM) (EXCLUDING NUTS THIMBLES AND WASHERS) 8.445 KG. (MAXIMUM)

2. 20 MM DIA STAYS SETS FOR 33KV LINES (GALVANIZED)

THE STAY SET (LINE GUY SET) WILL CONSIST OF THE FOLLOWING COMPONENTS:

a) **ANCHOR ROD WITH ONE WASHER AND NUT**: Overall length of Rod should be 1800mm to be made out of 20mm dia GS Rod, one end threaded upto 40mm length with a pitch of a threads per cm. And provided with one square G.S. Washer of Size 50x50x1.6mm and one GS Hexagonal nut conforming to IS:1367:1967 & IS:1363:1967. Both washer & nut to suit the threaded rod of 20mm. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality welding. Dimensional and other details are indicated and submitted by bidders for owner's approval before start of manufacturing.

b) **ANCHOR PLATE**: Size 300x300x8mm: To be made out of G.S. Plate of8mm thickness. The anchor plate to have at its centre 22mm dia hole.

c) **TURN BUCKLE, EYE BOLT WITH 2 NUTS:** To be made of 20mm dia G.S. Rod having an overall length of 450 mm. One end of the rod to be threaded upto 300mm length with a pitch of 4 threads per cm. The 20mm dia bolt so made shall be provided with two G.S. Hexagonal nuts of suitable size conforming to IS:1637/1967 & IS:1363/1967.

The other end of the rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality of welding. Welding details are to be indicated by the bidder separately for approval.

d) **BOW WITH WELDED CHANNEL:** To be made out of 16mm dia G.S. Rod. The finished bow shall have and overall length of 995 mm ad height of 450 mm. The apex or top of the bow shall be bent at an angle of 10R. The other end shall be welded with proper and good quality welding to a G.S. Channel 200mm long having a dimension of 100x50x4.7 mm. The Channel shall have 2 holes of 18 mm dia and 22 dia hole at its centre.

e) **THIMBLE 2 Nos.**: To be made of 1.5mm thick G.S. sheet into a size of 75x22x40mm and shape as per standard.

f) **GALVANISING**: The complete assembly shall be hot dip galvanised.

g) **WELDING**: The minimum strength of welding provided on various components of 20mm dia stay sets shall be 4900 kg. Minimum 6mm filet weld or its equivalent weld area should be deposited in all positions of the job i.e. at any point of the weld length. The welding shall be conforming to relevant IS: 823/1964 or its latest amendment.

h) **THREADING:** The threads on the Anchor Rods, Eye Bolts and Nuts shall be as per specification IS: 4218:1967 (ISO Metric Screw Threads). The Nuts shall be conforming to the requirements of IS: 1367:1967 and have dimension as per IS 1363:1967. The mechanical property requirement of fasteners shall confirm to the properly clause 4.6 each for anchor rods and Eye bolt and property clause 4 for nuts as per IS: 1367:1967.

AVERAGE WEIGHT OF FINISHED 20MM STAYS SET: 14.523 KG. (MIN.) (EXCLUDING NUTS THIMBLE & WASHER): 15.569 KG. (MAX.)

3. **TEST CERTIFICATE**: The contractor shall be required to conduct testing of materials at Govt./Recognized testing laboratory during pre – dispatch inspection for Tensile Load of 3100 Kg/4900 Kg. applied for one minute on the welding & maintained for one minute for 16 mm and 20 mm dia stay sets respectively.

4. **IDENTIFICATION MARK**: All stay sets should carry the identification mark of word DDUGJY and size of the stay set. This should be engraved on the stay plate and on stay rods to ensure proper identification of the materials.

The nuts should be of a size compatible with threaded portion of rods and there should be no play or slippage of nuts.

Welding wherever required should be perfect and should not give way after erection.

5. **TOLERANCES:** The tolerances for various components of the stay sets are indicated below subject to the condition that the average weight of finished stay sets of 16mm dia excluding nuts, thimbles and washers shall not be less than the weight specified above :-

No. Item	Section Tolerances	Fabrication Tolerances	Material
1 Anchor Plate	6mm thick + 12.5% - 5%	200x200mm + 1%	GS plate 6mm thick
	8mm thick + 12.5% - 5%	300x300mm + 1%	GS plate 8mm thick
2 Anchor Rod	16mm dia + 5%- 3%	Length 1800mm + 0.5%	GS Round 16mm dia
		Rounded Eye 40 mm inside dia + 3%. Threading 40mm+11% - 5	GS Round 16mm dia
	20mm dia + 3%- 2%	Length 1800mm + 0.5%	GS Round 20mm dia
		Round Eye 40mm inside dia + 3%. Threading 40mm +11% -5%	GS Found 20mm dia
3 Turn Buckle Bow	16 mm dia + 5%- 3%	Length 995mm + 1% 16mm dia	GS Round 16mm dia
		Length 180mm + 1% 50x50x6mm	GS Angle
		Channel length 200mm + 1%	GS Channel 100x50x4.7mm
4 Eye Bolt Rod	16mm dia +	Length 450mm + 1%	GS Round

	5%- 3%	Threading 300mm + 1% Round Eye 40mm inside dia + 3%	16mm dia
	20mm dia + 3%- 2%	Length 450mm + 1% Threading 300mm + 1% Round Eye 40mm inside dia + 3%	GS Round 20mm dia

45 GI Stay Wires

1. SCOPE

This Specification covers details of G.I. stranded stay wires for use in rural distribution system.

2. APPLICABLE STANDARDS

Except when they conflict with the specific requirements of this specification, the G.I. Stranded Wires shall comply with the specific requirements of IS:2141-1979. IS:4826-1979 & IS:6594-1974 or the latest versions thereof.

3. APPLICATION AND SIZES

3.1 The G.I. stranded wires covered in this Specification are intended for use on the overhead power line poles, distribution transformer structures etc.

3.2 The G.I. stranded wires shall be of 7/2.5mm, 7/3.15mm and 7/4.0mm standard sizes.

4. MATERIAL

The wires shall be drawn from steel made by the open hearth basic oxygen or electric furnace process and of such quality that when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as specified in this specification. The wires shall not contain sulphur and phosphorus exceeding 0.060% each.

5. TENSILE GRADE

The wires shall be of tensile grade 4, having minimum tensile strength of 700 N/mm2 conforming to IS:2141.

6. GENERAL REQUIREMENTS

6.1 The outer wire of strands shall have a right-hand lay.

6.2 The lay length of wire strands shall be 12 to 18 times the strand diameter.

7. MINIMUM BREAKING LOAD

The minimum breaking load of the wires before and after stranding shall be as follows :

No. of wires & const.	Wire dia (mm)	Min. breaking load of Single wire before stranding (KN)	Min. breaking load of the standard wire (KN)
7(6/1)	2.5	3.44	22.86
7(6/1)	3.15	5.45	36.26
7(6/1)	4.0	8.79	58.45

8. CONSTRUCTION

8.1 The galvanised stay wire shall be of 7-wire construction. The wires shall be so stranded together that when an evenly distributed pull is applied at the ends of completed strand, each wire shall take an equal share of the pull.

8.2 Joints are permitted in the individual wires during stranding but such joints shall not be less than 15 metres apart in the finished strands.

8.3 The wire shall be circular and free from scale, irregularities, imperfection, flaws, splits and other defects.

9. TOLERANCES

A tolerance of (±)2.5% on the diameter of wires before stranding shall be permitted.

10. SAMPLING CRITERIA

The sampling criteria shall be in accordance with IS:2141.

11. TESTS ON WIRES BEFORE MANUFACTURE

The wires shall be subjected to the following tests in accordance with IS:2141.

i) Ductility Test
ii) Tolerance on Wire Diameter

12. TESTS ON COMPLETED STRAND

The completed strand shall be tested for the following tests in accordance with IS:2141.

a) Tensile and Elongation Test :
   The percentage elongation of the stranded wire shall not be less than 6%.
b) Chemical analysis
c) Galvanising Test :
   The Zinc Coating shall conform to "Heavy Coating" as laid down in IS:4826

13. MARKING

Each coil shall carry a metallic tag, securely attached to the inner part of the coil, bearing the following information:

a) Manufacturers' name or trade mark
b) Lot number and coil number
c) Size
d) Construction
e) Tensile Designation
f) Lay
g) Coating
h) Length

i) Mass

j) ISI certification mark, if any

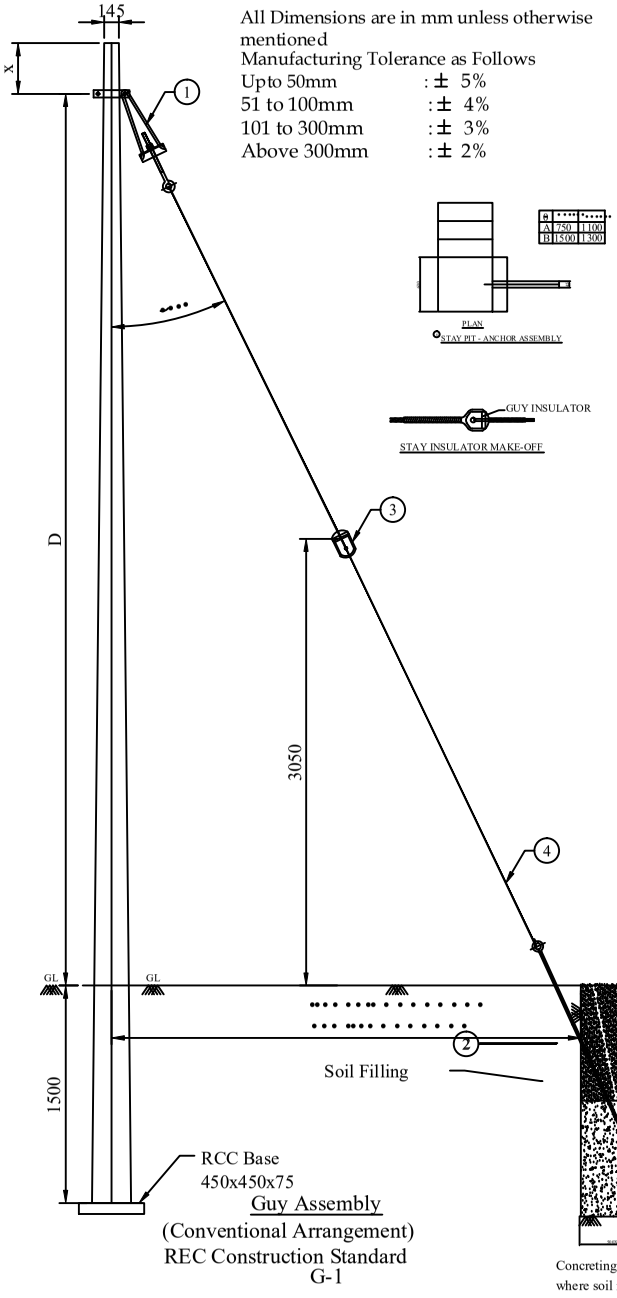
14. PACKING

The wires shall be supplied in 75-100 Kg. coils. The packing should be done in accordance with the provisions of IS:6594.

All Dimensions are in mm unless otherwise mentioned

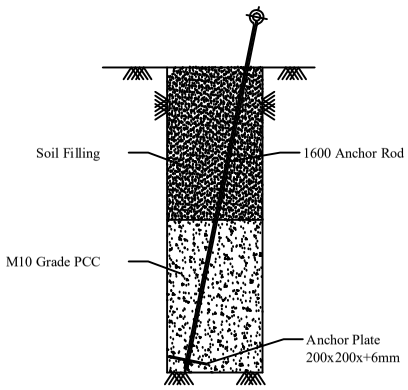
Manufacturing Tolerance as Follows

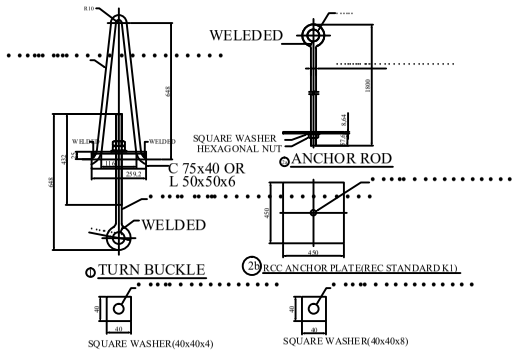
Upto 50mm	: ± 5%
51 to 100mm	: ± 4%
101 to 300mm	: ± 3%
Above 300mm	: ± 2%



Guy Assembly
(Conventional Arrangement)
REC Construction Standard
G-1

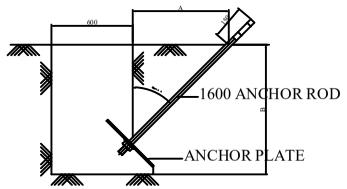
Stay Set Arrangement





Stay Set Arrangement

END MAKING OF GUY WIRE



ELEVATION

BILL OF MATERIAL					
ITEM NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	QTY.
1	TURN BUCKLE ASSEMBLY		G.I		1 NO.
a	EYE BOLT		G.I	550	1 NO.
b	SUPPORTING ANGLE	L50x50x6	G.I	180	1 NO.
c	EYE HOOK		G.I	1000	1 NO.
d	WASHER	4MM	G.I.	40X40	1 NO.
e	NUT	M20	G.I.		2 NOS.
2	ANCHOR ROD & ANCHOR PLATE		G.I.		1 NO.
a	ANCHOR ROD		G.I	1900	1 NO.
b	ANCHOR PLATE(REC STANDARD K-1)	75 MM	RCC	450X450	1 NO.
c	SQUARE WASHER	8 MM	G.I.	40X40	1 NO.
d	NUT	M16	G.I.		1 NO.
3	GUY INSULATOR				1 NO.
4	STAY WIRE	7/3.15mm	G.I.		
5	THIMBLE		G.I.		2 NOS.

Concreting 0.2cm

NOTES:-

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED.

2) ALL M.S. ITEM SHALL BE HOT DIP GALVANISED AS PER IS 2629&4759

3) MANUFACTURING TOLERANCE

4) M.S MATERIAL SHALL CONFIRM TO IS: 2062.

5) GUY INSULATORS TO BE UTILISED AS PER SPECIFICATION FOR HT & LT LINES RESPECTIVELY.

6) FOR FIRM SOILS, ONLY SOIL FILLING WITH COMPACTION TO BE DONE

FOR TENDER PURPOSE ONLY

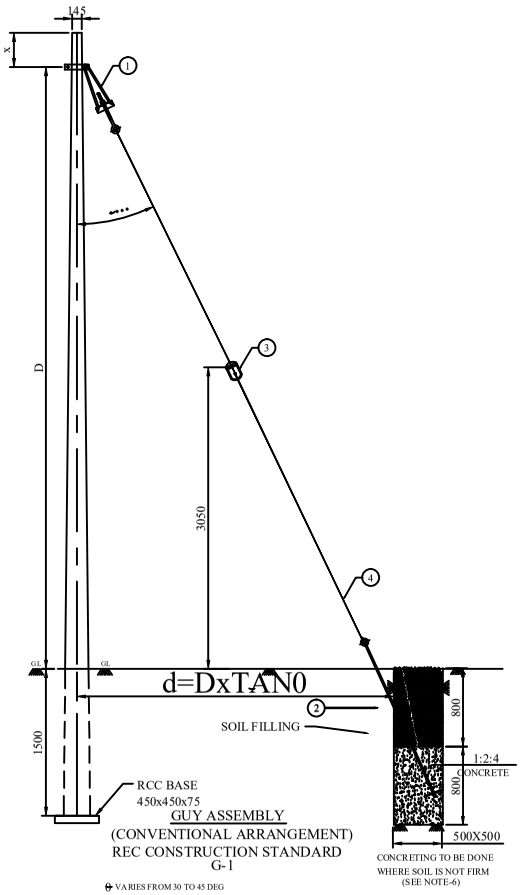
REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

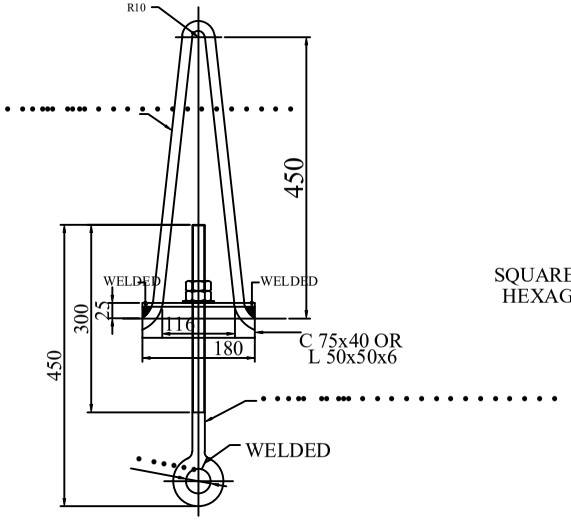
Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

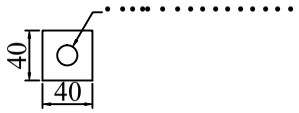
TITLE: STAY SET ARRANGEMENT FOR 11KV/LT LINE

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/GEN/09A	1 OF 1	0

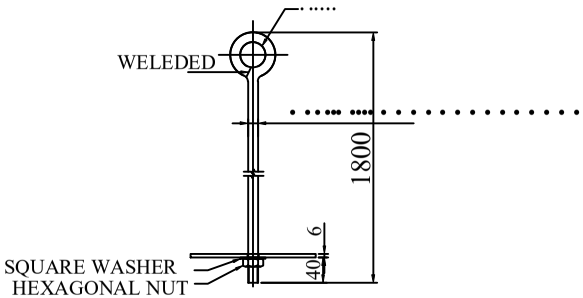




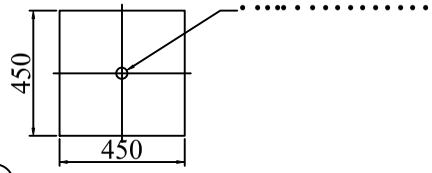
① TURN BUCKLE



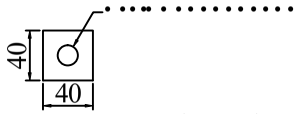
SQUARE WASHER(40x40x4)



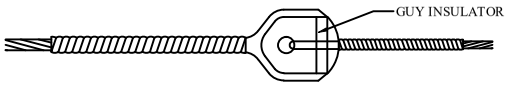
2a ANCHOR ROD



2b RCC ANCHOR PLATE(REC STANDARD K1)



SQUARE WASHER(40x40x8)



STAY INSULATOR MAKE-OFF

END MAKING OF GUY WIRE

NOTES:-

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED.
2) ALL M.S. ITEM SHALL BE HOT DIP GALVANISED AS PER IS 2629&4759
3) MANUFACTURING TOLERANCE
4) M.S MATERIAL SHALL CONFIRM TO IS: 2062.
5) GUY INSULATORS TO BE UTILISED AS PER SPECIFICATION FOR HT & LT LINES RESPECTIVELY.
6) FOR FIRM SOILS, ONLY SOIL FILLING WITH COMPACTION TO BE DONE

FOR TENDER PURPOSE ONLY

REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana(DDUGJY)

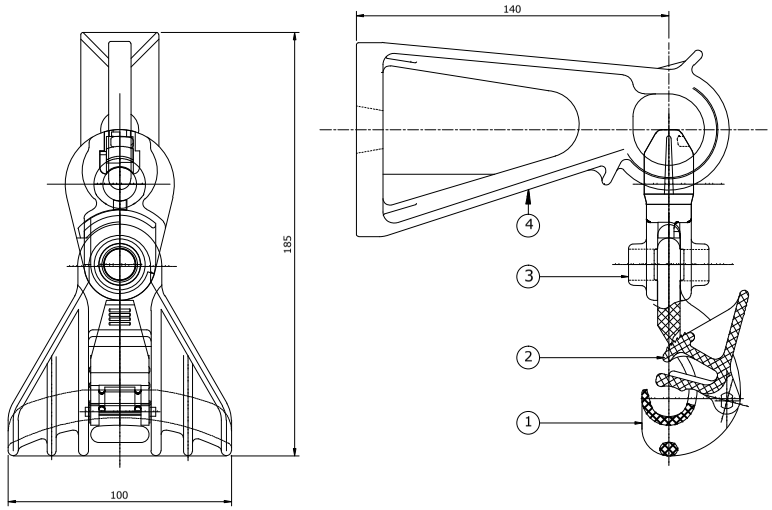
TITLE: STAY SET ARRANGEMENT ON 8M/140KG/PCC POLE

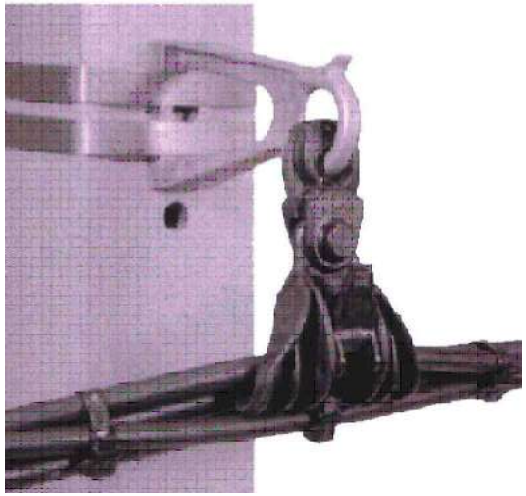
SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/GEN/09B	1 OF 1	0

SUSPENSION ASSEMBLY :-

NOTE :-

MATERIAL: SEE TABLE





SUSPENSION ASSEMBLY :-

SPECIFICATION :- AS PER NF C33-040

Messenger Type	Cable Range (mm^2)		Load
	Min	Max	KN
INSULATED/BARE	25	50	12

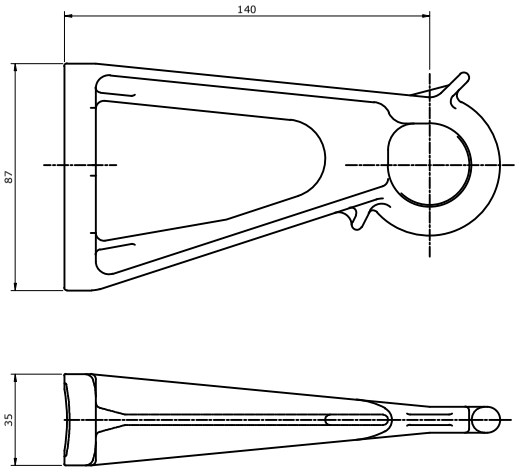
REP	QTY	DESCRIPITION	MATERIAL	COLOUR
4	1	MOUNTING BRACKET	HEAT TREATED ALUMINIUM ALLOY	NA
3	2	MOVABLE LINK	THERMO PLASTIC	BLACK
2	1	LEVER	THERMO PLASTIC	BLACK
1	1	BODY	THERMO PLASTIC	BLACK

BRACKET :-

NOTE :-

MATERIAL: HEAT TREATED ALUMINIUM ALLOY

SPECIFICATION :- AS PER NFC33040



FOR TENDER PURPOSE ONLY

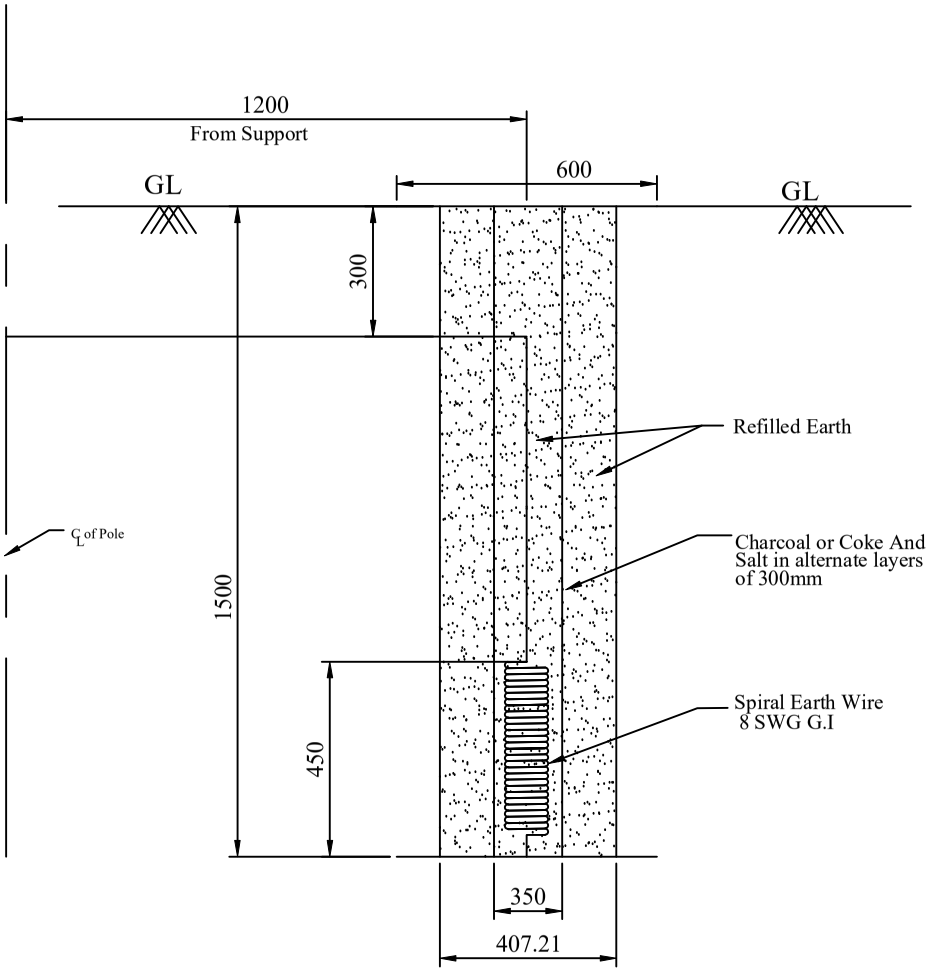
Rural Electrification Corporation Ltd.

PROJECT:
Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

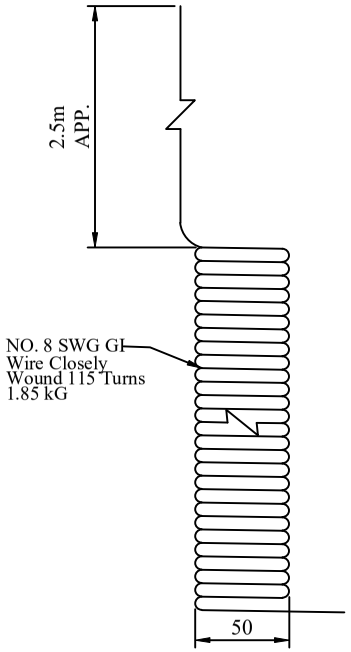
TITLE
SUSPENSION ASSEMBLY
(Cable Range 25-50 sq. mm)

REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT
R0					

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A4	1:100	REC/DDUGJY/LT-ACC-ABC/07B	1 OF 1	0



Coil Earthing Details



Earthing Spiral

NOTES:-

1) All dimensions are in mm unless otherwise mentioned.
2) Manufacturing Tolerance.
b) All other dimensions as given below
3) MS wire shall conform to IS 280
4) All MS parts shall be hot dip galvanised as per IS 2629 and IS 4759.
5) In rocky areas where digging upto 1500 mm is not possible,earthing arrangement in horizontal configuration buried at a depth not less than 800 mm shall be used.
6) Weight mentioned is for packing and forwarding purpose only.

FOR TENDER PURPOSE ONLY

R0					COMMON FOR ALL
REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT

Rural Electrification Corporation Ltd.

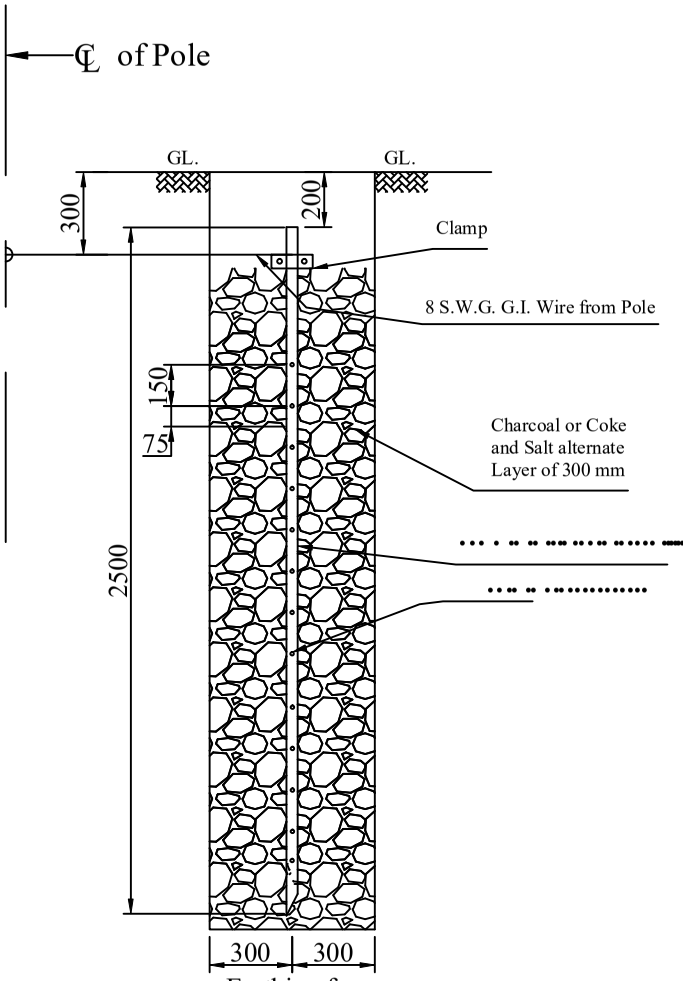
PROJECT:
Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE
SPIRAL EARTHING DETAILS

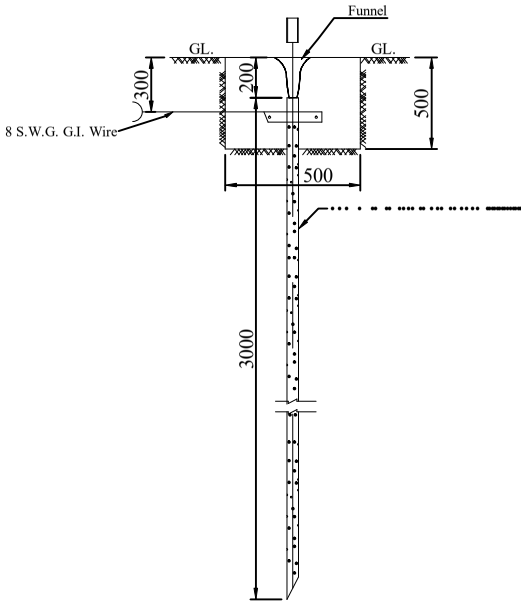
SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/GEN/08	1 OF 1	0

BILL OF MATERIAL

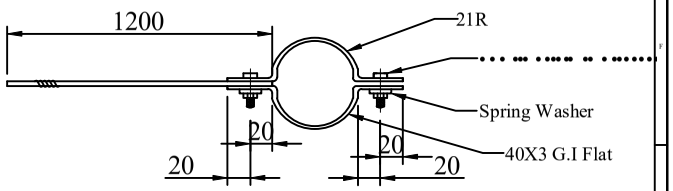
S.NO.	DESCRIPTION	ERECTION MARK	SECTION	LENGTH in MM	Wt/Mtr Kg/M	QTY	TOTAL Wt. Kg
1	Clamp for Earth Pipe		GI Flat 40x3	146	0.942	2 Nos	0.275
2	Bolts & Nuts		M12	30	0.057	2 Nos	0.114
3	Spring Washer		M12	3.5mm Thk.	0.006	2 Nos	0.012
					TOTAL WT.		0.401



Earthing for
Hard Stiff or Medium Clay



Earthing For Ordinary
Soil where Pipe could
be Hammered



Clamp for Earth Pipe

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. EARTH TERMINAL OF G.I
3. MANUFACTURING TOLERANCE.
4. MS PARTS SHALL CONFIRM TO IS:2062
5. ALL MS PARTS TO BE HOT DIP GALVANISED AS PER IS 2629 & 4759.
6. WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE ONLY

FOR TENDER PURPOSE ONLY

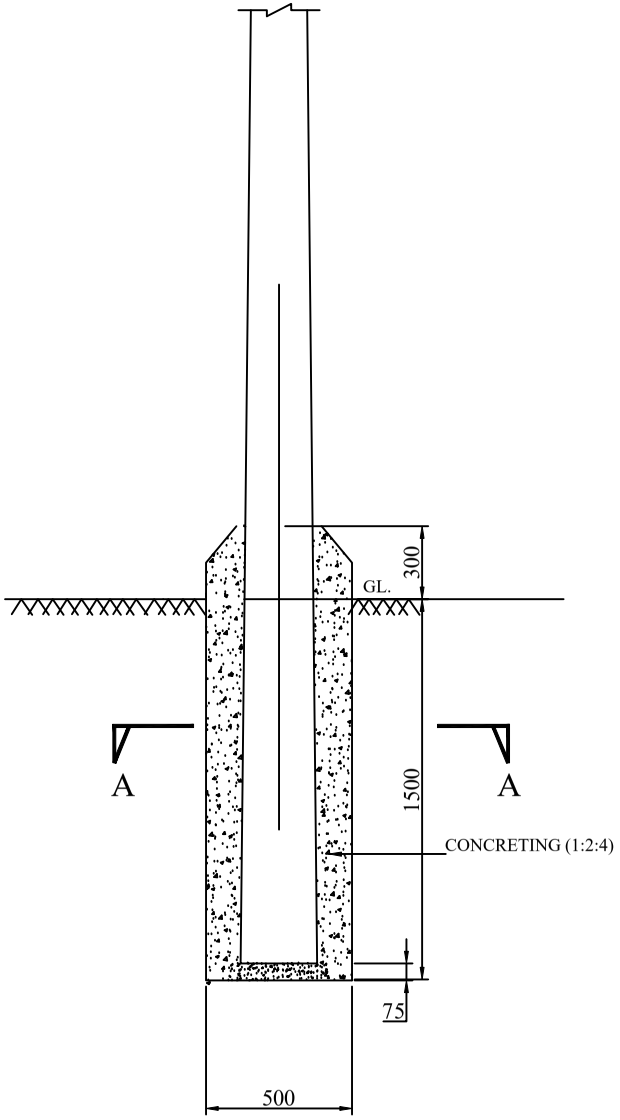
REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

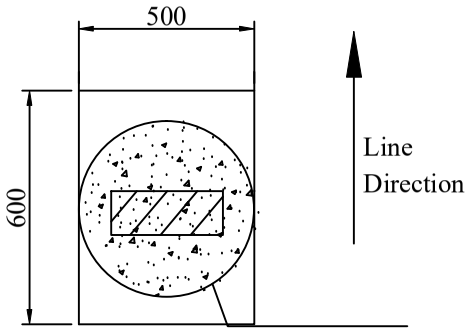
TITLE: PIPE TYPE EARTHING

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/GEN/04	1 OF 1	0



S.NO.	Description	Vol. in m^3
1		0.45
2	+0.014 Cut for muffing	

All Dimensions are in mm unless otherwise mentioned



Section A-A

NOTES:-

1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MM.
2. THIS ARRANGEMENT SHALL BE USED FOR ALL TAPPING POLES ,DEAD END POLES , DTC ANGULAR POLES, CROSSING, 2/4 POLE STRUCTURES AND FOR ALL 33 KV POLES.

FOR TENDER PURPOSE ONLY

Concrete Foundation For PSC Poles

REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: CONCRETE (PCC) FOUNDATION DETAILS FOR PSC POLES

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/GEN/01	1 OF 1	0

27 Insulation Piercing Connectors, Anchor (Dead End) & Suspension Accessories & Other Accessories for Aerial Bunched Cables for Working Voltage upto and including 1100 Volts

1.0 SCOPE

This specification covers the design, manufacture, assembly, testing and supply of Accessories for anchoring, suspending & making connections to Aerial Bunched Cables rated 1100 volts and insulated with cross-linked polyethylene.

2.0 STANDARD

The design, performance and test requirements shall confirm to this specification and the following standards. However in case of any conflict, the requirements of this specification shall prevail.

- NFC 33-020 Insulation Piercing Connectors
- NFC 33-209 LV Aerial Bunched Cables
- NFC 20-540 Environment Testing for Outdoor
- NFC 33-004 Electrical Ageing Test
- NFC 33-040 Suspension Equipments
- NFC 33-041 Anchoring Devices
- IS 14255 LV Aerial Bunched Cables

The Devices shall also be compatible with the cables of sizes & dimensions as defined in the Cable Specifications for the cables with which they are intended to be used.

3.0 CLIMATIC CONDITIONS

For the purpose of designing the climatic conditions as specified in annexure-1 shall be considered.

4.0 CABLE DATA

The standard sizes and characteristics of the phase and street lighting conductors, messenger wires shall be as specified in IS: 14255-1995.

The Accessories of LT XLPE Insulated Aerial Bunched Cables (ABC) with ~~insulated~~ bare messenger cum neutral are specified below:

a) The ABC accessories should be of proven design with minimum 2 years record of satisfactory operation with a major utility. Order copies and Performance Certificates should be enclosed with the offer.

b) Since ABC accessories are to be used with ~~insulated~~ bare neutral-cum-messenger, their design should incorporate specific features to prevent damage to the insulation which meeting the required electrical, mechanical & thermal requirements.

c) All mechanical, electrical & thermal ratings should meet or exceed 90% of the corresponding ratings of the cable, or the values specified herein, whichever are more stringent.

d) The accessories should provide "Double Insulation" so that a single point failure of insulation will not result in the system tripping.

5.0 THE ABC ACCESSORIES

The ABC Accessories shall consist of the following:

a)	Insulation Piercing Connectors (IPC)	:	For making tap-off/branch connectors/service connector to an ABC line.
b)	Anchoring Assembly (AA)	:	For fitting onto a pole for anchoring the end of a length of ABC, or for a major change in direction.
c)	Suspension Assembly (SA)	:	For supporting a length of ABC at an intermediate pole in a length, with small angle of deviation.
d)	Service clamp (sc)	:	For anchor Insulated service lines (armoured or unarmour)
e)	Transformer Connections	:	For connection to the transformer bushing.
f)	Junction Sleeves	:	For Phases, neutral messengers & Street lighting conductor.
g)	ABC Service Main Distribution Box	:	For Distribution of multiple no. of Service Connections from Main AB cable.

5.1 Insulation Piercing Connectors (IPC)

5.1.1 Insulation Piercing Connectors (IPC) are used for making Tee/Tap-off/Service connectors to an ABC/Bare Overhead Line.

5.1.2 Insulation Piercing Connectors are designed to make a connection between the uncut main conductor and a branch cable conductor without having to strip either cable to expose the conductor instead the tightening action of the IPC will first pierce the Insulation, then make good electrical contact between the main end and branch conductor while simultaneously insulating and sealing the connection.

5.1.3. Constructional Features of IPC

5.1.3.1 The housing shall be made entirely of mechanical and weather resistant plastic insulation material and no metallic part outside the housing is acceptable except for the tightening bolt.

5.1.3.2 Any metallic part that is exposed must not be capable of carrying a potential during or after connector installation.

5.1.3.3 Screws or nuts assigned for fitting with IPC (Insulating Piercing connector), must be fitted with torque limiting shear heads to prevent over tightening or under tightening (min & max torque values to be specified by Manufacturer).

5.1.3.4 The IPC must perform piercing and connection on Main and Branch cable simultaneously.

5.1.3.5 The IPCs shall be water proof and the water tightness shall be ensured by appropriate elastomer materials and not by grease, gel or paste alone.

5.1.3.6 Design of IPC should be such as to not cause damage to insulation of adjacent conductors due to vibration and relative movement during service.

5.1.3.7 The connector shall have a rigid removable end cap which can be slide fitted onto the main connector body on either right or left by the installer (depending on site requirement) for sealing the cut end of the branch cable. Once the connector is fitted, it should not be possible to remove the cap without removing the connector.

5.1.3.8 All the metallic parts of the connector should be corrosion resistant and there should not be any appreciable change in contact resistance & temperature after overloads & load cycling.

- The contact plates should be made of tinned copper/aluminium alloy.
- Connector teeth should be factory greased & sealed to retard water or moisture ingress & corrosion.
- The Insulation material should be made of weather & UV resistant reinforced polymer.
- The outer metallic part should have potential free tightening bolts to allow safe installation on live lines.

5.1.4 **Mechanical Tightening and Electrical Continuity**

5.1.4.1 Connectors shall be tightened upto 70% of the minimum torque indicated by the Manufacturer. At this torque electrical contact should have occurred between conductors to be joined. Then connectors shall be tightened up to the breakdown of the shear heads and lastly, upto 1.5 times the maximum torque indicated by the manufacturer.

For the connector fitted with two screws on the same core, after the breakdown of the shear heads tightening may be carried out manually and alternatively using a torque meter. The test conditions shall be as close as possible to those defined for the use of the test machine as per NF-C standard.

5.1.4.2 At 1.5 times the maximum torque indicated by the manufacturer, there shall be no breakdown of any part of the connector or the core conductor.

5.1.4.3 Maximum rated torque shall not exceed 20 N.m for conductor <95 sq.mm and30 for >95 but <150 sq.mm.

5.1.4.4 Tightening screws shall have hex. Heads of 10 mm, 13 mm or 17 mm only.

5.1.5 Effect of Tightening on Main Core of IPC

5.1.5.1 The connector shall be fitted approx. at the centre of the main core, which is secure between two anchoring points 0.5 mtr. To 1.5 mtr.apart. At the time of fitting the connectors, the main core shall be under longitudinal tension at 20% of the load indicated in Table-1:

Table-1

Nominal Cross – section (sq.mm.)	Tensile Strength (Newton)
16	1200
25	1800
35	2500
50	3500

70	5000
150	10000

5.1.5.2 Tensile strain shall be increased to the full value indicated in the Table 1 and held minute. There should be no breakdown of the core conductor.

5.1.6 **Effect of Tightening on Branch Core of IPC**

5.1.6.1 Test specimen shall be made up as in clause 5.1.5.1 except that this shall be do the smallest cross sections of main and branch conductors within its range.

5.1.6.2 An increasing tensile load shall be applied to the Branch Conductor along the axis of the recess for the Branch cable. Load shall increase at 100 – 500 N/minute until it reaches the value specified in the Table 2 and maintained for 1 minute.

Table-2	
Nominal Cross – section (sq.mm.)	Tensile Strength (Newton)
16 (Alu)	290
25	450
35 & above	500

5.1.6.3 No slippage or breaking of conductor shall occur.

5.1.7 Dielectric & Water Tightness Test of IPC

5.1.7.1 The connector is tightened up to the minimum torque indicated by the manufacturer.

5.1.7.2 Connectors are mounted on

- Minimum cross section of main core.
- Maximum cross section of main core.

5.1.7.3 In each case Branch is of minimum cross section.

5.1.7.4 Protection caps for the branch cable are to be used in accordance with the requirements of clause 5.1.3.7. An additional water tight cap of any design may be used to seal one end of the main cable if it is immersed under water. No additional gel or any protection is to be provided while installing connector.

5.1.7.5 The entire assembly shall be immersed at a depth of approx. 30cms. For 30 minutes with the free ends of main and branch cable out of the water.

5.1.7.6 An AC voltage of 6 kV shall be applied between the water bath and each of the cores in turn for 1 minute. There shall be no flashover or electrical tripping with a trip setting of 10 mA + 0.5mA.

5.1.8 **Electrical & Ageing Test of IPC**

5.1.8.1 Two test configurations are used according to Table 3 with the connections tightened to the minimum torque specified by their manufacturers and resistance recorded.

Table - 3		
Configuration	Main core cross section	Branch core cross section Tensile Strength (K.N)
1st Configuration	Maximum	Maximum
2nd Configuration	Maximum	Maximum

5.1.8.2 The configurations are subjected to 200 heat cycles by injecting suitable current into them. In each cycle the temperature of the conductor shall be raised from ambient to 120 + 5°C as, measured by a thermocouple.

5.1.8.3 The duration of each heating cycle is chosen to maintain a sufficiently steady temperature of 120 + 5°C for 15 minutes. The duration of each cooling cycle is chosen to bring the conductor temperature to within 2°C of ambient.

5.1.8.4 Nominal heating current is indicated in the Table-4. It shall be permissible to accelerate the temperature rise by using a current up to 1.5 times the nominal current and to accelerate the cooling period by use of a fan or air blower.

Table-4	
Nominal Cross – section (sq.mm.)	Nominal Heating Current (A)
16	102
25	139
35	175
50	225
70	283
95	350
120	412
150	480
185	545
240	670

5.1.8.5 The over current test of Clause 5.1.9 shall be done after 50 cycles if the connector is a safety connector designed to ground a phase connector while the line is being worked on.

5.1.8.6 At the end of the 200 cycles the resistance shall again be measured. It shall not differ from the initial value by more than 12%.

5.1.9 **Over Current Test of IPC**

5.1.9.1 Over current test is required to establish the performance of Safety Connectors that are intended to provide a safe path to ground for the phases while the line is de-energised for working. It establishes the performance of the connector under short term over load conditions.

5.1.9.2 After the first 50 cycles of clause 5.1.8, the connectors are subjected to 4 over currents of 1 sec duration each.

5.1.9.3 The conductor temperature at the start of the over current test should be not more than 35ºC.

5.1.9.4 Current density during over current shall be 100 A/sq.mm for Aluminium and 95 A/sq.mm for Aluminium – Alloy Conductor.

5.1.9.5 Variation in time of over current is permissible between 0.85 sec & 1.15 sec., provided if maintains the relationship I2

t = K where,
I = rms value of over current in Amps.
t = time in seconds
K = Constant

5.1.9.6 After the over current test the electrical ageing test of clause 5.1.8 shall be resumed.

5.1.10 **Type Test of IPC**

5.1.10.1 Type Test Reports should be submitted from an Independent Laboratory of Repute or the Works Laboratory in case of a foreign manufacturer covering the following (on any convenient size of fitting of same design made from the same materials).

5.1.10.2 The installation of the connectors shall be done by the laboratory following instructions provided by the manufacturer.

5.1.10.3 The Test report shall record the embossing and marking on the connector.

5.1.10.4 The following shall constitute Type Tests for IPC :

- Electrical Ageing Test
- Dielectric and Water Tightness Test.
- Mechanical Tightening Test
- Effect of Tightening on main Core
- Effect of Tightening on Branch core
- Over-current Test (Applicable as per relevant clause of latest version of NFC 33020)*

The following shall be Type Test for Suspension Assembly (SA)

- Mechanical Test
- Voltage Test
- Climatic Aging Test
- Corrosion Test
- Endurance Test under Thermal & Mechanical Stresses (optional till testing facilities are available in India)*

The following shall be Type Tests for Anchoring Assemblies (AA)

- Mechanical Test
- Voltage Test
- Dynamic Test (Applicable for areas having subzero minimum temperature) *
- Climatic Aging Test
- Corrosion Test
- Endurance Test under Thermal & Mechanical Stresses

5.2 Anchoring Clamp for Insulated Messenger:

The clamps should be designed to Anchor LT-AB cable with insulated messenger. The clamp should consists of an Aluminium alloy corrosion resistant castled body, bail of stainless steel and self adjusting plastic wedges which shall anchor/hold the neutral messenger without damaging the insulation.

*Amendment issued vide letter No. REC/DDUGJY/SBD/2017-18/609 dated 05.10.2018

- No losable part in the process of clamping arrangement
- The clamp should conform to the standard NFC 33041 and 33042 or equivalent I.S. if any.
- The clamp body should be made of corrosion resistant Alluminium alloy, bail should be of stainless steel and wedges should be weather and UV resistant polymer.
- ~~Ultimate tensile strength of the clamp should not be less than 15 km for 50/70sq.mm insulated messenger wire / 10 KN for 25/35 sq.mm insulated messenger wire.~~
- ~~Slip load of the clamp should not be less than 3 KN for 50/70 sq.mm. messenger wire / 2 KN for 25/35 sq.mm. messenger wire.~~ Ultimate tensile strength of the clamp should be as per Table-6 of Technical Specification. *

5.2.1 Anchoring assemblies are used to firmly attach the messenger of ABC to a support and transmit the mechanical tension.

- at the end of a run or to the supporting structures
- at a major change in direction.

5.2.2 Each Anchoring Assembly shall include.

- One number tension bracket.
- One number wedge type tension clamp
- Flexible Rope for fixing tension clamp to bracket.

5.2.3 Anchoring assemblies shall be supplied in sets to ensure compatibility of the materials against corrosion or wear of moving parts.

5.2.1 Tension Bracket of AA

5.2.4.1 The tension bracket shall be made out of a single piece of Aluminium alloy suitable for attachment to a pole either by

a) 16mm galvanized steel bolt (s) or
b) two stainless Steel straps of 20 x 0.7 mm.

5.2.4.2 The tension bracket should be designed to ensure the Flexible rope cannot slip out at any angle.

5.2.4.3 The tension bracket should be rated and tested for the loads specified in Table-5. The load shall be applied at an angle of 45º from the normal to the surface of mounting of the bracket.

Table - 5

Conductor Size (Sq.mm.)	Rating	Load for deformation <10mm (Newtons)	Load for deformation <30mm & no-break (Newtons)
25-35	1500 Kg.	12,000	15,000
50-95	2000Kg	15,600	19,500

5.2.5 Flexible Rope of AA

5.2.5.1 The Anchoring assembly shall be supplied with a stainless steel flexible Rope to connect the Tension Clamp to the Tension Bracket.

5.2.5.2 The rope should have sufficient flexibility to ease the torsional movement of the ABC System.

5.2.5.3 The Rope should be pre-fitted with compression type end fittings to secure the tension clamp.

*Amendment issued vide letter No. REC/DDUGJY/SBD/2017-18/609 dated 05.10.2018

5.2.5.4 A wear resistant moveable saddle should be un-loosably fitted on the Rope to prevent abrasion at the point of fitting into the tension bracket.

5.2.5.5. The Rope should have sufficient mechanical strength to withstand the mechanical test for the complete assembly tests in this specification.

5.2.6 Wedge Type Tension Clamp of AA

5.2.6.1 Wedge type clamps shall be used for clamping the messenger without damaging the insulation.

5.2.6.2 The clamp shall be capable of clamping an uncut messenger so that it can continue without break to the connecting point or next span.

5.2.6.3 The clamp shall be fully insulating type of mechanical and weather resisting thermoplastic.

5.2.6.4 No bolts or loose parts are allowed as part of the Clamping system.

5.2.6.5 No tools shall be needed for fitting the messenger into the clamp.

5.2.6.6 The clamp shall be self tightening and capable of holding without slippage the load specified in the Table-6.

Table - 6

Conductor Size		Rating (Kg.)	T start (I minute) (Newtons)	T final (I minute) (Newtons)
Sq. mm.	Dia. (mm)			
25-35	8-11	1000 Kg.	8,000	10,000
50-54	8-11	1500 Kg.	12,000	15,000
70-95	13.5-16	2000 Kg.	12,000	15,000

5.2.6.7 After fitting the insulated messenger in the clamp, load T start will be held for 1 minute & then load increased to T final at rate between 5000 – 7,500 N/mtr. In each case there shall be no breakdown of any part of clamp and slippage of messenger in relation to the clamp.

5.2.7 Voltage Test on Clamp of AA

5.2.7.1 Voltage test is carried out on anchor clamps to ensure no damage is caused to the insulated messenger.

5.2.7.2 A conductive rod of dia. corresponding to the average dia. that can be accommodated in the clamp is fitted into the clamp, protruding by approx. 50mm at each end of the tightening piece.

5.2.7.3 The rod and clamp is subjected to tensile load as stated in Table 7 below when fixed to a support in its normal manner.

Table - 7

Conductor Size		Normal rating (kg)	Load Applied (N)
Sq. mm.	Dia. (mm)		
25-35	8-11	1000	2000
50-54	8-11	1500	4000
70-95	13.5-16	2000	4000

5.2.7.4 A power frequency voltage of 6 kV is applied for 1 minute between the rod and conductive part of the clamp, or fixation point in absence of conductive part.

5.2.7.5 No breakdown or flashover shall occur. There shall be no tripping due to leakage with a setting of 10 + 0.5 mA.

5.2.8 Endurance under Mechanical & Thermal Stress of AA

5.2.8.1 This test is done on clamp rated 1500 Kg. or 2000 Kg. using insulated messenger 50 to 70 sq. mm.

5.2.8.2 A neutral messenger is fitted between two anchor clamps, with clamp spacing approx. 5 mtr. & 1 mtr. Of messenger protruding from the end. Marks are made to enable measurement of slippage.

5.2.8.3 The sample is subjected to 500 cycles of 90 minutes each as described below:

5.2.8.3.1 Messenger temperature is raised by passing an AC current to 60 +3O C within 15 minutes. This temperature is maintained for at least 30 minutes to give a total heating period of 45 mts.per cycle.

5.2.8.3.2 Messenger is allowed to cool naturally to ambient for further 45 minutes to complete 90mts. Cycle time.

5.2.8.3.3 Mechanical load is applied during the cycle as per table 8 below. Load F1 is applied throughout the cycle, except for a short period of 5 sec. to 60 sec. when it is gradually increased from F1 to F2 at any time during the last 15 minutes of the 90 minute cycle.

Table - 8

Conductor Size		Rating (Kg.)	F1 (Newtons)	F2 (Newtons)
Sq. mm.	Dia. (mm)			
25-35	8-11	1000 Kg.	2,200	5,000
50-54	8-11	1500 Kg.	4,000	7,500
70-95	13.5-16	2000 Kg.	4,500	10,000

5.2.8.3.4 There should be no slippage greater than 4 mm after 2 cycles or greater than 8 mm after 500 cycles.

5.2.8.3.5 Voltage test is done at the end of the 500 cycles by immersing the test specimen of neutral messenger and clamps in water of resistively not less than 200 Ohm mtr. For 30 minutes.

5.2.8.3.6 A voltage of 10 kV ac is applied for 1 minute between messenger and water bath using a trip setting of 10 + 0.5 am. There should be no breakdown or tripping.

5.3 Suspension clamp for insulated neutral messenger:

The clamp should be designed to hang L.T – AB cable with insulated neutral messengers. The neutral messengers should be fixed by an adjustable grip device. A movable link should allow longitudinal and transversal movement of the clamp body.

- No losable part in the process of clamping arrangement.
- The clamp should conform to the standard NFC 33040 or equivalent I.S, if any.
- The clamp and the link made of Polymer should provide an additional insulation between the cable and the pole.
- The clamps and movable links should be made of weather and UV resistant glass fibre reinforced polymer.
- Clamps should be fixed with pole by eye hook / bracket. Bracket should be made of corrosion resistant alluminium alloy.
- ~~Ultimate tensile strength of the clamp should not be less than 15 KN for 50/70 sq.mm. Insulated messenger wire 4.3 KN for 25/35 sq.mm. Insulated messenger wire.~~
- ~~Maximum allowable load of the clamp should not be less than 20 KN for 50/70 sq.mm. insulated messenger sire/15 KN for 25/30 sq.mm insulated messenger wire~~. Ultimate tensile strength of the clamp should be as per Table-10 of Technical Specification.

*Amendment issued vide letter No. REC/DDUGJY/SBD/2017-18/609 dated 05.10.2018

5.3.1 Suspension Assembly is used for supporting an ABC by installation on the messenger at an intermediate point of support such as a pole. It can accommodate small angles of deviation upto 30°.

5.3.2 Each Suspension Assembly shall consist of:

- One number Suspension Bracket.
- One number moveable (articulated) connecting link.
- One number Suspension Clamp.

5.3.3 Suspension Assemblies shall be supplied in sets to ensure compatibility of the materials against corrosion or wear of rotating/moving parts.

5.3.4 Suspension Bracket of SA

5.3.4.1 The Suspension Bracket shall be made from single piece alluminium alloy suitable for attachment to a pole by either.

a) 16 mm galvanized steel bolt or
b) Two stainless steel straps.

5.3.4.2 The Suspension Bracket shall be provided with an upper bulge to prevent the clamp from turning over on the Bracket for more than 45 O from the horizontal or to within less than 60 mm from the pole / fixing structure.

5.3.4.3 The Suspension Bracket should be so designed to ensure that the articulated link cannot slip out of it.

5.3.4.4 Suspension Brackets shall be designed to withstand a load applied at the anchoring point of the movable link as per Table – 9 below without deformation of more than 10mm or breakdown at 33O below horizontal (there should be no longitudinal component of load parallel to the plane of fixing).

Table - 9

Conductor Size		Normal rating (kg)	Load (N)
Sq. mm.	Dia. (mm)		
25-35	8-11	1500Kg.	12500
70-95	13-17	2000Kg.	14000

5.3.5 Movable (Articulated) Link of SA

5.3.5.1 Movable Links are used between the Suspension Bracket and Suspension Clamp to allow a degree of movement and flexibility between the two.

5.3.5.2 Moveable Links should be made fully of insulating type of mechanical and weather resistant thermoplastic. A metallic wear resistant ring should however be fitted at point of contact between the Suspension Bracket and the movable link.

5.3.5.3 The Movable link should be unloosably fitted to the Bracket and the Clamp.

5.3.6 Suspension Clamp of SA

5.3.6.1 Suspension Clamps are used for locking the messenger of the ABC bundle without damaging the insulation or allowing the messenger to become dismounted from the fitting.

5.3.6.2 The Suspension Clamp shall accommodate messenger wires from 25 to 95 sq.m.

5.3.6.3 The Suspension Clamp shall be made fully of insulating type of mechanically strong and weather resistant plastic.

5.3.6.4 Bolts should not be used for clamping / locking the messenger in the Clamp.

5.3.6.5 There shall be no losable parts in the Suspension clamp.

5.3.6.6 The Suspension Clamp should be unloosably fitted to the rest of the Suspension Assembly.

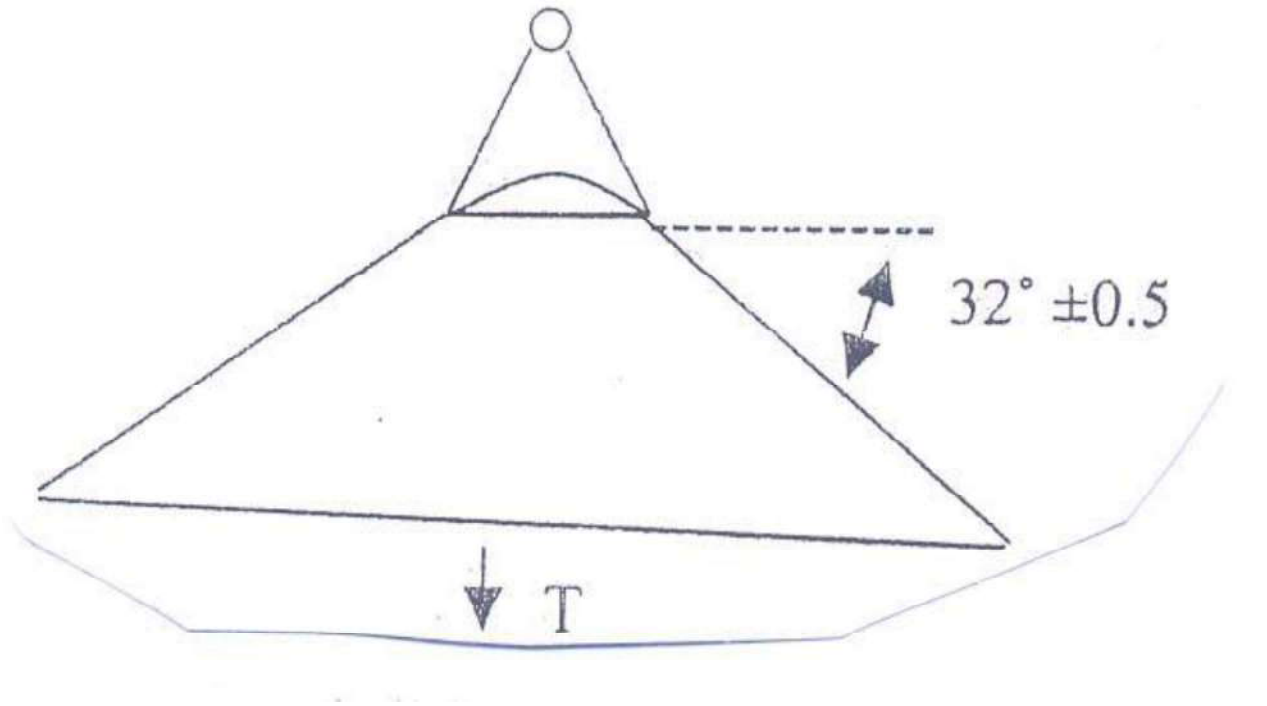
5.3.7 Mechanical Test on Clamp of SA

5.3.7.1 The Sub Assembly shall be subjected to a vertical load applied as per drawing in accordance with Table-10. There shall be no breakdown or permanent deformation at load T initial for 1 minute or when the load is increased to T final and released.

Table - 10

Conductor Size		Rating (Kg.)	T start (I minute) (Newtons)	T final (I minute) (Newtons)
Sq. mm.	Dia. (mm)			
25-54	8-15	1500 Kg.	9,600	12,000
70-95	13-17	2000 Kg.	12,800	16,000

Fig. : A



5.3.7.2 A sample messenger shall be fitted into a fixed suspension clamp and subjected to a gradually applied longitudinal load of 300 N. There shall be no permanent slip page.

5.3.8 Voltage Test of SA

A copper foil is wrapped at the clamping point around the maximum size of messenger allowed in that clamp. An ac voltage of 6 KV is applied between the copper foil and nearest conductive point of the clamp or into its absence to the point of fixation. The voltage should be withstood for 1 minute without breakdown or flashover.

5.3.9 Test Under Mechanical & Thermal Stress

5.3.9.1 The test specimen is made up of approx. 10mts. Of messenger wire strung between two anchor clamps with a Suspension Clamp fixed in the middle. Masses of 40 Kg. are suspended at a distance of 1-2mtr. On either side of the Suspension Clamp with a fixing mechanism of mass 2 + 1 Kg.

5.3.9.2 The specimen is subjected to 500 cycles of 90 minutes each. Each cycle consists of the following:

a) For first 75 minutes a constant longitudinal tension of 4000 N is applied to the messenger for rating of 1500 Kg. and of 4500 N rating of 2000 Kg. while 64cycles right and left oscillation are produced on the clamp 32ºon either side of the vertical.

b) During the first 45 minutes an intermittent current of 4-5 A/sq.mm is applied to maintain the conductor temp at 60 + 3º C.

c) During the next 45 minutes of the cycle the conductor is allowed to cool down naturally to the ambient.

d) At the 75th minute, after having completed 64 oscillations, the oscillations are stopped and the longitudinal tension is increased to 7500 N for 1500 kg. Rating and 10000 N for 2000 Kg. Rating.

3.9.3 No messenger slippage should occur within the Suspension Clamp during the 500cycles.

5.3.9.4 At the end of the 500 cycles, the messenger is immersed in water for 30 minutes. It is then tested to withstand 10 kV ac for 1 minute with a trip setting of 10 + 0.5 mA. There should be no breakdown or flashover.

5.4 **Acceptance Tests**

5.4.1 The following shall constitute Acceptance Tests for Insulation Piercing Connectors(IPC) :

- Visual *
- Dimensional (as per SCD and overall dimensions submitted with Tender Offer)*
- ~~Electrical Ageing Test ***~~
- Dielectric and Water Tightness Test. **
- Mechanical Tightening Test **
- Effect of Tightening on Main Core **
- Effect of Tightening on Branch Core **

The above tests are to be carried out as per sampling plan below. ~~However electrical geing test on IPC (market***) is to be done on only one connector of each type and size.~~

In case of random failure/defect, double the sample lot is to be drawn and there should be no failure/defect exceeding half the permissible defects (rounded down) shown in the chart.

Lot Size	For tests Marked*		For tests Marked**	
	Sample Size	Max. permissible Defects	Sample Size	Max. permissible Defects
Upto 100	2	nil	2	nil
101 to 1000	6	nil	4	nil
>1001	0.01% subject to min. 6 pieces	0.1% of pieces checked	4	nil

5.4.2 The following shall constitute acceptance tests for Anchor Assemblies:

- Visual *
- Dimensional (as per SCD and overall dimensions submitted with Tender Offer)*
- Mechanical Test on Bracket**
- Mechanical Test on Clamp **
- Voltage Test *

5.4.3 The following shall constitute acceptance tests for Suspension Assemblies:

- Visual *
- Dimensional (as per SCD and overall dimensions submitted with Tender Offer)*
- Mechanical Test on Bracket**
- Mechanical Test on Clamp **
- Voltage Test *

The above tests (for AA & SA) are to be carried out as per sampling plan below. In case of random failure/defect, double the sample lot is to be drawn and there should be no failure/defect exceeding half the permissible defects (rounded down) shown in the chart.

Lot Size	**For tests Marked***		**For tests Marked****	
	Sample Size	**Max. permissible Defects**	**Sample Size**	**Max. permissible Defects**
Upto 100	2	nil	1	nil
101 - 500	5	1	2	nil
501 - 2500	10	2	2	nil
2501 & above	10 + 0.2 %	2 + 10% pf addl. Sample quantity	4	1

6.0 SERVICE CLAMP

The clamps should be designed to anchor insulated service lines (armoured or unarmoured) with 2/4 conductors.

- The clamps should be made of weather and UV resistant polymer.
- No losable part in the process of clamping arrangement
- The clamp should conform to the standard NFC 33042 or equivalent I.S., if any. No losable
- Breaking Load of the clamp should not be less than 3 KN.

7.0 TRANSFORMER CONNECTION

- The connection to the transformer should be made with Pre-Insulated lugs for phase and street lighting conductors and with an Aluminum Lug for neutral Messenger. If the Bus-bars-bars are of copper, the Lugs should be preferably Bi-metallic type.
- The Barrel of the lug normally insulated with an Anti-UV black Thermoplastic tube sealed with a flexible ring. Die reference, size and strip length are to be indicated on the plastic.
- Sizes covered 16-70 & upto 150 m2 Aluminium XLPE insulated cable.
- Reference standard NFC 33021 or equivalent I.S. if any.

8.0 JUNCTION SLEEVES

- The sleeves should be Pre-Insulated for phases, neutral messengers and street lighting conductors.
- Sleeve should be made of Aluminum, insulated with an Anti-UV black thermoplastic tube hermetically sealed two ends with 2 flexible rings.
- Die reference, size and strip length are indicated on the sleeve itself.
- Sizes needed : 16-70 & upto 150 mm2 for Aluminum XLPE insulated cable.
- Reference standard : NFC 33021 or equivalent I.S. if any.
- Design as per furnished drawing.

9.0 EYE HOOKS

- Eye looks should be designed as to hold suspension clamps and Dead end clamps and to be installed with the pole clamp.
- Eye-hooks should be made of forged Galvanized steel.
- The clamps corrosion resistance should conform the standards I.S. 2629 & I.S.2633.
- Bolts and nuts should be made of hot dip Galvanized steel according to VDE 0210 and VDE 0212.
- Ultimate Tensile strength (UTs) of the clamp should 20 KN.
- Design as per furnished drawing.

10.0 SERVICE MAIN DISTRIBUTION BOXES

10.1 Scope

This Distribution Box should be Weather & Moisture Proof with Spring loaded/Bolt& Nut type Bus Bar system & should be able to carry a current according to specified capacity. It can have 1/3-phase input & provision of 4 to 6 nos. of 3-phase or 1-phase outputs. The box should have the provision for special key for locking & Proper arrangement of sealing. The boxes should be assembled on the pole using Metal Tapes & Buckles or Bolts. No. of Boxes per pole may vary with supporting arrangement for more no. of service connections. The Spring used should be of stainless steel having required capacity to provide suitable pressure in the connector.

10.2 Construction

Distribution Boxes should be designed with Bus Bars with spring action contact, or screw-bolt technique. For spring action contact only insertion of the conductor into the specified groove of the Busbar is sufficient for proper connection whereas for Nut Bolt type proper washers & other accessories are to be provided for connections. It should be used for multiple connections (3-phase or 1-phase) in low voltage Distribution Network. The boxes should be suitable for 1/3-phase (4 crores) inputs &provision for 4 to 6 nos. of 3-phase or 1-phase outputs. Bus bars should be with a continuous pair of contact bars with colour code to facilitate the identification of the correct energy phase.

The box should be able to incorporate the input or output cable dia. Of maximum16mm. (Equivalent to 120Sq.mm.).

The Boxes should consist of special type Lock & key system as well as provision for sealing for complete protection of the service connection contacts.

10.3 Current Ratings

The maximum current rating should be 140A/200A/250A & concerned authority should have the liberty to choose among the above ratings as per their requirement.

10.4 Voltage Ratings:

The maximum voltage withstand capacity should be 600V.

10.5 Working Temp

Safe working temperature should be around 80 C for Outer Box & 100OC for metallic Bus bars.

10.6 Materials

Material used in the manufacturing process of the components of this product should be specified in the respective product drawings & can be summarized as follows :

- Outer Box (Base & Cap) : With UV protection & Flame retardant characteristics(HB, as per UL 94-Tests for Flammability of Plastic materials) & preferably made up of ASA (Achylonitrile Styrene Acrylate).
- Cable Grommets : Ethyelene-Propylene Rubber :
- Safety Key : PA 6.6 (Nylon).
- Safety Screw : Stainless Steel or Plating Finished steel.
- Insulation protection as per IP 44.
- Bus bars or Terminal Blocks : PA 6.6 (Nylon), Stainless Steel & Copper.
- Button & Cable Holder : PA 6.6 (Nylon) with 50% Glass Fibre.
- Busbar Insulation :Polymide.

10.7 Locking System

The boxes should consist of Special type Lock & Key arrangement as well as provision for sealing for complete protection of the service connection contacts.

11.0 G.A. DRAWINGS ETC.

11.1 A drawing / picture clearly showing principal parts & dimensions for all products should be submitted along with the offer.

11.2 The principal outer dimensions of each item, l x b x w in mm and weight in gms should be submitted along with the offer.

11.3 The Employer may call for samples for verification & evaluation purposes.

12.0 GENERAL CONDITIONS OF MANUFACTURE

13.0 GTP

The Guaranteed Technical Particulars should be filled up in the given format of GTP.

14.0 TESTING STANDARD – Given in Annexure 2 & 3.

Note : 1) Any specific meteorological data other than those listed above applicable for a particular equipment/item will be available in the technical specification for that equipment/item.

2) When values specified above contradicts with respective equipment TS, the later will prevail for that equipment.

3) The atmosphere in the area is laden with industrial and town gases and smoke with dust in suspension during the dry months and subject to tough colder months.

4) Heavy lightning is usual in the area during the months from May to November.

ANNEXURE-1

GENERAL CONDITIONS FOR MANUFACTURE

The products shall be in accordance recognized standards used in L.T. ABC or equivalent I.S., if any.

Marking	:	Each product shall be clearly identified with manufacturer name or
		trade mark, reference and capacity of the item and batch no.
Packaging	:	Manufacturer shall mention the packaging of each item. Installation
		instruction should be included in packaging.
Type test	:	Each supplier should provide type test reports with the offer, carried
		out in accordance with one of the reference standards in NABL
		Accredited Laboratory.
Routine test	:	Supplier shall provide a control plan, which will be implemented on
		each item. Routine test reports should be submitted by the
		manufacturer with inspection call.
Quality	:	All suppliers should preferably be ISO-9000 certified.

Anchoring and suspension clamps should be installable on existing poles using appropriate devices (hooks, pigtails, brackets etc.).

All crimped connectors should be installed with mechanical or hydraulic hand crimping tools.

ANNEXURE – 2

TESTING STANDARDS :

The Insulating Piercing Connector should conform to following std. :

Tests	**Tests Standard / Test Procedure**
Corrosion Qualification Test	As per NF C 33-020 (Jun '98), or equivalent I.S., if any. Exposure in Saline Environment : The exposure should be carried out as per NF en 60068-2-11 (Aug. '99) std. requirement. The concentration of Saline solution must be of 5% $\pm$ 1% in mass, & the temperature of the test chamber must be maintained at 35°C $\pm$ 2°C. Exposure in Sulphur environment saturated of humidity – The exposure should be carried out as per NF T 30-055 (Mar. '74) std. requirement. SO_2 concentration in the chamber should be 0.067% in volume. The temperature of the test chamber should be increased to 40°C $\pm$ 3°C. The total test should include four identical periods of 14 days, in which 7 days of exposure in Saline environment & in other 7 days – 8 hrs. cycles in SO_2 environment & 16 hrs. in laboratory environment.
Electrical Ageing Test	As per NF C 33-020 & NF C 33-004 (Jun '98) or equivalent I.S., if any. Total no. of cycles 200, Heating time -60 mins., Cooling time -45 mins., Pause time – 2 mins.
Dielectric Investigation Test in water	As per NF C 33-020 (Jun '98) or equivalent I.S., if any. 15°C & 30°C & relative humidity between 25% & 75%. The tightening of the connectors should be at minimal value of the torque indicated by the manufacturer. The sample should be placed in tank full of water on 30 cm height, after an immersion length of30 mins. The set is subjected to a dielectric test under a voltage of 6 KV at industrial frequency during 1 min. No flashover / breakdown should occur at 6 KV during 1 min.

Tests	**Tests Standard / Test Procedure**
Mechanical Tests	As per NF C 33-020 (Jun '98) or equivalent I.S., if any. For checking electrical continuity, shear heads & mechanical behaviour of the connector's suitable tests as per the above specification have to conduct.

Capacity needed :

For ABC 16 to 95 mm^2

Model 1 for customer service	Main 16 to 95 mn^2
	Tap 2.5 to 10 mm^2 (For Street lighting/service connection)
Design as per furnished drawing	
Model 2 for customer service	Main 16 to 95 mm^2
	Tap 04 to 35 mm^2 (for distribution box charging)
Design as per furnished drawing	
Model 3 for customer service	Main 25 to 95 mm^2
	Tap 25 to 95 mm^2 (For ABC to ABC Tee Joint)
Design as per furnished drawing.	

ANNEXURE – 3

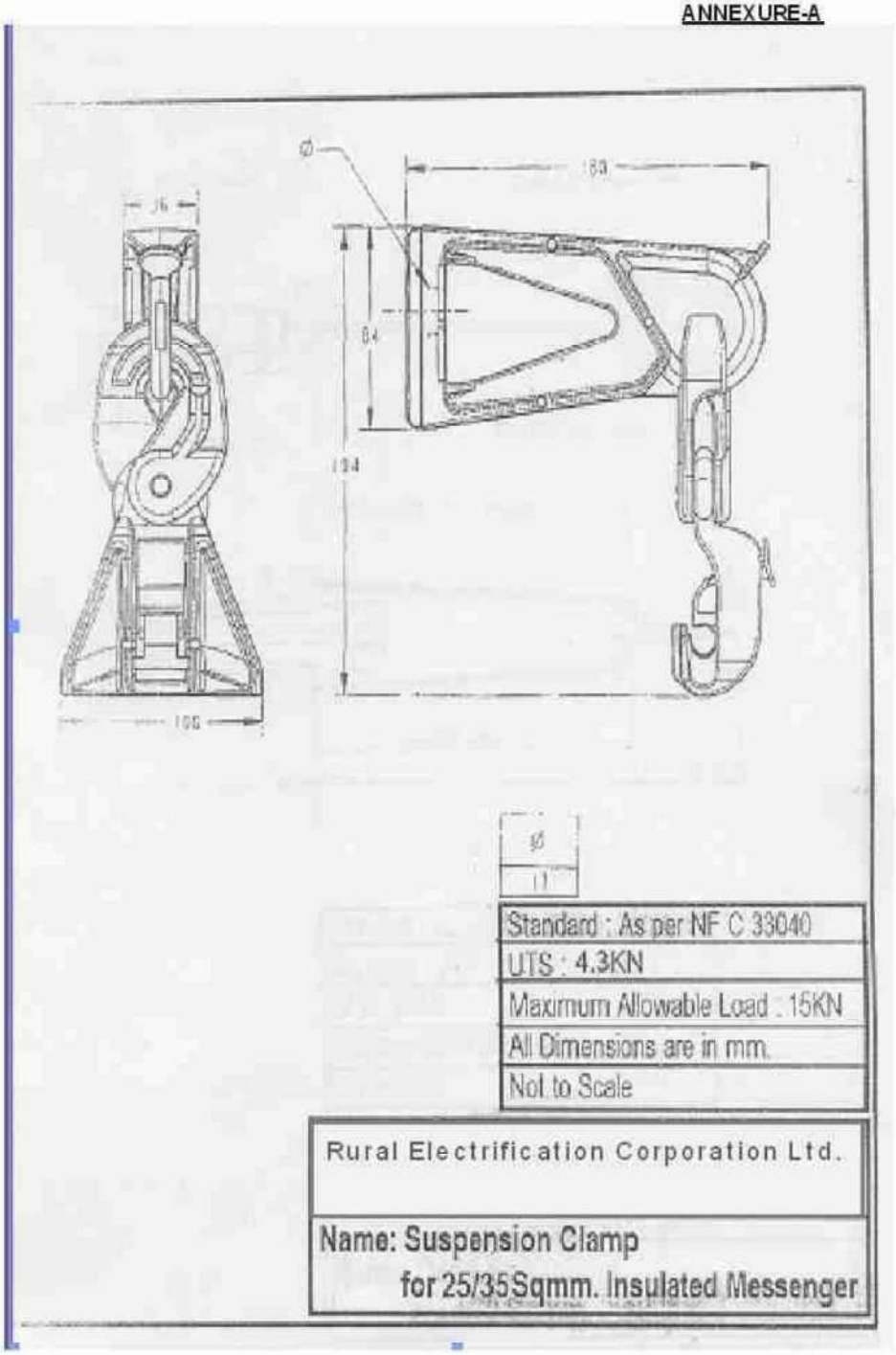
TESTING STANDARDS

Impact Resistance should be according to UL 746C. Insulation Protection should be as per IP 44. The Quter Plastic box should conform to following std. –

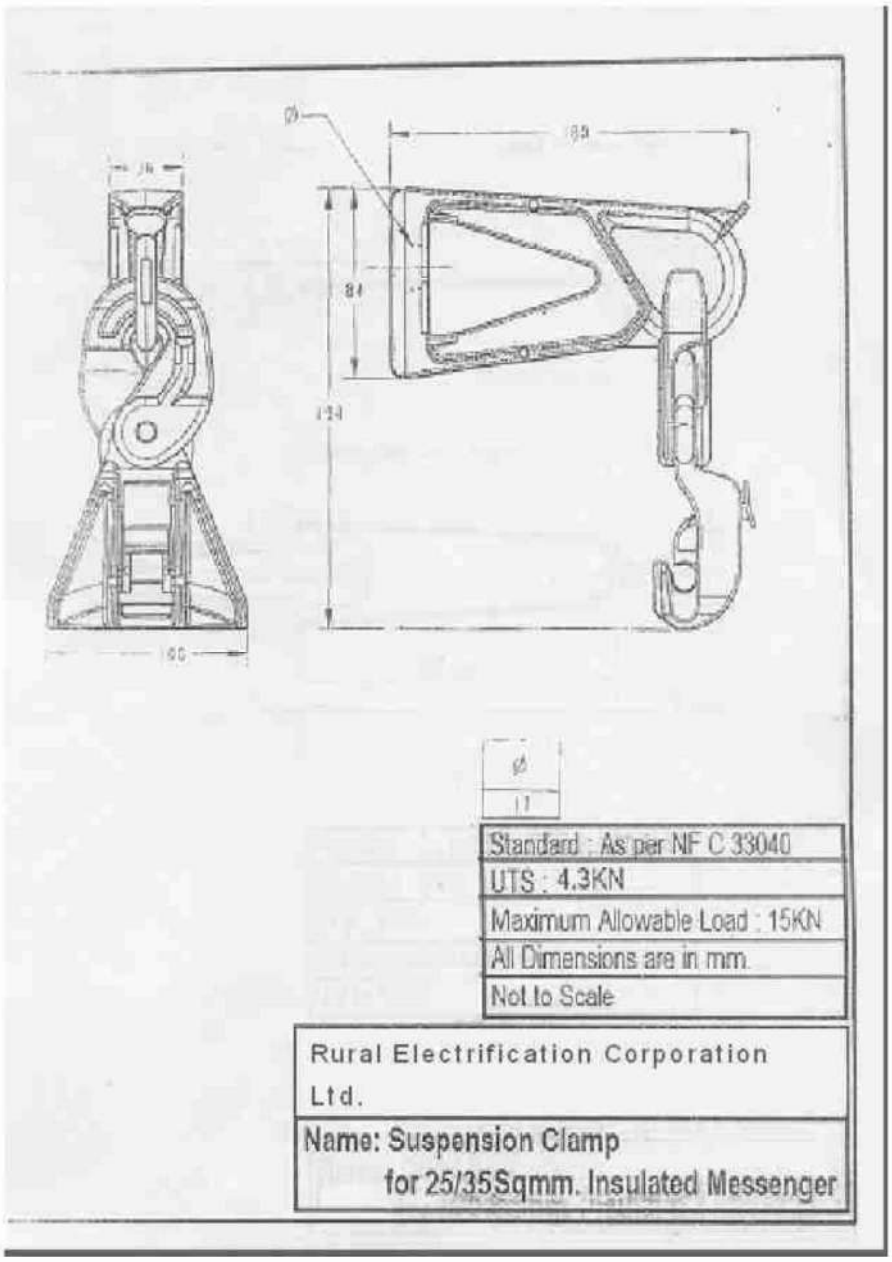
Test / Standard	Requirements	Test Procedures
Degree of Protection IEC 60529	IP 44 – Protected against the penetration of solid objects exceeding 1.0mm in diameter and against penetration of water jets that may affect the product operation.	First Digit : A 1.0mm diameter test wire should not penetrate in any apparent opening (force = 1 N ± 10%) Second Digit : A spray nozzle is used to spread a water jet in all possible directions.
Impact Resistance UL 746-C	After the test the product should not show any evidence of : - Live electrical parts accessible to the test probe, as described in this test specification. - Any results, which may affect the mechanical performance of the product. - Any results, which may increase the probability of electrical shocks.	The impact should be generated by dropping a steel ball – with a diameter of 50.8 mm and a mass of 0.535 kg – from a specified height sufficient to produce an impact energy of 6.8 J (0.69 13 kg.m.)
UV Resistance UL 746-C	The sample physical properties average value after an accelerated aging with UV radiation – should not be lower than 70% of its initial value,	According to ASTM G26, Exposure Method 1, Xenon Arc Lamp Type B or ASTM G 155, Exposure Cycle I, with continuous
	without aging, that is, a variation of + 30% is allowed.	exposure to light and intermittent exposure to water jets, with programmed cycles of 120 minutes, consisting of a 102 minutes light-only exposure

Test / Standard	Requirements	Test Procedures
		and a 18 minutes exposure to light and water jets.
Withstanding Voltage UL 746-C	Product should withstand the specified voltage	A 5 kV voltage should be applied to the samples after the 40 hours conditioning cycle at 23 $\pm$ 2°C and 50 $\pm$ 5% relative humidity plus 96 hours at 35 $\pm$ 2°C and 90$\pm$5% relative humidity.
Flammability UL 94	After the UV radiation accelerated aging, the material should maintain the same original flammability level (HB).	The test can be applied to test samples molded with the same material used for the base and the cap of the box or taking a piece of these components.
Flexural Strength ASTM D790 UL 746-C	After UV radiation accelerated aging, the average value for this test should not be lower than 70% of the original value, that is, a maximum variation of 30% is allowed.	A group of test samples without aging should be tested and the average values calculated. Another group should be aged under UV radiation then it should be tested and the new average should be calculated and compared to the initial average value.
Tensile Strength ASTM D638 UL 746-C	After aging with UV Radiation, the average value should not be lower than 70% of the initial values, that is, a maximum variation of 30% is allowed.	One of the test bodies must be tested without being submitted to accelerated aging and is computed over mean values. Another group is submitted to the radiation induced aging and then tested and the new mean value is computed and compared to the first computed mean value.

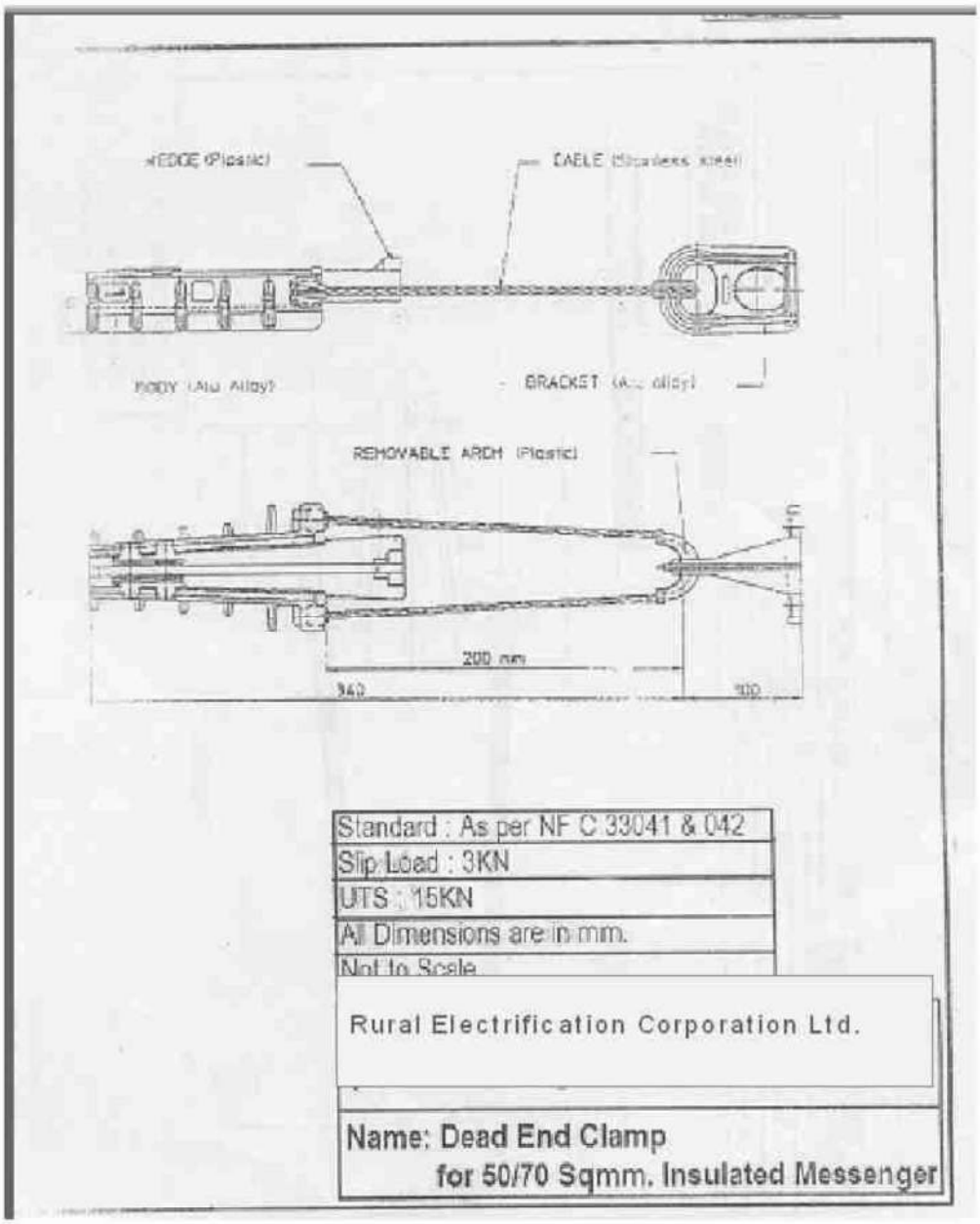
ANNEXURE-A


Ø
Ø
11
Standard : As per NF C 33040
UTS : 4.3KN
Maximum Allowable Load : 15KN
All Dimensions are in mm.
Not to Scale
Rural Electrification Corporation Ltd.
Name: Suspension Clamp
for 25/35Sqmm. Insulated Messenger

ANNEXURE-B


Ø
84
Ø
17
Standard : As per NF C 33040
UTS : 4.3KN
Maximum Allowable Load : 15KN
All Dimensions are in mm.
Not to Scale
Rural Electrification Corporation Ltd.
Name: Suspension Clamp
for 25/35Sqmm. Insulated Messenger

ANNEXURE-C

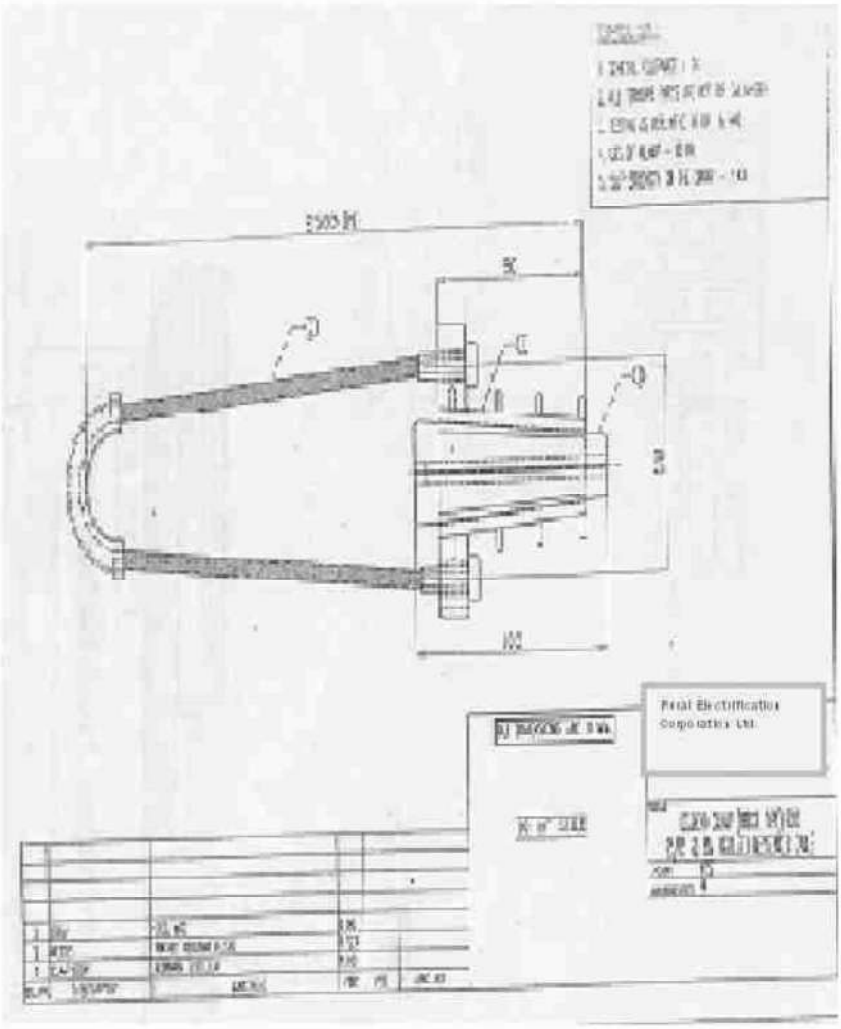


Standard : As per NF C 33041 & 042
Slip Load : 3KN
UTS : 15KN
All Dimensions are in mm.
Not to Scale

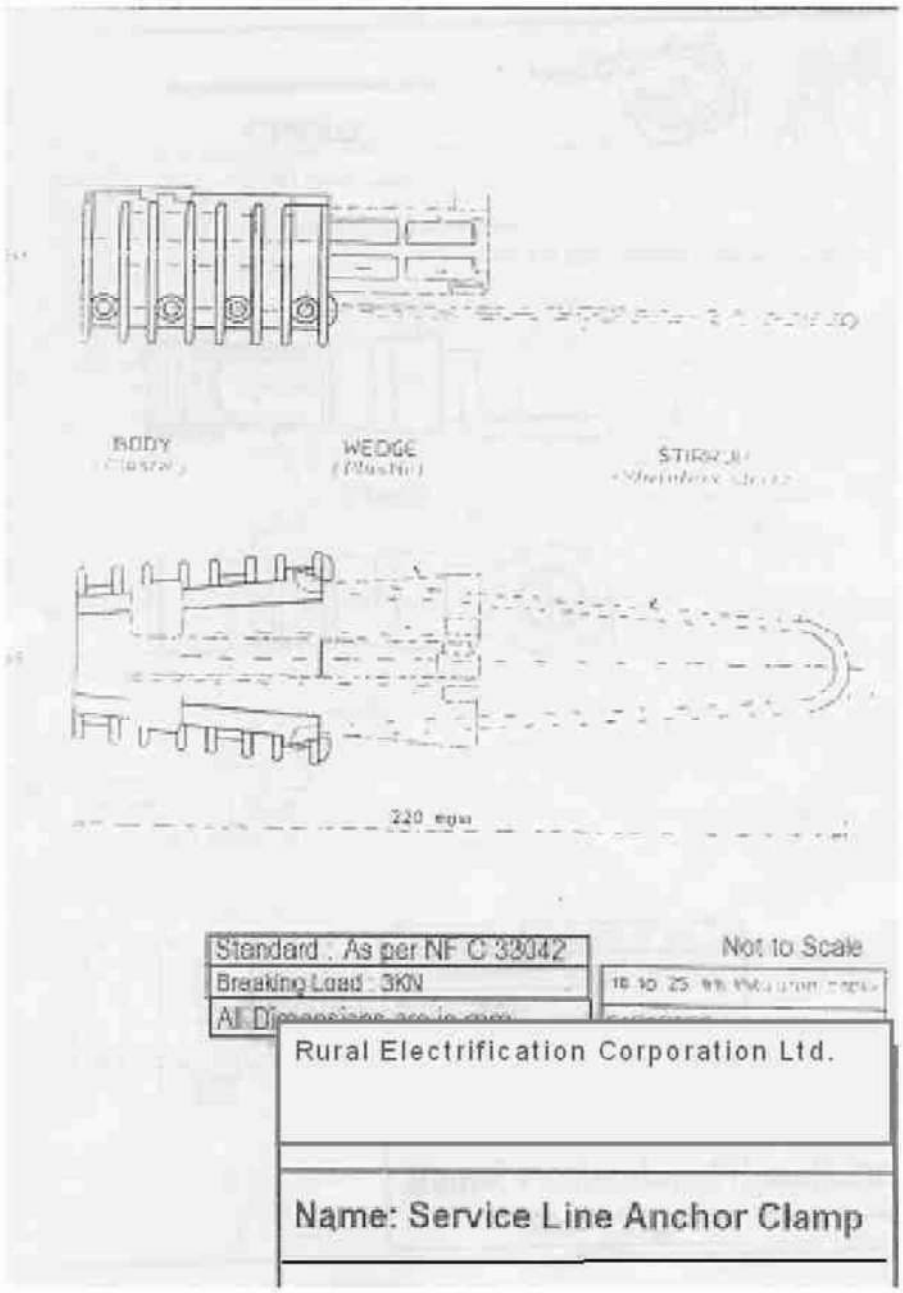
Rural Electrification Corporation Ltd.

Name: Dead End Clamp
for 50/70 Sqmm. Insulated Messenger

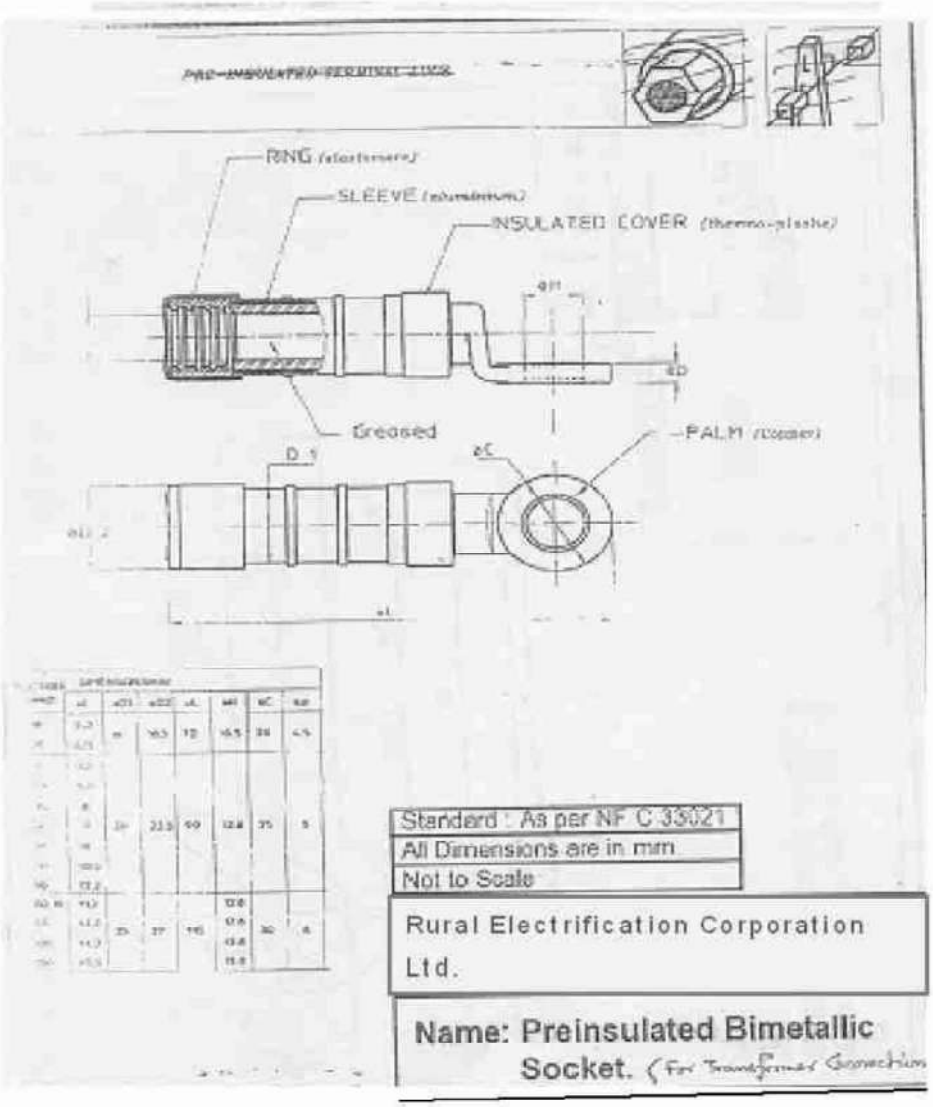
ANNEXURE-D



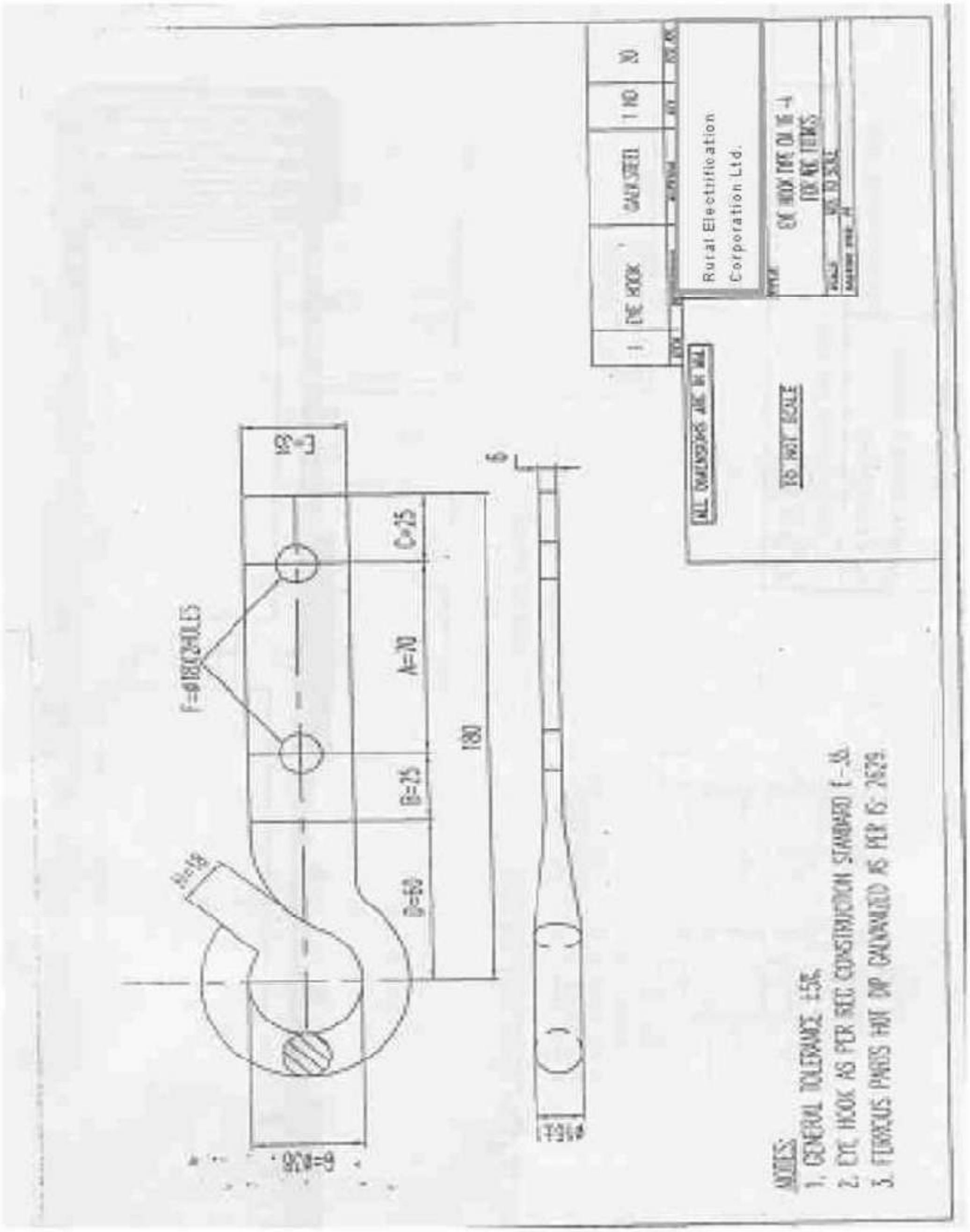
ANNEXURE-E


BODY
WEDGE
220 approx
Standard : As per NF C 33042
Breaking Load : 3KN
Not to Scale
Rural Electrification Corporation Ltd.
Name: Service Line Anchor Clamp

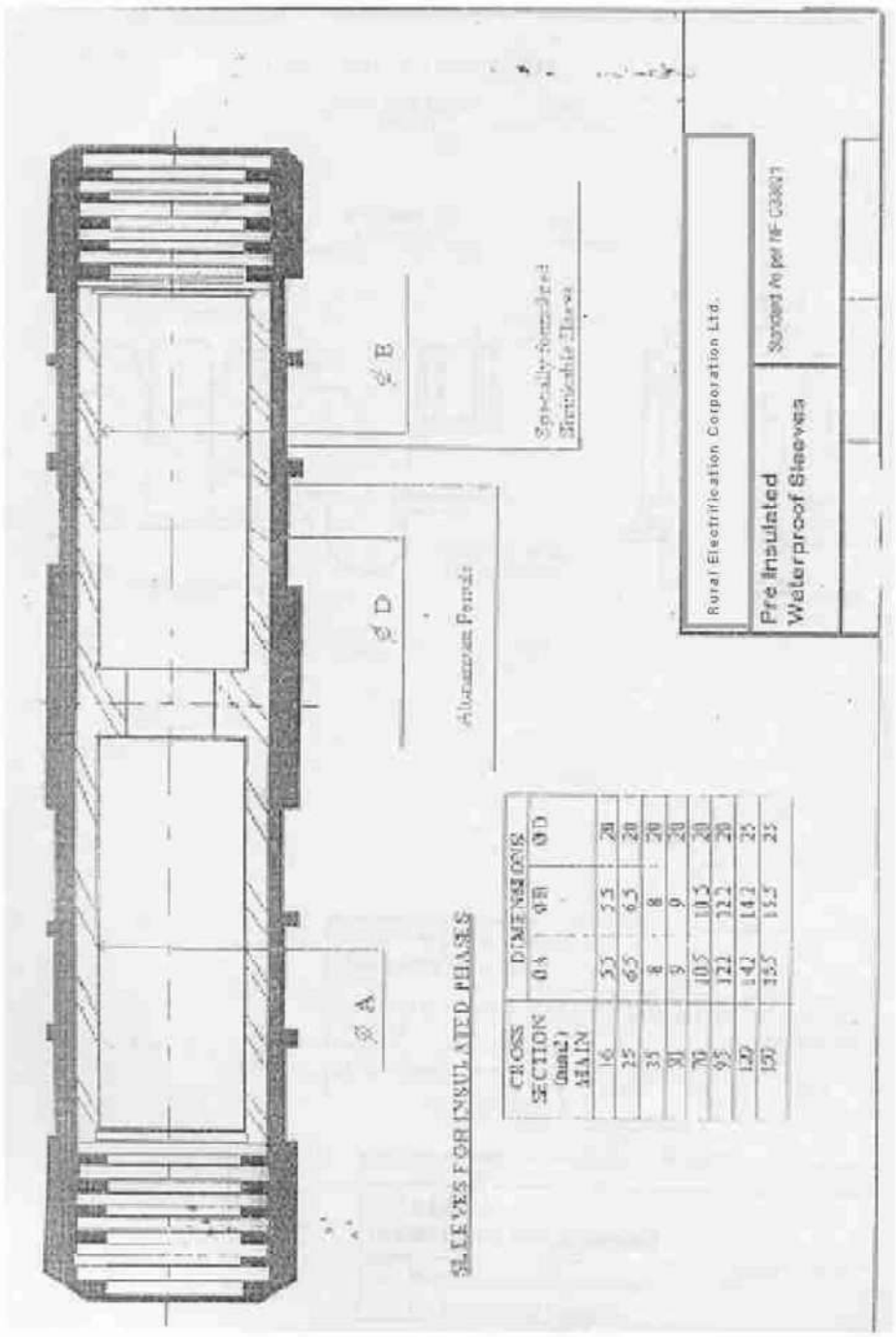
ANNEXURE-F


RING
SLEEVE
INSULATED COVER
Greased
PALM
Standard : As per NF C 33021
All Dimensions are in mm
Not to Scale
Rural Electrification Corporation Ltd.
Name: Preinsulated Bimetallic Socket.

ANNEXURE-G

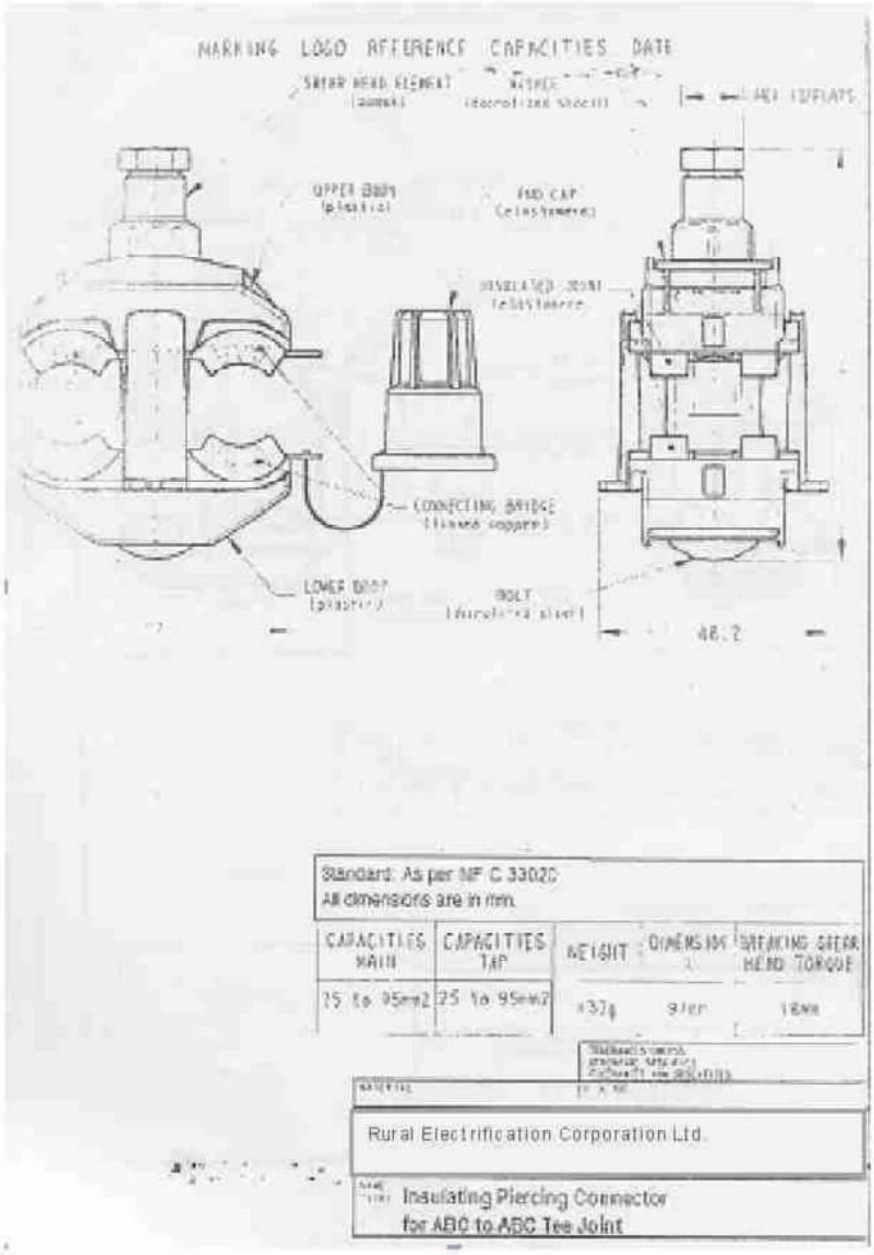

Rural Electrification Corporation Ltd.
ALL DIMENSIONS ARE IN MM
DO NOT SCALE
NOTES:
1. GENERAL TOLERANCE ±5%
2. EYE HOOK AS PER REC CONSTRUCTION STANDARD E-16
3. FERROUS PARTS HOT DIP GALVANISED AS PER IS- 2629

ANNEXURE-H

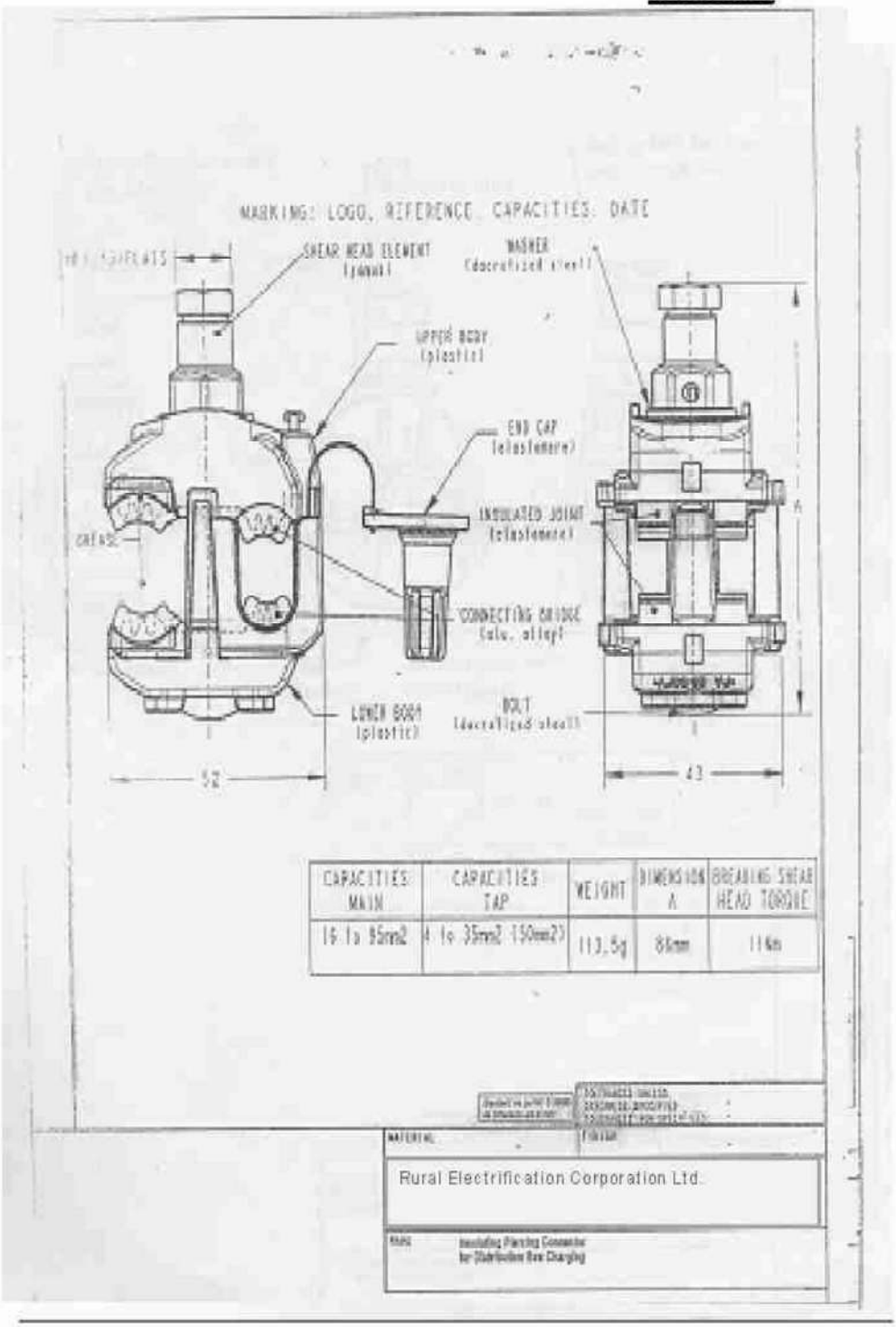


CROSS SECTION (mm²) MAIN	DIMENSIONS		
	ØA	ØB	ØD
16	55	55	20
25	65	65	20
35	8	8	20
50	9	9	20
70	105	105	20
95	122	122	20
120	142	142	25
150	155	155	25

ANNEXURE-I


MARKING LOGO REFERENCE CAPACITIES DATE
UPPER BODY
(plastic)
END CAP
(elastomeric)
INSULATED JOINT
(elastomeric
CONNECTING BRIDGE
(tinned copper)
LOWER BODY
(plastic)
BOLT
(hardened steel)
48.2
Standard: As per NF C 33020
All dimensions are in mm.
CAPACITIES MAIN
CAPACITIES TAP
WEIGHT
DIMENSION
BREAKING SHEAR HEAD TORQUE
25 to 95mm2
25 to 95mm2
Rural Electrification Corporation Ltd.
Insulating Piercing Connector
for ABC to ABC Tee Joint

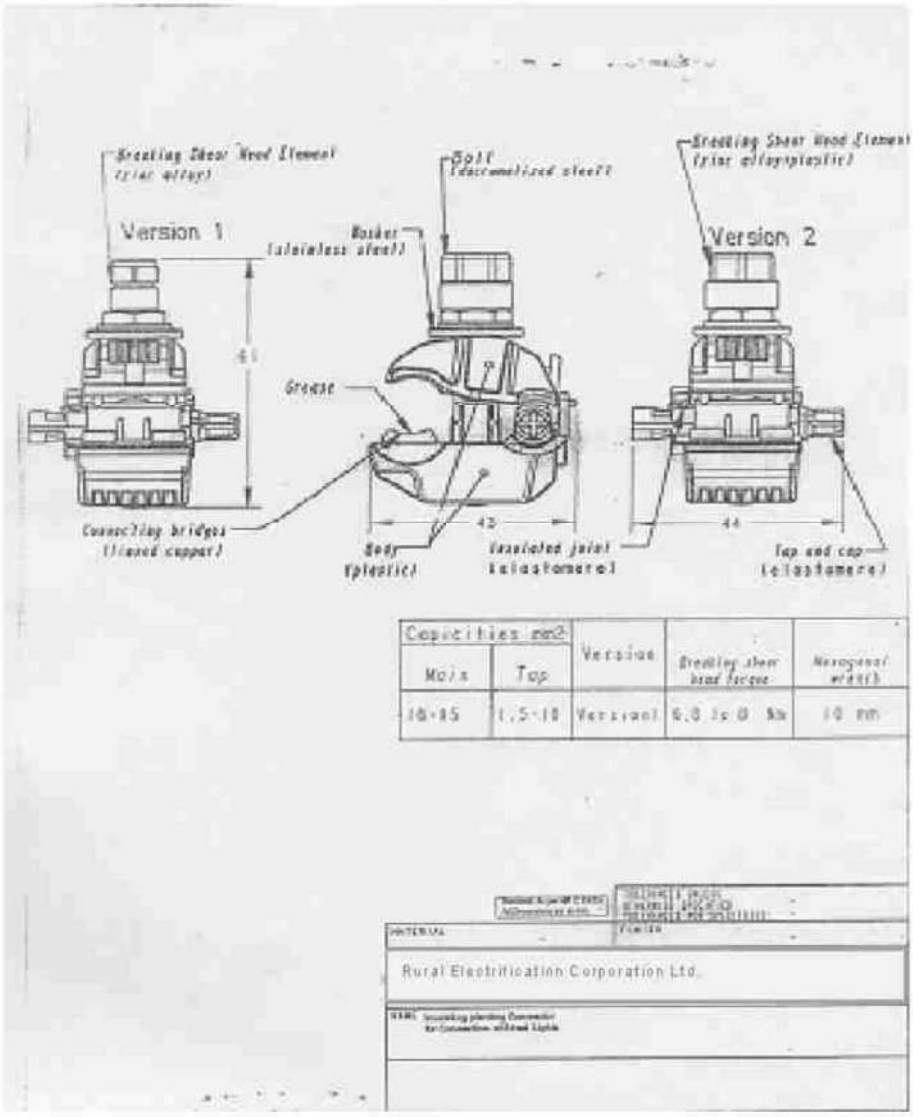
ANNEXURE-I

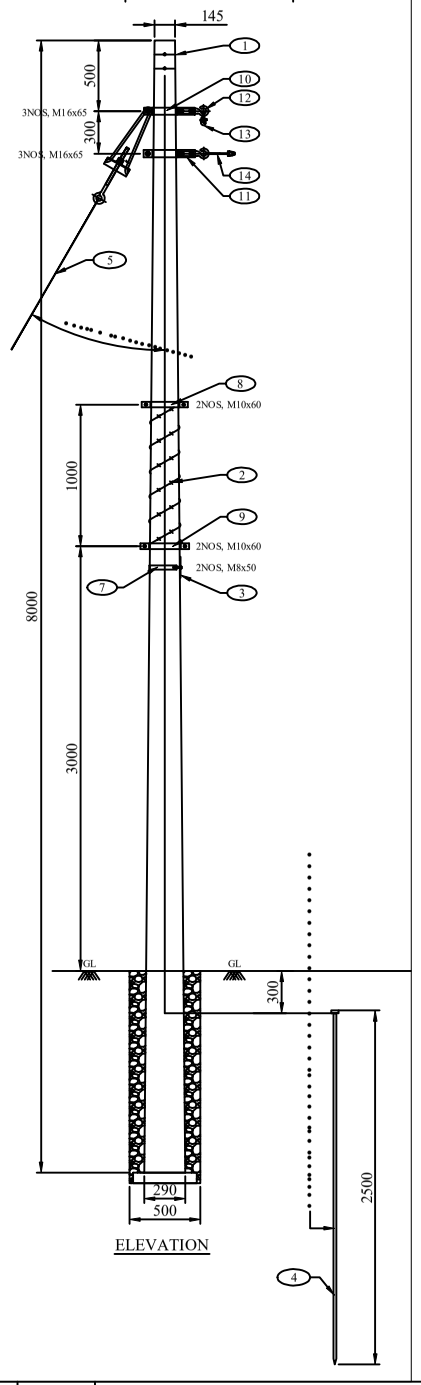


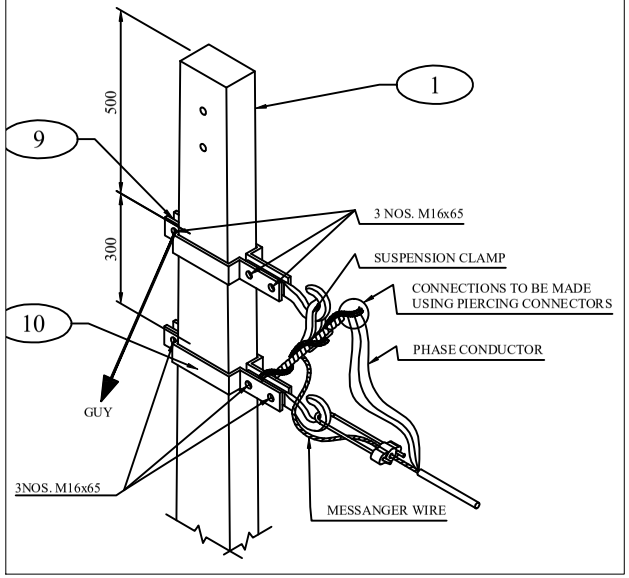
CAPACITIES MAIN	CAPACITIES TAP	WEIGHT	DIMENSION A	BREAKING SHEAR HEAD TORQUE
16 to 95mm2	4 to 35mm2 150mm2)	113.5g	86mm	11Nm

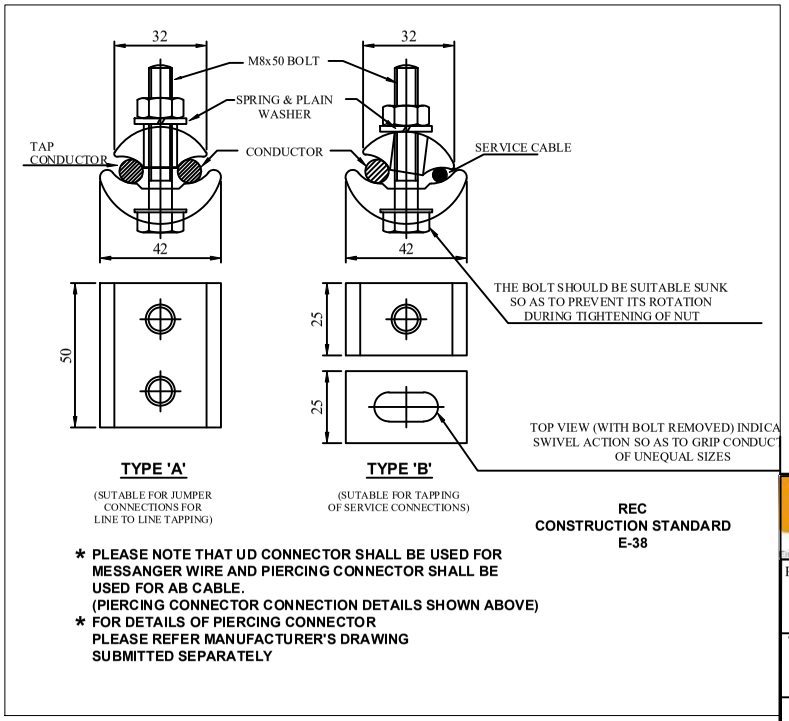
Rural Electrification Corporation Ltd.

ANNEXURE-K


Breaking Shear Head Element
(zinc alloy)
Version 1
Gasket
(stainless steel)
Bolt
(electroplated steel)
Breaking Shear Head Element
(zinc alloy/plastic)
Version 2
41
Grease
Connecting bridges
(tinned copper)
43
44
Body
(plastic)
Insulated joint
(elastomere)
Top and cap
(elastomere)
Capacities mm2
Main
Tap
Version
Breaking shear head torque
Necessary wrench
16-95
1.5-16
Version1
6.8 to 8 Nm
10 mm
Rural Electrification Corporation Ltd.







REC
CONSTRUCTION STANDARD
E-38

*** PLEASE NOTE THAT UD CONNECTOR SHALL BE USED FOR MESSANGER WIRE AND PIERCING CONNECTOR SHALL BE USED FOR AB CABLE.**
(PIERCING CONNECTOR CONNECTION DETAILS SHOWN ABOVE)
*** FOR DETAILS OF PIERCING CONNECTOR PLEASE REFER MANUFACTURER'S DRAWING SUBMITTED SEPARATELY**

BILL OF MATERIAL

SR. NO.	NESCL ERE CODE		DESCRIPTION	QTY.	REF. DRG. NO.
1	001		8m/200Kg. PSC POLE	1 NO.	REC-XII Plan-GEN-001A
2	003		BARBED WIRE	3.5 MTR	
3	022		433V DANGER BOARD	1 NO.	REC-XII Plan-LT-016
4	005		SPIKE EARTHING	1 SET	REC-XII Plan-GEN-012
5	006		STAY SET ARRANGEMENT	1 SET	
6	814M		CLAMP FOR DANGER BOARD	1 NO.	REC-XII Plan-LT-015 (SHT-2)
7	816		TOP CLAMP TOP ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-015 (SHT-2)
8	817		BOTTOM CLAMP TOP ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-015 (SHT-2)
9	818A		CLAMP FOR EYE HOOK	2 NOS.	REC-XII Plan-LT-015 (SHT-2)
10	818B		CLAMP FOR EYE HOOK	2 NOS.	REC-XII Plan-LT-015 (SHT-2)
11	019		EYE HOOK	2 NOS.	REC-XII Plan-LT-015 (SHT-2)
12	026		SUSPENSION CLAMP	1 SET	REC-XII Plan-LT-015 (SHT-2)
13	025		DEAD-END CLAMP	1 SET	REC-XII Plan-LT-015 (SHT-2)
			NUTS & BOLTS	AS REQD.	REC-XII Plan-LT-015 (SHT-2)

NOTES:

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED.
2) MANUFACTURING TOLERANCE AS FOLLOWS
   - UP TO 50mm ±••• ±•• ± • • • •
   - 51 TO 100mm ±••• ±•• ± • • • •
   - 101 TO 300mm ±••• ±•• ± • • • •
   - ABOVE 300mm ±••• ±•• ± • • • •
3) ALL M.S. PARTS SHALL CONFORM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759.
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE.
7) ALL CHANNELS AND ANGLES SHALL CONFORM TO IS:SP6 PART-1
   ALL CHANNELS SHALL BE ISLC CHANNELS.

FOR TENDER PURPOSE ONLY

REV.NO.	DATE	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY	APPD	DATE
R0								

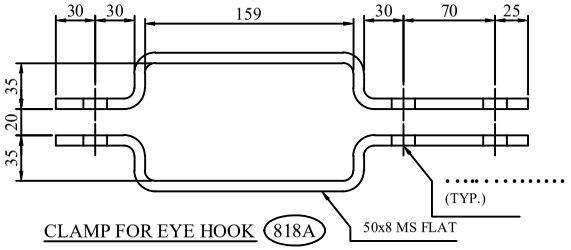
आर ई सी REC

Rural Electrification Corporation Ltd.

PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

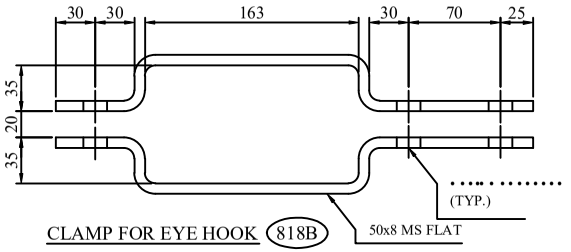
TITLE: GA & COMPONENT DETAILS OF AB CABLE CONNECIONS AND TAPPING ARRANGEMENT

SCALE		REV. NO.
NTS		0
SIZE	DRG. NO.	SHT. NO.
A3	REC/DDUGJY/LT-OH/02A	1 OF 2



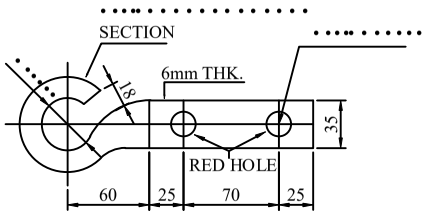
CLAMP FOR EYE HOOK (818A)

1 SET=2 NOS.(HALF CLAMP)



CLAMP FOR EYE HOOK (818B)

1 SET=2 NOS.(HALF CLAMP)



EYE HOOK (019)

REC

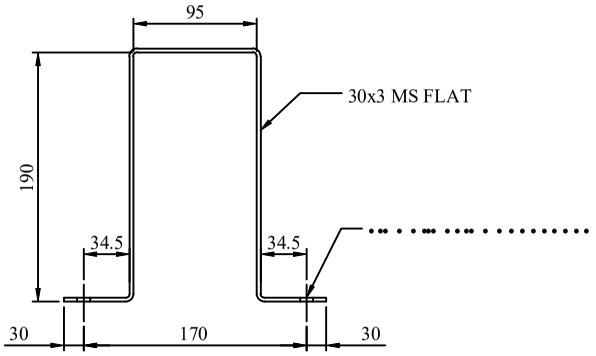
CONSTRUCTION STANDARD

E-35

BILL OF MATERIAL

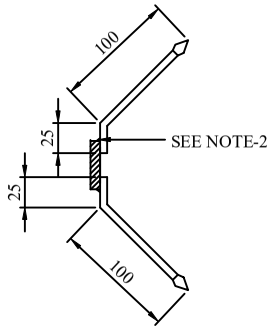
SR. NO.	NESCL ERE CODE	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
1	814M	CLAMP FOR DANGER BOARD	30x3	M.S.	610	0.701	1 NO.	0.428
2	818A	CLAMP FOR EYE HOOK	50x8	M.S.	430+430	3.14	1 SET	2.7
3	818B	CLAMP FOR EYE HOOK	50x8	M.S.	434+434	3.14	1 SET	2.726
4	816	TOP CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	395+395	1.60	1 SET	1.264
5	817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	413+413	1.60	1 SET	1.322
		SPIKE	6mm ROD	M.S.	125	0.22	56 NOS.	1.54
							TOTAL	9.98

SR. NO.	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
5	NUTS & BOLTS	M16		65	0.164KG/NO.	6 NOS.	0.984
6	NUTS & BOLTS	M10		60	0.055KG/NO.	4 NOS.	0.220
7	NUTS & BOLTS	M8		50	0.05KG/NO.	2 NOS.	0.100
8	SPRING WASHERS	M16		3.5 THK.	0.009KG/NO.	6 NOS.	0.054
9	SPRING WASHERS	M10		3.5 THK.	0.003KG/NO.	4 NOS.	0.012
10	SPRING WASHERS	M8		3.5 THK.	0.002KG/NO.	2 NOS.	0.004
11	PLAIN WASHER	M16		3 THK.	0.015KG/NO.	6 NOS.	0.090
12	PLAIN WASHER	M10		3 THK.	0.005KG/NO.	4 NOS.	0.020
13	PLAIN WASHER	M8		3 THK.	0.004KG/NO.	2 NOS.	0.080
						TOTAL	1.564



PLAN

DANGER CLAMP (814M)



6mm ROD SPIKE

SECTION A-A

NOTES:

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED.
2) MANUFACTURING TOLERANCE AS FOLLOWS
   - UP TO 50mm
   - 51 TO 100mm
   - 101 TO 300mm
   - ABOVE 300mm
3) ALL M.S. PARTS SHALL CONFORM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759.
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE.
7) ALL CHANNELS AND ANGLES SHALL CONFORM TO IS:SP6 PART-1 ALL CHANNELS SHALL BE ISLC CHANNELS.

FOR TENDER PURPOSE ONLY

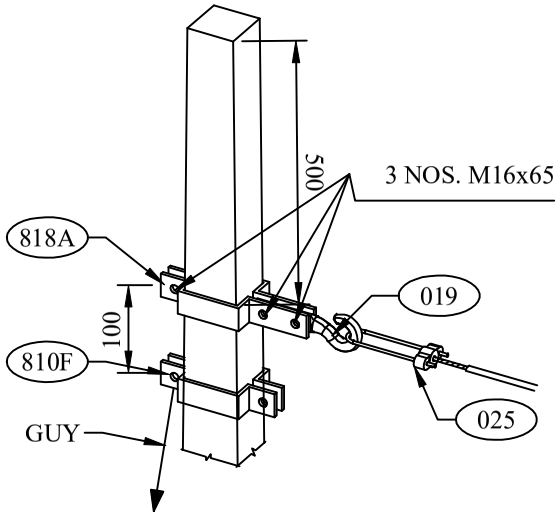
REV.NO.	DATE	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY	APPD	DATE

Rural Electrification Corporation Ltd.

PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: GA & COMPONENT DETAILS OF AB CABLE CONNECIONS AND TAPPING ARRANGEMENT

DATE	SCALE	VENDER DRG. NO.	REV. NO.
	NTS		0
	SIZE	DRG. NO.	SHT. NO.
	A3	REC/DDUGJY/LT-OH/02B	2 OF 2

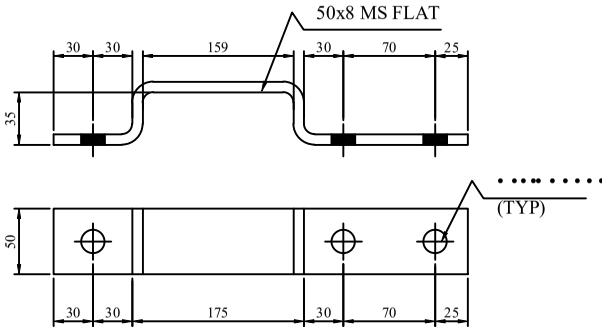


GENERAL NOTES:

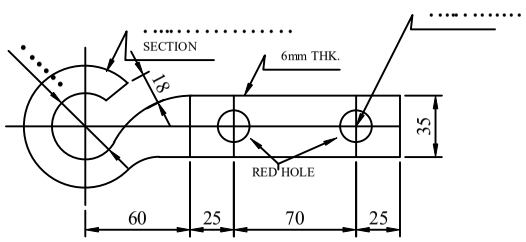
1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED
2) MANUFACTURING TOLERANCE.
3) ALL M.S. PARTS SHALL CONF0RM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE ONLY.
7) ALL CLAMPS AND ANGLES SHALL CONFORM TO IS:SP6 PART-1. ALL CHANNELS SHALL BE ISLC CHANNELS.

BILL OF MATERIAL			
ERE CODE	DESCRIPTION	QTY.	REF. DRG. NO.
001	8m/200Kg..PSC POLE	1 NO.	REC-XII Plan-GEN-001A
003	BARBED WIRE	3.5 MTR.	
022	433V DANGER BOARD	1 NO.	
005	SPIKE EARTHING	1 SET	REC-XII Plan-GEN-012
008	STAY SET ARRANGEMENT	1 SET	REC-XII Plan-GEN-007
814M	CLAMP FOR DANGER BOARD	1 NO.	REC-XII Plan-LT-001
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-007
817	BOTTOM CLAMP TOP ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-007
810F	CLAMP FOR STAY SET	1 SET	REC-XII Plan-LT-015
818A	CLAMP FOR EYE HOOK	1 SET	
019	EYE HOOK	1 NO.	
025	DEAD END CLAMP	1 NO.	
	NUTS & BOLTS	AS REQD.	REC-XII Plan-LT-014

BILL OF MATERIAL							
ERE CODE	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
814M	CLAMP FOR DANGER BOARD	30x3	M.S.	610	0.701	1 NO.	0.428
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	395	1.60	2 NOS.	1.264
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	413	1.60	2 NOS.	1.322
810F	CLAMP FOR STAY SET	50x8	M.S.	368	3.14	2 NOS.	2.311
	SPIKE	6mm ROD	M.S.	125	0.22	56 NOS.	1.54
818A	CLAMP FOR EYE HOOK	50x8	M.S.	430	3.14	2 NOS.	2.700
019	EYE HOOK					1 NO.	
025	DEAD END CLAMP					1 NO.	
	NUTS & BOLTS	M16		65	0.164KG/NO.	5 NOS.	0.820
	NUTS & BOLTS	M10		60	0.055KG/NO.	4 NOS.	0.220
	NUTS & BOLTS	M8		60	0.05KG/NO.	2 NOS.	0.100
	SPRING WASHERS	M16		3.5 THK.	0.009KG/NO.	5 NOS.	0.045
	SPRING WASHERS	M10		3.5 THK.	0.003KG/NO.	4 NOS.	0.012
	SPRING WASHERS	M8		3.5 THK.	0.002KG/NO.	2 NOS.	0.004
	PLAIN WASHER	M16		3 THK.	0.015KG/NO.	5 NOS.	0.075
	PLAIN WASHER	M10		3 THK.	0.005KG/NO.	4 NOS.	0.02
	PLAIN WASHER	M8		3 THK.	0.004KG/NO.	2 NOS.	0.08
						TOTAL	10.941

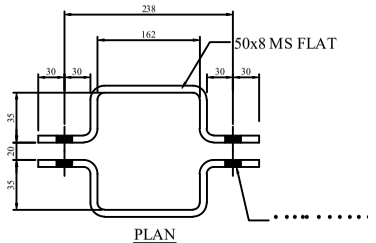


CLAMP FOR EYE HOOK 818A



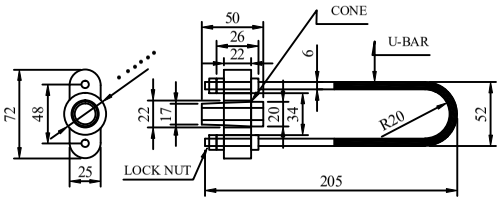
EYE HOOK 019

REC
CONSTRUCTION STANDARD
E-35



PLAN

STAY SET CLAMP 810F



INSULATED DEAD END CLAMP 025

REC
CONSTRUCTION STANDARD
E-35

FOR TENDER PURPOSE ONLY

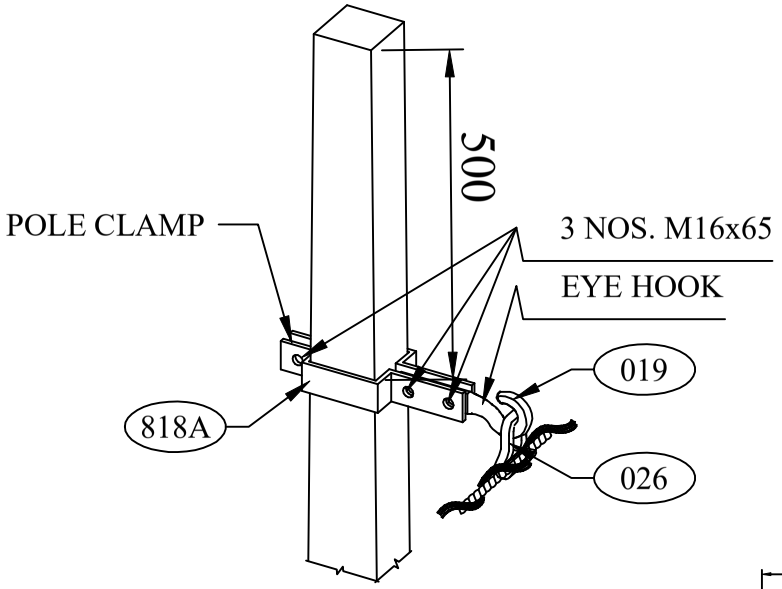
Rural Electrification Corporation Ltd.

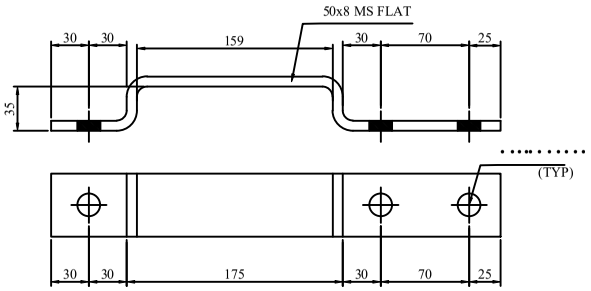
PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: GA OF LT LINE FORMATION ON SINGLE 8M/200 kG PSC POLE (DEAD END) WITH LT AB CABLE

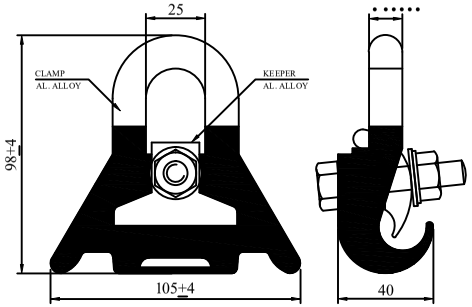
REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-OH/03	1 OF 1	0



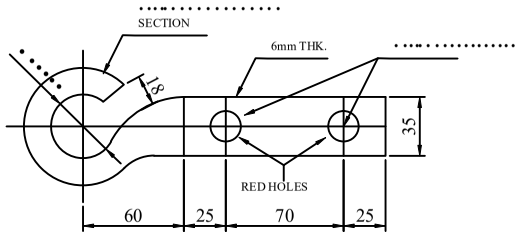


CLAMP FOR EYE HOOK (818A)



* SUSPENSION CLAMP (026)

FOR DETAILS OF SUSPENSION CLAMP
PLEASE REFER MANUFACTURER'S DRAWING
SUBMITTED SEPARATELY



EYE HOOK (019)

REC
CONSTRUCTION STANDARD
E-35

BILL OF MATERIAL

ERE CODE	DESCRIPTION	QTY.	REF. DRG. NO.
1	8m/200Kg. PSC POLE	1 NO.	REC-XII Plan-GEN-001A
2	BARBED WIRE	3.5 MTR.	
3	433V DANGER BOARD	1 NO.	
4	SPIKE EARTHING	1 SET	REC-XII Plan-GEN-012
814M	CLAMP FOR DANGER BOARD	1 NO.	REC-XII Plan-LT-001
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-001
817	BOTTOM CLAMP TOP ANTI CLIMBING DEVICE	1 SET	REC-XII Plan-LT-001
818A	CLAMP FOR EYE HOOK	1 SET	REC-XII Plan-LT-013
019	EYE HOOK	1 NO.	REC-XII Plan-LT-013
026	SUSPENSION CLAMP	1 NO.	REC-XII Plan-LT-013
	NUTS & BOLTS	AS REQD.	

BILL OF MATERIAL

ERE CODE	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
814M	CLAMP FOR DANGER BOARD	30x3	M.S.	610	0.701	1 NO.	0.428
816	TOP CLAMP FOR ANTI CLAMP DEVICE	40x5	M.S.	395	1.60	2 NOS.	1.264
817	BOTTOM CLAMP FOR ANTI CLAMP DEVICE	40x5	M.S.	413	1.60	2 NOS.	1.322
	SPIKE	6mm ROD	M.S.	125	0.22	56 NOS.	1.540
818A	CLAMP FOR EYE HOOK	50x8	M.S.	430	3.14	2 NOS.	2.700
019	EYE HOOK					1 NO.	
026	SUSPENSION CLAMP					1 NO.	
	NUTS & BOLTS	M16		65	0.164KG/NO.	3 NOS.	0.492
	NUTS & BOLTS	M10		60	0.055KG/NO.	4 NOS.	0.220
	NUTS & BOLTS	M8		60	0.05KG/NO.	2 NOS.	0.100
	SPRING WASHERS	M16		3.5 THK.	0.009KG/NO.	3 NOS.	0.027
	SPRING WASHERS	M10		3.5 THK.	0.003KG/NO.	4 NOS.	0.012
	SPRING WASHERS	M8		3.5 THK.	0.002KG/NO.	2 NOS.	0.004
	PLAIN WASHER	M16		3 THK.	0.015KG/NO.	3 NOS.	0.045
	PLAIN WASHER	M10		3 THK.	0.005KG/NO.	4 NOS.	0.020
	PLAIN WASHER	M8		3 THK.	0.004KG/NO.	2 NOS.	0.080
						TOTAL	8.254

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED
2) MANUFACTURING TOLERANCE.
3) ALL M.S. PARTS SHALL CONF0RM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE ONLY.
7) ALL CLAMPS AND ANGLES SHALL CONFORM TO IS:SP6 PART-1. ALL CHANNELS SHALL BE ISLC CHANNELS.

FOR TENDER PURPOSE ONLY

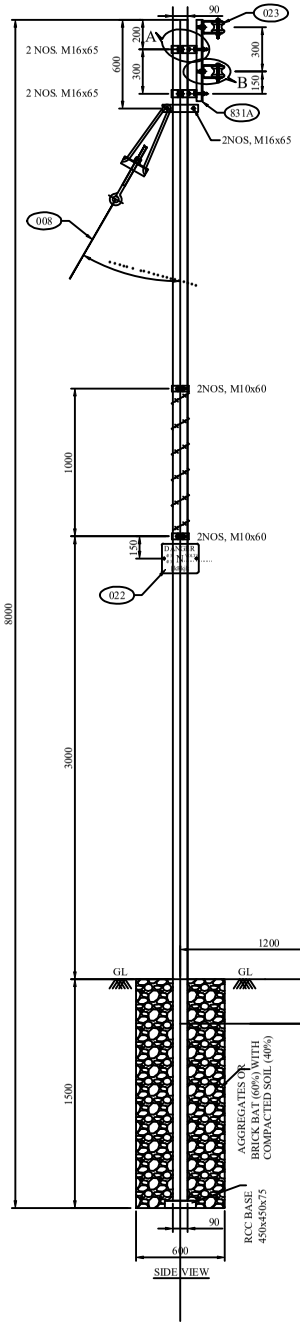
REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

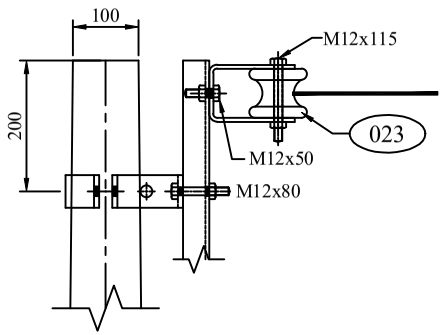
Rural Electrification Corporation Ltd.

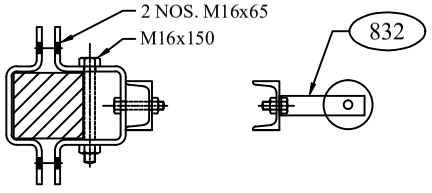
PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: GA OF LT LINE FORMATION ON SINGLE 8M/200 kG PSC POLE (IN LINE ARRAIGNMENT) WITH LT AB CABLE

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-OH/04	1 OF 1	0

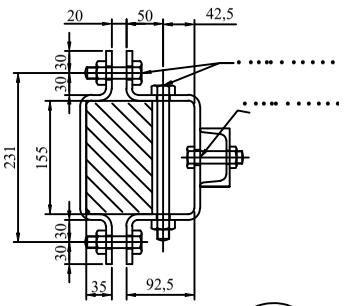




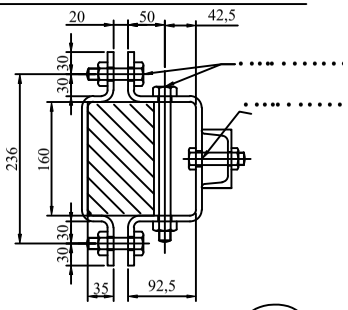


DETAIL `A'

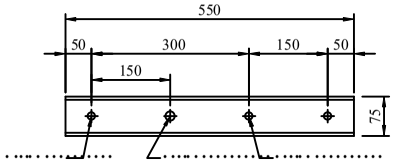
DETAIL `B'



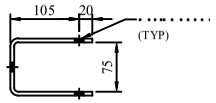
TOP CLAMP FOR SHACKLE INSULATOR CHANNEL (834)



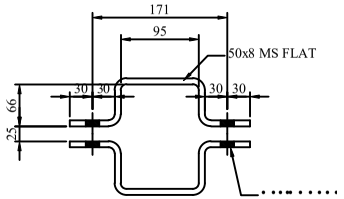
BOTTOM CLAMP FOR SHACKLE INSULATOR CHANNEL (834D)



SHACKLE INSULATOR MOUNTING CHANNEL (831A)



U- CLAMP 30x6 (833)



PLAN

STAY SET CLAMP (811)

GENERAL NOTES:
1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED
2) MANUFACTURING TOLERANCE
3) ALL M.S. PARTS SHALL CONF0RM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE.
7) ALL CLAMPS AND ANGLES SHALL CONFORM TO IS:SP 6 PART-1. ALL CHANNELS SHALL BE ISLC CHANNELS.

BILL OF MATERIAL

ERE CODE	DESCRIPTION	QTY.	REF. DRG. NO.
001	8M/200Kg. PSC POLE	1 NO.	REC-XII Plan-GEN-001A
003	BARBED WIRE	3.5MTR	
005	SPIKE EARTHING	1 SET	REC-XII Plan-GEN-012
008	STAY SET ARRANGEMENT	1 SET	REC-XII Plan-GEN-007
022	415V DANGER BOARD	1 NO.	
023	LT SHACKLE INSULATOR (TYPE-1)	2 NOS.	
831A	SHACKLE INSULATOR MOUNTING CHANNEL	1 NO.	
814M	CLAMP FOR DANGER BOARD	1 NO.	REC-XII Plan-LT-001
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC-XII Plan-LT-001
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC-XII Plan-LT-001
811	STAY SET CLAMP	1 SET	
834	TOP CLAMP FOR SHACKLE INSULATOR CHANNEL	1 SET	
833	U-CLAMP FOR SHACKLE INSULATOR	2 NOS.	
834D	BOTTOM CLAMP FOR SHACKLE INSULATOR CHANNEL	1 SET	

BILL OF MATERIAL

ERE CODE	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
831A	SHACKLE INSULATOR MOUNTING CHANNEL	75x40	M.S.	550	5.7	1 NO.	3.135
814M	CLAMP FOR DANGER BOARD	30x3	M.S.	610	0.701	1 NO.	0.428
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	395	1.60	2 NOS.	1.264
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	413	1.60	2 NOS.	1.322
811	CLAMP FOR STAY SET	50x8	M.S.	363	3.14	2 NOS.	2.304
834	TOP CLAMP FOR SHACKLE INSULATOR CHANNEL	50x8	M.S.	837	3.14	1 SET	2.628
834D	BOTTOM CLAMP FOR SHACKLE INSULATOR CHANNEL	50x8	M.S.	847	3.14	1 SET	2.659
833	U-CLAMP	30x6	M.S.	325	1.415	2 NOS.	0.919
	SPIKE	6mm ROD	M.S.	125	0.22	56 NOS.	1.540
						TOTAL	16.199

	DESCRIPTION	SIZE	MATERIAL	LENGTH MM	KG.	QTY.	TOTAL Wt. KG.
	NUTS & BOLTS	M16		150	0.299	2 NOS.	0.598
	NUTS & BOLTS	M16		65	0.164	6 NOS.	0.984
	NUTS & BOLTS	M12		115	0.134	2 NOS.	0.268
	NUTS & BOLTS	M12		80	0.102	2 NOS.	0.204
	NUTS & BOLTS	M12		50	0.075	2 NOS.	0.150
	NUTS & BOLTS	M10		60	0.055	4 NOS.	0.220
	NUTS & BOLTS	M8		60	0.050	2 NOS.	0.100
	SPRING WASHERS	M16		3.5 THK.	0.009	8 NOS.	0.072
	SPRING WASHERS	M12		3.5 THK.	0.009	6 NOS.	0.054
	SPRING WASHERS	M10		3.5 THK.	0.003	4 NOS.	0.012
	SPRING WASHERS	M8		3.5 THK.	0.002	2 NOS.	0.004
	PLAIN WASHER	M16		3 THK.	0.015	8 NOS.	0.120
	PLAIN WASHER	M12		3 THK.	0.015	6 NOS.	0.090
	PLAIN WASHER	M10		3 THK.	0.005	4 NOS.	0.020
	PLAIN WASHER	M8		3 THK.	0.004	2 NOS.	0.080
						TOTAL	2.976

FOR TENDER PURPOSE ONLY

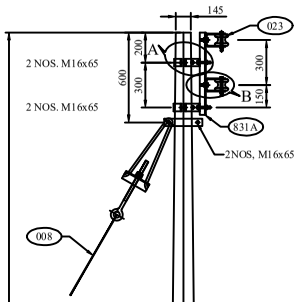
REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

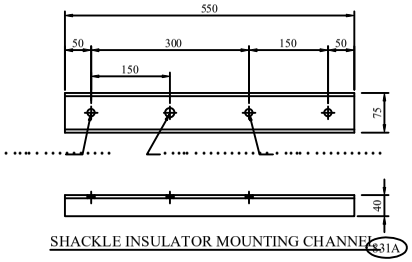
Rural Electrification Corporation Ltd.

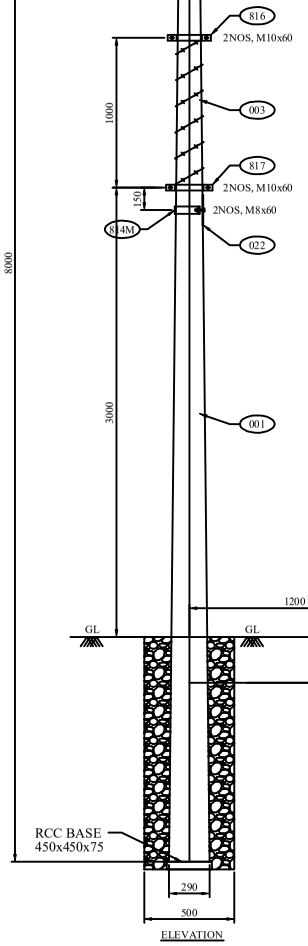
PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

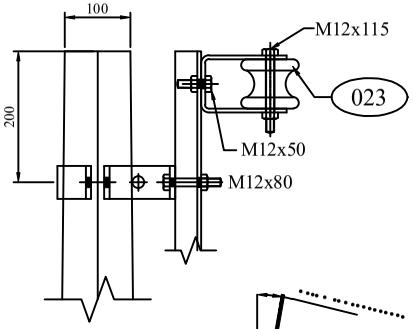
TITLE: GA OF LT LINE VERTICAL FORMATION ON SINGLE 8M/200 kG PSC POLE (AT DEAD END) 1Ph, 2WIRE

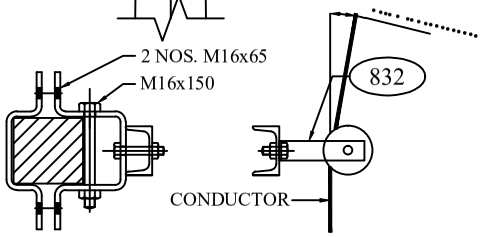
SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-OH/05	1 OF 1	0

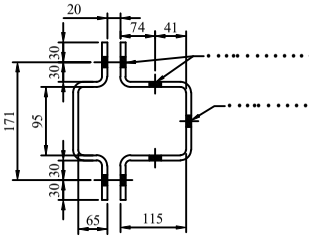


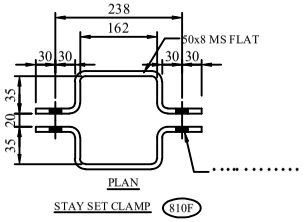


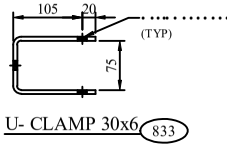












BILL OF MATERIAL			
ERE CODE	DESCRIPTION	QTY.	REF. DRG. NO.
001	8M/200Kg. PSC POLE	1 NO.	REC-XII Plan-GEN-001A
003	BARBED WIRE	3.5MTR	
005	SPIKE EARTHING	1 SET	REC-XII Plan-GEN-012
008	STAY SET ARRANGEMENT	1 SET	
022	415V DANGER BOARD	1 NO.	
023	LT SHACKLE INSULATOR (TYPE-1)	2 NOS.	
831A	SHACKLE INSULATOR MOUNTING CHANNEL	1 NO.	REC-XII Plan-LT-011
814M	CLAMP FOR DANGER BOARD	1 NO.	REC-XII Plan-LT-001
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC-XII Plan-LT-001
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC-XII Plan-LT-001
810F	STAY SET CLAMP	1 SET	REC-XII Plan-LT-011
832	CLAMP FOR SHACKLE INSULATOR CHANNEL	2 SET	REC-XII Plan-LT-011
833	U-CLAMP FOR SHACKLE INSULATOR	2 NOS.	REC-XII Plan-LT-011

BILL OF MATERIAL							
ERE CODE	DESCRIPTION	SECTION	MATERIAL	LENGTH MM	kG./mtr.	QTY.	TOTAL Wt. KG.
831A	SHACKLE INSULATOR MOUNTING CHANNEL	75x40	M.S.	550	5.7	1 NO.	3.135
814M	CLAMP FOR DANGER BOARD	30x3	M.S.	610	0.701	1 NO.	0.428
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	395	1.60	2 NOS.	1.264
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	40x5	M.S.	413	1.60	2 NOS.	1.322
810F	CLAMP FOR STAY SET	50x8	M.S.	368	3.14	2 NOS.	2.311
832	CLAMP FOR SHACKLE INSULATOR CHANNEL	50x8	M.S.	822	3.14	2 SET	5.162
833	U-CLAMP	30x6	M.S.	325	1.415	2 NOS.	0.919
	SPIKE	6mm ROD	M.S.	125	0.22	56 NOS.	1.540
						TOTAL	16.081

	DESCRIPTION	SIZE	MATERIAL	LENGTH MM	KG.	QTY.	TOTAL Wt. KG.
	NUTS & BOLTS	M16		150	0.299	2 NOS.	0.598
	NUTS & BOLTS	M16		65	0.164	6 NOS.	0.984
	NUTS & BOLTS	M12		115	0.134	2 NOS.	0.268
	NUTS & BOLTS	M12		80	0.102	2 NOS.	0.204
	NUTS & BOLTS	M12		50	0.075	2 NOS.	0.150
	NUTS & BOLTS	M10		60	0.055	4 NOS.	0.220
	NUTS & BOLTS	M8		60	0.050	2 NOS.	0.100
	SPRING WASHERS	M16		3.5 THK.	0.009	8 NOS.	0.072
	SPRING WASHERS	M12		3.5 THK.	0.009	6 NOS.	0.054
	SPRING WASHERS	M10		3.5 THK.	0.003	4 NOS.	0.012
	SPRING WASHERS	M8		3.5 THK.	0.002	2 NOS.	0.004
	PLAIN WASHER	M16		3 THK.	0.015	8 NOS.	0.120
	PLAIN WASHER	M12		3 THK.	0.015	6 NOS.	0.090
	PLAIN WASHER	M10		3 THK.	0.005	4 NOS.	0.020
	PLAIN WASHER	M8		3 THK.	0.004	2 NOS.	0.080
						TOTAL	2.976

GENERAL NOTES:
1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED
2) MANUFACTURING TOLERANCE
3) ALL M.S. PARTS SHALL CONFORM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE.
7) ALL CLAMPS AND ANGLES SHALL CONFORM TO IS:SP 6 PART-1. ALL CHANNELS SHALL BE ISLC CHANNELS.

FOR TENDER PURPOSE ONLY

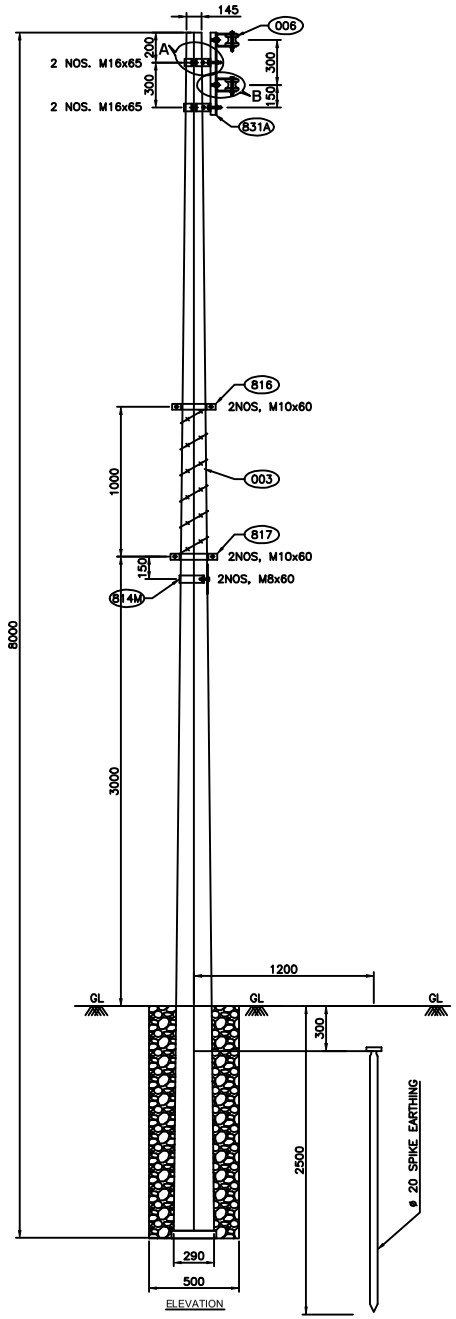
Rural Electrification Corporation Ltd.

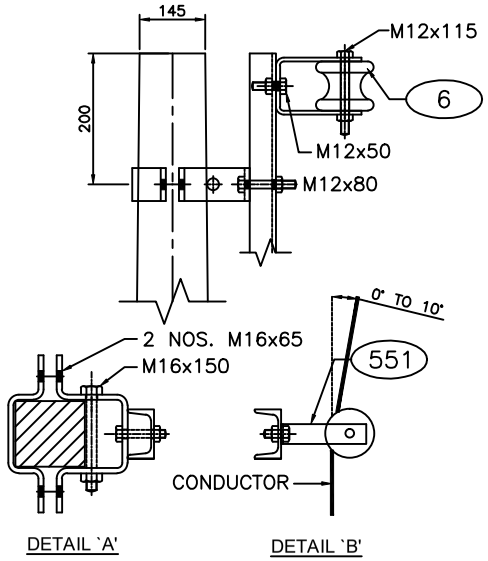
PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: GA OF LT LINE VERTICAL FORMATION ON SINGLE 8M/200 kG PSC POLE (AT ANGULAR LOCATION) 1Ph, 2WIRE

REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT
R0					

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-OH/06	1 OF 1	0





BILL OF MATERIAL

ERE CODE	DESCRIPTION	QTY.	REF. DRG. NO.
001	8m/200Kg. PSC POLE	1 NO.	REC–XII Plan–GEN–001A
003	BARBED WIRE	3.5 MTR.	
005	SPIKE EARTHING	1 SET	REC–XII Plan–GEN–012
022	415V DANGER BOARD	1 NO.	
006	LT SHACKLE INSULATOR (TYPE–1)	2 NOS.	
831A	SHACKLE INSULATOR MOUNTING CHANNEL	1 NO.	REC–XII Plan–LT–010
814M	CLAMP FOR DANGER BOARD	1 NO.	REC–XII Plan–LT–010
816	TOP CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC–XII Plan–LT–010
817	BOTTOM CLAMP FOR ANTI CLIMBING DEVICE	1 NO.	REC–XII Plan–LT–010
832	TOP CLAMP FOR SHACKLE INSULATOR CHANNEL	1 SET	REC–XII Plan–LT–010
833	U–CLAMP FOR SHACKLE INSULATOR	2 NOS.	REC–XII Plan–LT–010

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED
2) MANUFACTURING TOLERANCE
3) ALL M.S. PARTS SHALL CONF0RM TO IS:2062
4) ALL M.S. FABRICATED ITEMS SHALL BE HOT DIP GALVANISED AS PER IS:2629 & 4759
5) ALL THE ITEMS SHALL BE MARKED WITH ERECTION CODE.
6) WEIGHT MENTIONED IS FOR PACKING & FORWARDING PURPOSE.
7) ALL CLAMPS AND ANGLES SHALL CONFORM TO IS:SP 6 PART-1. ALL CHANNELS SHALL BE ISLC CHANNELS.

FOR TENDER PURPOSE ONLY

REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE: GA OF LT LINE VERTICAL FORMATION ON SINGLE 8M/200 kG PSC POLE (IN LINE ARRANGEMENT) 1Ph, 2WIRE

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO
A3	NTS	REC/DDUGJY/LT-OH/07A	1 OF 2	0

29 11 kV and 33 kV Air Break Switches

1) SCOPE

This specification provides for manufacture, testing at works and supply of 11KV & 33KV AB switches. The 11KV and 33 KV AB switches shall conform to IS: 9920 (Part-I to IV)

2) AB SWITCHES

The 11KV & 33KV Air Break Switches are required with two poles in each phase. The AB Switches shall be supplied complete with phase coupling shaft, operating rod and operating handle. It shall be manually gang operated and vertically break and horizontal mounting type.

The equipment offered by the bidder shall be designed for a normal current rating of 200 Amps and for continuous service at the system voltage specified as under:

i) 11 KV AB Switch	:	11KV + 10%	continuous 50 C/s solidly grounded earthed neutral system
ii) 33KV AB Switch	:	33 kV + 10%	-do-

The length of break in the air shall not be less than 400 mm for 11KV AB Switches and 500 mm for 33 KV AB Switches.

The 11KV & 33KV AB Switches are required with post insulators. The AB switches should be suitable for mounting on the structure. The mounting structure will be arranged by the bidder. However, the AB Switches shall be supplied with base channel for mounting on the structure which will be provided by the owner. The phase to phase spacing shall be 750mm in case of 11KV AB Switches & 1200mm in case of 33KV AB Switches.

3) POST INSULATORS

The complete set of three phase AB Switches shall have stacks of post insulators.

11KV AB Switches: 3 No. 11KV Post Insulator per stack* (1 No. 11kV post insulator per stack shall be permitted)

33KV AB Switches: 3 No. 33KV Post Insulator per stack* (2 No. 22kV or 3 No. 11kV post insulator shall be permitted in each stack).

The post insulators should conform to the latest applicable Indian standards IS: 2544 Specification for Porcelain Post insulator of compact solid core or long rod insulators are also acceptable. Creepage distance should be adequate for highly polluted outdoor atmosphere in open atmosphere. The porcelain used for manufacture of AB Switches should be homogeneous free from flaws or imperfections that might affect the mechanical dielectric quality. They shall be thoroughly vitrified, tough and impervious to moisture. The glazing of the porcelain shall be of uniform brown in colour, free from blisters, burns and other similar defects. Insulators of the same rating and type shall be interchangeable.

* Amendment issued vide letter No. REC/DDUGJY/SBD/TS/2017-18D. No.3091 Dated 25.08.2017.

The porcelain and metal parts shall be assembled in such a manner that any thermal expansion differential between the metal and porcelain parts through the range of temperature variation shall not loose the parts or create undue internal stresses which may affect the electrical or mechanical strength. Cap and base of the insulators shall be interchangeable with each other. The cap and base shall be properly cemented with insulators to give perfect grip. Excess cementing must be avoided.

Each 11KV & 33KV Post Insulators should have technical particulars as detailed below:

		11 kV	33 kV
i	Nominal system voltage kV (rms)	11	33
ii	Highest system voltage kV (rms.)	12	36
iii	Dry Power Frequency one kV minute withstand voltage (rms) in KV	35	75
iv	Wet Power frequency one minute withstand voltage (rms) in KV	35	75
v	Power Frequency puncture kV (rms) voltage	1.3 times the actual dry flashover voltage	
vi	Impulse withstand voltage kV (Peak)	75	170
vii	Visible discharge voltage kV (rms)	9	27
viii	Creepage distance in mm (minimum)	320	580

The rated insulation level of the AB Switches shall not be lower than the values specified below:-

Sl. No	Standard declared voltage KV/RMS	Rated Voltage of the AB Switches	Standard impulse with stand voltage (positive & negative polarity kV (Peak)		One Minute power frequency withstand voltage kV (rms)	
			Across the Isolating distance	To earth & between poles	Across the Isolating distance	To earth & between poles
i	11KV	12KV	85KV	75KV	32KV	28KV
ii	33KV	36KV	195KV	170KV	80KV	70KV

4) TEMPERATURE RISE

~~The maximum temperature attained by any part of the equipment when in service at site under continuous full load conditions and exposed to the direct rays of Sun shall not exceed 45 degree above ambient.~~ Maximum permitted temperature rise over ambient temperature will be as per Table-4 of IS 9921 (Part-2). *

Amendment issued vide letter No. REC/DDUGJY/SBD/TS/2017-18D. No.3091 Dated 25.08.2017.

5) MAIN CONTACTS

AB Switches shall have heavy duty self-aligning type contacts made of hard drawn electrolytic copper/brass. The various parts should be accordingly finished to ensure interchangeability of similar components. The moving contacts of the switch shall be made from hard drawn electrolytic copper brass. This contact shall have dimensions as per drawing attached so as to withstand safely the highest short-circuit currents and over voltage that may be encountered during service. The surface of the contact shall be rounded smooth and silver-plated. In nut shell the male and female contact assemblies shall ensure.

1. Electro-dynamic withstands ability during short circuits without any risk of repulsion of contacts.
2. Thermal withstands ability during short circuits.
3. Constant contact pressure even when the lower parts of the insulator stacks are subjected to tensile stresses due to linear expansion of connected bus bar of flexible conductors either because of temperature variations or strong winds.
4. Wiping action during closing and opening.
5. Fault alignment assuring closing of the switch without minute adjustments.

6) CONNECTORS

The connectors shall be made of hard drawn electrolytic copper or brass suitable for Raccoon/Dog ACSR conductor for both 11KV & 33KV AB Switches. The connector should be 4 -bolt type.

7) OPERATING MECHANISM

All AB Switches shall have separate independent manual operation. They should be provided with ON/OFF indicators and padlocking arrangements for locking in both the end positions to avoid unintentional operation. The isolating distances should also be visible for the AB Switches.

The AB Switch will be supplied with following accessories:

Sl	**Item**	**Size of 11KV AB Switch**	**Size of 33KV AB Switch**
i	Operating Rod (GI dia) ISI mark	Length 5.50 meter dia: 25MM	Length 5.50 mtrsdia: 40MM
ii	Phase coupling square rod (GI) ISI mark	Length 1800 mm Size 25x25 mm	Length 2700 mm Size 40 x 40 mm
iii	Hot dip galvanized Operating handle (GI)	1 No.	1 No.

The AB Switches shall be capable to resist any chance of opening out when in closed position. The operating Mechanism should be of robust constructions, easy to operate by single person and to be located conveniently for local operation in the switchyard. The GI pipe shall conform to ('B' class or Medium class Blue strip) ISS: 1239-68 and ISI marked by embossing. The vertical down rod should be provided with

adequate joint in the mid section to avoid bending or buckling. Additional leverage should be provided to maintain mechanical force with minimum efforts.

All iron parts should be hot dip galvanized as per IS 4759-1979 and zinc coating shall not be less than 610 gm/sq. meter. All brass parts should be silver plated and all nuts and bolts should be hot dip galvanized.

8) ARCING HORNS

It shall be simple and replaceable type. They should be capable of interrupting line-charging current. They shall be of first make and after break type.

9) BUSH

The design and construction of bush shall embody all the features required to withstand climatic conditions specified so as to ensure dependable and effective operations specified even after long periods of inaction of these Air Break Switches. They shall be made from highly polished Bronze metal with adequate provision for periodic lubrication through nipples and vent.

10) DESIGN, MATERIALS AND WORKMANSHIP

All materials used in the construction of the equipment shall be of the appropriate class, well finished and of approved design and material. All similar parts should be accurately finished and interchangeable.

Special attention shall be paid to tropical treatment to all the equipment, as it will be subjected during service to extremely severe exposure to atmospheric moisture and to long period of high ambient temperature. All current carrying parts shall be of non-ferrous metal or alloys and shall be designed to limit sharp points/edges and similar sharp faces.

The firm should have the following type test certificate. The type test should be from CPRI or equivalent lab:-

1. Test to prove capability of rated peak short circuit current and the rated short time current. The rated short time current should correspond to minimum of 10K Amp and the peak short circuit current should correspond to minimum of 25K Amps.
2. Lightning impulse voltage test with positive & negative polarity.
3. Power Frequency voltage dry test and wet test
4. Temperature rise test
5. Mill volt drop tests

The above tests should be performed on the AB Switches, manufactured as per owner approved drawing with the specification. Along with the type test certificate, the certified copy of the drawing (from the testing lab) should also be kept for inspection of our officer. Also the test certificates should not be older than 5 years from the date of opening of tender.

Dimension of 11 & 33KV AB Switches in (Max.)Tolerance 5%.

Sl.	Particulars	11KV AB Switch	33KV AB Switch
i	MS Channel	450x75x40	675x100x50
ii	Creepage distance of Post Insulator	320mm (Min)	580mm (Min)
iii	Highest of Port shell	254 mm	368 mm
iv	Fixed contact assembly		
	i) Base	165x36x8	165x36x8
	Ii) Contact	70x30x6	70x30x6
	Iii) GI cover	110x44	140x44
	v) Spring	6 Nos.	6 Nos.

11) Moving Contact Assembly

i	Base Assembly	135x25x8	170x40x8
ii	Moving	180x25x9	290x25x14
iii	Bush	Bronze Metal	Bronze Metal
iv	Thickness of Grooves	7	11

12) Connectors

i	Connector	60x50x8 (Moving & fix both)	60x50x8 (Moving & fix both)

The bidder should provide AB Switches with terminal connectors, set of insulators, mechanical inter works and arcing horns sets. The base channel for the mounting of AB Switches shall also be included in the scope of AB Switches. The operating mechanisms together with down pipe operating handle etc. are also included in the scope of supply.

10.0 Acceptance Tests for CMRI and PC Software

All CMRI after final assembly and before dispatch from Bidder's/Manufacturer's works shall be duly tested to verify that they are suitable for supply to the Employer. In particular, each and every CMRI shall be subjected to the following acceptance test:

(i) Functional Checks
(ii) Downloading Meter Data from the Meter(s)
(iii) Compatibility with PC software
(iv) Downloading the meter data on PC
(v) Functioning of advance and retard time commands
(vi) Per meter downloading time verification
(vii) Capacity of CMRI for data storage

35 Earthing Coil

Earthing Coils shall be fabricated from soft GI Wire Hot Dip Galvanized. The Hot Dip galvanized wire shall have clean surface and shall be free from paint enamel or any other poor conducting material. The coil shall be made as per REC constructions standard (Refer tender drawing No. REC-XI Plan-Gen-005). The Hot Dip galvanizing shall conform to IS:2629/1966, 2633/1972 and 4826/1969 with latest amendments. Galvanizing should be heavily coated and should stand for the following tests.

Galvanizing Tests

i) Minimum Mass of Zinc

a) ON GI Wire used 280 cm/m^2
b) After Coiling – 266 gm/m^2. The certificate from recognized laboratory shall be submitted towards mass of zinc.

ii) Dip TestShall stand 3 dips of 1 minute and one dip of ½ minute before coiling and 43 dips of 1 minute after coiling as per IS : 4826/1979.

THE DIMENSIONAL REQUIREMENT SHALL BE AS FOLLOWS

a) Nominal dia of GI Wire 4 mm (Tolerance $\pm$ 2.5%)
b) Minimum no. of turns – 115 Nos.
c) External dia of Coil (Min) – 50 mm
d) Length of Coil (Min) – 460 mm
e) Free length of GI Wire at one end coil (Min.) – 2500 mm

The turns should be closely bound. Weight of one finished Earthing Coils (min.) – 1.850 Kg.

Adhesion test – As per ISS 4826 – 1979.

42 Earthing

(AS PER IS 3043-1987)

Earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules 2003 amended from time to time and relevant regulations under Electricity Supply Authority concerned.

In case of high and extra high voltages, the neutral points shall be earthed by not less than two separate distinct connections with earth, each having its own electrodes sub-station and will be earthed at any other point provided no interference is caused by such earthing. If necessary, the neutral may be earthed through suitable impedance.

As far as possible, all earth connections should be visible for inspection. Each earthing system shall be so designed, that, the testing of individual earth electrodes is possible. It is recommended that the value of any earth system resistance shall be such as to conform to the degree of shock protection desired.

It is recommended, that a drawing showing the main earth connections and earth electrodes be prepared for each installation and submitted to Employer.

No addition to the current carrying system, either temporary or permanent, shall be made which will increase the maximum available fault current on its duration until it has been ascertained that the existing arrangement of earth electrodes, earth bus-bar etc., are capable of carrying the new value of earth fault current which may be obtained by this addition.

All materials, fittings etc., used in earthing shall conform to Indian Standard Specifications, wherever they exist.

GENERAL REQUIREMENTS AND PROCEDURES FOR EARTHING AT SUB-STATIONS.

The ground resistance for sub-stations should not exceed a value 2(two) ohms. The joints/connections in the earthling, system shall be welded only, except the connections, which require opening for testing/maintenance. Such connections should be bolted tightly, using spring and ring washers for proper contact pressure. The G.S. flats to be provided for the horizontally laid earth grid should have overlap welded joints, with length of welding at least twice the width of the flat, e.g., 100 MM for 50x6 MM G.S. flats. There should not be any dirt, grease, oil, enamel, paint or any such non-conductive coatings on the surfaces being joined/ connected. Only the finished joints/connections above ground may be provided with red-oxide or any other protective coating. Underground earth electrodes and earth grid elements, when laid, should have a clean metallic surface, free from paint, enamel, grease or any such non-conductive coatings.

As far as possible, all earth connections should be accessible for visual inspection. No cut-outs, links or switches, other than linked switches arranged to operate simultaneously on the earthed or earthed neutral conductor and the live wire shall be inserted in the supply system. Earth electrodes or mate should not be installed in close proximity to metal fence to avoid possibility of fence becoming live. Separate earth electrodes, isolated from the earth grid, are to be provided for grounding the fence wires.

Pipes or rods used as electrodes should be in one piece, as far as possible, with a minimum allowable length of 3 mtrs. Except where rock or hard stratum is encountered, the pipe/rod electrodes should be driven into the ground to a minimum depth of 3 mtrs. The strip electrodes, forming the horizontal gild, should be buried underground to a minimum depth of 0.5 mtrs. The path of earth wire should be out of normal reach of any person, as far as possible.

For high resistivity soils, above 100 Ohm-mtrs., attempts should be made to bring the soil resistivity in the range of 50 to 60 Ohm-mtrs. By digging and treating the soil mass around the earth grid/electrodes with a mixture of salt and charcoal.

In case of rocky top soil and sub-stratum, having very high resistivity, with no scope of improvement by other means, the procedure given below should be followed:

1. At least two bores of diameter little less than 40 mm, with a minimum distance of 10 mtrs. between them, should be made in the ground at suitable locations inside the S/S yard. The boring should be done until soil sub-stratum rich in moisture and low in resistivity is encountered. G.I. pipes of 40 MM dia. should be descended in each bore, such that, the soil mass around the pipes grips them tightly, Back – filling of bores, if required, with wet soil/clay may be done to ensure this condition. The G.I. pipes in these deep bores should be interconnected with the main earthing grid of the S/S through 50x6 mm G.S. flat, with all the joints/connections and terminations being either fully welded, or clamped/bolted and welded simultaneously. The G.I. pipes in the bores should also be interconnected with each other. In extreme cases, the bores may have to be made at remote locations i.e. outside the S/S yard, with inter-connections, through 50x6 MM flats, as explained before.

2. The procedures to be observed stringently for making connections and joints between various elements of the earthing system are as follows:

a. G.S. flat to Structure/flat - The G.S. flat should be welded to the metallic portion (leg) of the structure after thoroughly cleaning the surfaces to be welded. The length of the welding should be at least twice the width of the G.S. flat, e.g.-minimum 100 mm for 50x6 mm G.S. flat. Exactly similar procedure is to be adopted for joints between two G.S. flats.

b. G.I. wire to structure. The G.I. wire should be bolted to the structure after making an eye formation and kept tight with the help of spring and ring washer. Then, the entire arrangement should be welded.

c. G.I. wire to G.S. flat- The G.I. wire should be bolted and then welded to G.S. flat, as explained above.

d. G.I. rod to G.S. flat- The G.I. rod should be securely clamped to the G.S. flat with the help of bolts and washers and the entire arrangement should then be welded.

e. G.I. wire to G.I. pipe – GI wire should be bolted to the G.I. pipe and then welded, keeping in view the relevant precautions, mentioned before.

f. G.I. flat to G.I pipe – The GI flat should be bolted tightly to the G.I. pipe and then the connection should be welded.

Before making connections and joints, it should be ensured that, the elements to be joined have a clean metallic contact surface without any non-conductive coating.

EARTH GRID SYSTEM

Grid system of interconnected conductors forming a closed loop mesh is to be installed using 75x8 mm MS flat for peripheral and branch conductors. Interconnections are made by welding them. This earth grid will be laid at a depth of about 0.5 mtr. bonded to general mass of the earth by 3 mtrs. long earth electrode of solid MS rod (or pipe) of dia 25mm. The G.I. pipe 40 mm. dia 3 mtrs. long in the earthing pits, driven vertically.

It is to this earth grid that the transformer neutral, apparatus, frame work and other non-current carrying metal work associated like transformer tank, switchgear frame etc. are to be connected. All these connections should be made in such a way that reliable and good electrical connection is ensured.

Aluminum/ other paint, enamel, grease and scale should be removed from the point of contact before connections are made. No part of the ground connection leads should be embedded in concrete.

Arrangement of connection of earth connection shall be as follow:

1. STRUCTURES:

Structures including frames, metal supports within the substation grid at least two legs, preferably diagonally opposite (where more than two legs are provided) on each metal structure shall be connected to earth grid with GI wire of 4mm dia or 6 mm dia.

2. ISOLATORS/ SWITCHES:

The operating handle shall be connected to earth grid independent of the structure earthing or through the steel mounting structure, through 4 mm dia G.I. wire.

3. LIGHTNING ARRESTOR:

The bases of lightning arrestors shall be directly connected to the earth electrodes by 4 or 6 SWG G.I. wires as short and as straight as practicable, to ensure minimum impedance. Separate earth leads should be used for L.A. in each phase. In addition there shall be as direct connections as practicable from the earthed side of the lightning arrestors to the frame of the apparatus being protected. Surge counters, could also be inserted in the circuit where lightning incidences are high, but in such cases, the lightning arrestor should be mounted on insulated base. Invariably, earth connections for lightning arrestors should be separate, and in no case should they be joined looped or meshed with other conductors. For lightning arrestors mounted near transformers, earthing connections shall be done with the earthing pits and earthing leads shall be laid clear of the tank and collars in order to avoid possible oil leakage caused by arcing. The earth connection should not pass through iron pipes, as it would increase the reactive impedance of the connection.

4. POWER TRANSFORMER:

- The tank of the transformer shall be directly connected to the main earth grid. In addition there shall be a separate and as direct a connection as practicable from the tank to the earth side of protecting LA using 4 or 6 SWG GI wire.
- The earthing of the neutral shall be by two separate, distinct and direct connections of 50x6 mm GS flat to earth pits, which form a part of the earth grid, and shall be run clear of the tank and collars.
- The transformer track rails shall be connected to earth

5. OUT DOOR VCB:

At least two legs, preferably diagonally opposite of the supporting structure frame work of each circuit breaker unit shall be connected to the earth grid, through 50x6 mm G.S. flats.

6. FENCING:

Fencing and gate should be earthed separately.

7. CURRENT TRANSFORMERS / POTENTIAL TRANSFORMERS:

The bases of the current transformers should be directly connected to the earth grid through 4 or 6 SWG G.I. wires. The base (neural side) of the P.Ts. should be directly connected to the earth grid through 4 or 6 SWG G.I. wires. Separate earth leads should be used for P.Ts. in each phase. The termination of leads on the P.T. neutral should be bolted/clamped and not welded, to facilitate opening of the earth connection for testing purposes. In addition, all bolted cover plates to which bushings are attached, should be connected to the earth grid, both in case of C.Ts. and P.Ts.

8. Armoring of armored metal-sheathed cables within the station grid area shall be connected to the earth grid.

9. Substation L.T. Supply Transformer: Same as above except that the neutral earthing conductor used shall be 4 or 6 SWG G.I. wire.

43 Gi Earthing Pipe

Earthing pipe should be made of 40 mm diameter ISI marked B class GI Pipe. 12 mm dia suitable holes on its circumference shall be made as per approved drawing. The pipe should be in one piece. No joints or welding would be allowed on its length. Clamps made of 50x6mm GI flat duly drilled with 12 mm size holes should be welded at the top end for connection of earth conductor.

Pipe used shall be 40mm NB diameter, ISI marked Galvanized Mild Steel Tubes continuously welded Electric Resistance Welded ERW/High Frequency Induction welded (HFIW)/Hot finished welded (HFW) type, conforming to IS-554-1985 with latest amendment of MEDIUM quality (Class B).

1. MANUFACTURE:

GI earth pipe (40 mm diameter & 3 metre long) shall be made of tubes which shall be made from tested quality steel manufactured by any approved process as follows:

a) Electric Resistance Welded (ERW).
b) High Frequency Induction Welded (HFIW) and
c) Hot finished Welded (HFW).

Tubes made by manual welding are not acceptable.

2. DIMENSIONS:

The dimensions and weights of tubes shall be in accordance with Table-I and Table-II of IS: 1239 (Part-I)/1990 with latest amendments, subject to tolerance permitted therein. Necessary 12 mm diameter holes across the circumference shall be provided as per approved drawing. Drawings shall be approved by the owner before start of the manufacturing work. The tube, earthing pipe shall be provided with 50x6mm GS clamps on one end, one clamp is to be welded with the pipe and another is removable to enable measurement of earth resistance of the pit. Other end of the earth pipe should be cut half in slop to make it a sharp.

3. GALVANIZING:

Tubes shall be galvanized in accordance with IS-4736-1986 with latest amendment for not dip zinc coating of Mild Steel Tubes. The minimum mass of zinc coating on the tubes shall be in accordance with clause 5.1 of IS-4736-1986 (specification for hot dip zinc) and when determined on a 100mm long test piece in accordance with IS: 6745:1972 shall be 400 g/m^2. The zinc coating shall be uniform adherent reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, rust, stains, bulky white deposits and blisters.

4. HYDRAULIC TEST:

(Before applying holes) Each tube shall withstand a test pressure of 5 M Pa maintained for at least 3 seconds without showing defects of any kind. The pressure shall be applied by approved means and maintained sufficiently long for proof and inspection. The testing apparatus shall be fitted with an accurate pressure indicator

5. TEST ON FINISHED TUBES AND SOCKETS:

The following tests shall be conducted by the manufacturer of finished tubes and sockets.

a) The tensile strength of length of strip cut from selected tubes when tested in accordance with IS-1894-1972, (Method for tensile testing of steel tubes), shall be at least 320N/mm^2.

b) The elongation percentage on a gauge length of 5.65/so (where so is the original cross-sectional area of test specimen) shall not be less than 20%.

c) When tested in accordance with IS-2329-1985 (Method for Bend test on Metallic tubes) the finished tube shall be capable of with standing the bend test without showing any sign of fracture or failure. Welded tubes shall be bent with the weld at 90 degree to the plane of bending. The tubes shall not be filled for this test.

d) Galvanized tubes shall be capable of being bent cold without cracking of the steel, through 90 degree round a former having a radius at the bottom of the groove equal to 8 times the outside diameter of tube.

e) Flattening Test on Tubes above 50 mm Nominal Bore: Rings not less than 40 mm in length cut from the ends of selected tubes shall be flattered between parallel plates with the weld, if any, at 90 degree (point of maximum bending) in accordance with IS-2328-1983. No opening should occur by fracture in the weld unless the distance between the plate is less than 75 percent of the original outside diameter of the pipe and no cracks or breaks in the metal elsewhere than in the weld shall occur, unless the distance between the plates is less than 60% of the original outside diameter. The test rings may have the inner and outer edges rounded.

f) GALVANISHING TEST:

- Weight of zinc Coating: For tubes thickness upto 6 mm the minimum weight of zinc coating, when determined on a 100 mm long test piece in accordance with IS-4736-1986 shall be 400 grm/m^2.

- The weight of the coating expressed in gram/m^2 shall be calculated by dividing the total weight of the zinc (inside plus outside) by the total area (inside plus outside) of the coated surface.

- Test specimen for this test shall be cut approximately 100 mm in length from opposite ends of the length of tubes selected for testing. Before cutting the test specimen, 50 mm from both ends of the samples shall be discarded.

g) Free Bore Test: A rod 230mm long and of appropriate diameter shall be passed through relevant nominal bore of the sample tubes to ensure a free bore.

h) Uniformity of Galvanized Coating: The galvanized coating when determined on a 100 mm long test piece [see V (a) (iii)] in accordance with IS-2633-1986 (Method for testing uniformity of coating on zinc coated articles) shall with stand 4 one minute dips.

6. WORKMANSHIP:

The tubes shall be cleanly finished and reasonably free from injurious defects. They shall be reasonably straight, free from cracks, surface flaws, laminations, and other defects, both internally and externally. The screw tubes and sockets shall be clean and well-cut. The ends shall be cut cleanly and square with the axis of tube.

7. MARKING:

The medium class of tubes shall be distinguished by Blue colour bands which shall be applied before the tubes leaves the manufacturers' works. Tubes shall be marked with the standard mark.

44 GS Stay Sets (16 mm AND 20 mm)

1. 16MM DIA STAY SETS (GALVANIZED)

The stay sets (Line Guy set) will consist of the following components:-

a) **ANCHOR ROD WITH ONE WASHER AND NUT**: Overall length of rod should be 1800 mm to be made out of 16 mm dia GS Rod, one end threaded upto 40mm length with a pitch of 5 threads per cm and provided with one square GS washer of size 40x40x1.6mm and one GS hexagonal nut conforming to IS:1367:1967 & IS:1363:1967. Both washer and nut to suit threaded rod of 16mm dia. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality welding.

b) **ANCHOR PLATE SIZE 200x200x6MM**: To be made out of GS plate of 6mm thickness. The anchor plate should have at its centre 18mm dia hole.

c) **TURN BUCKLE & EYE BOLT WITH 2 NUTS**: To be made of 16mm dia GS Rod having an overall length of 450 mm, one end of the rod to be threaded upto 300 mm length with a pitch of 5 threads per cm and provided with two GS Hexagonal nuts of suitable size conforming to IS:1363:1967 & IS:1367:1967. The other end of rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality welding.

d) **BOW WITH WELDED ANGLE**: To be made out of 16mm dia GS rod. The finished bow shall have an overall length of 995mm and height of 450 mm, the apex or top of the bow shall be bent at an angle of 10 R. The other end shall be welded with proper and good quality welding to a GS angle 180mm long having a dimension of 50x50x6mm. The angle shall have 3 holes of 18mm dia each.

e) **THIMBLE**: To be made on 1.5 mm thick GS sheet into a size of 75x22x40mm and shape as per standard shall be supplied.

f) **Galvanizing**: The complete assembly shall be hot dip galvanized.

g) **WELDING:** The minimum strength of welding provided on various components of 16mm dia stay sets shall be 3100 kg. Minimum 6 mm fillet weld or its equivalent weld area should be deposited in all positions of the job i.e. at any point of the weld length. The welding shall be conforming to relevant IS: 823/1964 or its latest amendment. Minimum length of weld to be provided at various places in the stay sets shall be indicated by the bidder. Welding if, found short in lengths as per final approved drawings shall be rejected.

h) **THREADING:** The threads on the Anchor Rod, Eye Bolt & Nuts shall be as per specification IS: 4218:1967 (ISO Metric Screw Threads). The nuts shall be conforming to the requirement of IS: 1367:1967 & have dimensions as per IS; 163:1967. The mechanical property requirement of fasteners shall conform to property clause 4.6 each for anchor rod & Eye bolt and property clause 4 for nuts as per IS: 1367:1967.

AVERAGE WEIGHT OF FINISHED 16MM STAY SETS 7.702 KG. (MINIMUM) (EXCLUDING NUTS THIMBLES AND WASHERS) 8.445 KG. (MAXIMUM)

2. 20 MM DIA STAYS SETS FOR 33KV LINES (GALVANIZED)

THE STAY SET (LINE GUY SET) WILL CONSIST OF THE FOLLOWING COMPONENTS:

a) **ANCHOR ROD WITH ONE WASHER AND NUT**: Overall length of Rod should be 1800mm to be made out of 20mm dia GS Rod, one end threaded upto 40mm length with a pitch of a threads per cm. And provided with one square G.S. Washer of Size 50x50x1.6mm and one GS Hexagonal nut conforming to IS:1367:1967 & IS:1363:1967. Both washer & nut to suit the threaded rod of 20mm. The other end of the rod to be made into a round eye having an inner dia of 40mm with best quality welding. Dimensional and other details are indicated and submitted by bidders for owner's approval before start of manufacturing.

b) **ANCHOR PLATE**: Size 300x300x8mm: To be made out of G.S. Plate of8mm thickness. The anchor plate to have at its centre 22mm dia hole.

c) **TURN BUCKLE, EYE BOLT WITH 2 NUTS:** To be made of 20mm dia G.S. Rod having an overall length of 450 mm. One end of the rod to be threaded upto 300mm length with a pitch of 4 threads per cm. The 20mm dia bolt so made shall be provided with two G.S. Hexagonal nuts of suitable size conforming to IS:1637/1967 & IS:1363/1967.

The other end of the rod shall be rounded into a circular eye of 40mm inner dia with proper and good quality of welding. Welding details are to be indicated by the bidder separately for approval.

d) **BOW WITH WELDED CHANNEL:** To be made out of 16mm dia G.S. Rod. The finished bow shall have and overall length of 995 mm ad height of 450 mm. The apex or top of the bow shall be bent at an angle of 10R. The other end shall be welded with proper and good quality welding to a G.S. Channel 200mm long having a dimension of 100x50x4.7 mm. The Channel shall have 2 holes of 18 mm dia and 22 dia hole at its centre.

e) **THIMBLE 2 Nos.**: To be made of 1.5mm thick G.S. sheet into a size of 75x22x40mm and shape as per standard.

f) **GALVANISING**: The complete assembly shall be hot dip galvanised.

g) **WELDING**: The minimum strength of welding provided on various components of 20mm dia stay sets shall be 4900 kg. Minimum 6mm filet weld or its equivalent weld area should be deposited in all positions of the job i.e. at any point of the weld length. The welding shall be conforming to relevant IS: 823/1964 or its latest amendment.

h) **THREADING:** The threads on the Anchor Rods, Eye Bolts and Nuts shall be as per specification IS: 4218:1967 (ISO Metric Screw Threads). The Nuts shall be conforming to the requirements of IS: 1367:1967 and have dimension as per IS 1363:1967. The mechanical property requirement of fasteners shall confirm to the properly clause 4.6 each for anchor rods and Eye bolt and property clause 4 for nuts as per IS: 1367:1967.

AVERAGE WEIGHT OF FINISHED 20MM STAYS SET: 14.523 KG. (MIN.) (EXCLUDING NUTS THIMBLE & WASHER): 15.569 KG. (MAX.)

3. **TEST CERTIFICATE**: The contractor shall be required to conduct testing of materials at Govt./Recognized testing laboratory during pre – dispatch inspection for Tensile Load of 3100 Kg/4900 Kg. applied for one minute on the welding & maintained for one minute for 16 mm and 20 mm dia stay sets respectively.

4. **IDENTIFICATION MARK**: All stay sets should carry the identification mark of word DDUGJY and size of the stay set. This should be engraved on the stay plate and on stay rods to ensure proper identification of the materials.

The nuts should be of a size compatible with threaded portion of rods and there should be no play or slippage of nuts.

Welding wherever required should be perfect and should not give way after erection.

5. **TOLERANCES:** The tolerances for various components of the stay sets are indicated below subject to the condition that the average weight of finished stay sets of 16mm dia excluding nuts, thimbles and washers shall not be less than the weight specified above :-

No. Item	Section Tolerances	Fabrication Tolerances	Material
1 Anchor Plate	6mm thick + 12.5% - 5%	200x200mm + 1%	GS plate 6mm thick
	8mm thick + 12.5% - 5%	300x300mm + 1%	GS plate 8mm thick
2 Anchor Rod	16mm dia + 5%- 3%	Length 1800mm + 0.5%	GS Round 16mm dia
		Rounded Eye 40 mm inside dia + 3%. Threading 40mm+11% - 5	GS Round 16mm dia
	20mm dia + 3%- 2%	Length 1800mm + 0.5%	GS Round 20mm dia
		Round Eye 40mm inside dia + 3%. Threading 40mm +11% -5%	GS Found 20mm dia
3 Turn Buckle Bow	16 mm dia + 5%- 3%	Length 995mm + 1% 16mm dia	GS Round 16mm dia
		Length 180mm + 1% 50x50x6mm	GS Angle
		Channel length 200mm + 1%	GS Channel 100x50x4.7mm
4 Eye Bolt Rod	16mm dia +	Length 450mm + 1%	GS Round

	5%- 3%	Threading 300mm + 1% Round Eye 40mm inside dia + 3%	16mm dia
	20mm dia + 3%- 2%	Length 450mm + 1% Threading 300mm + 1% Round Eye 40mm inside dia + 3%	GS Round 20mm dia

45 GI Stay Wires

1. SCOPE

This Specification covers details of G.I. stranded stay wires for use in rural distribution system.

2. APPLICABLE STANDARDS

Except when they conflict with the specific requirements of this specification, the G.I. Stranded Wires shall comply with the specific requirements of IS:2141-1979. IS:4826-1979 & IS:6594-1974 or the latest versions thereof.

3. APPLICATION AND SIZES

3.1 The G.I. stranded wires covered in this Specification are intended for use on the overhead power line poles, distribution transformer structures etc.

3.2 The G.I. stranded wires shall be of 7/2.5mm, 7/3.15mm and 7/4.0mm standard sizes.

4. MATERIAL

The wires shall be drawn from steel made by the open hearth basic oxygen or electric furnace process and of such quality that when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as specified in this specification. The wires shall not contain sulphur and phosphorus exceeding 0.060% each.

5. TENSILE GRADE

The wires shall be of tensile grade 4, having minimum tensile strength of 700 N/mm2 conforming to IS:2141.

6. GENERAL REQUIREMENTS

6.1 The outer wire of strands shall have a right-hand lay.

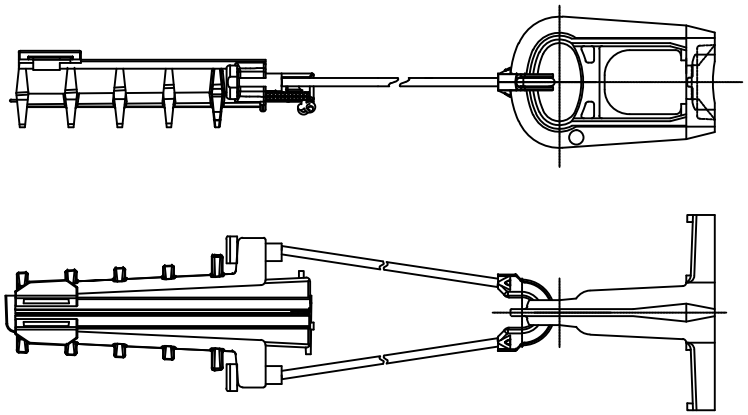
6.2 The lay length of wire strands shall be 12 to 18 times the strand diameter.

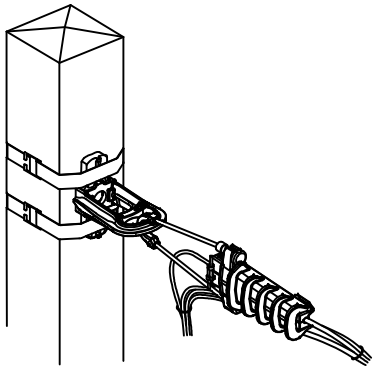
7. MINIMUM BREAKING LOAD

The minimum breaking load of the wires before and after stranding shall be as follows :

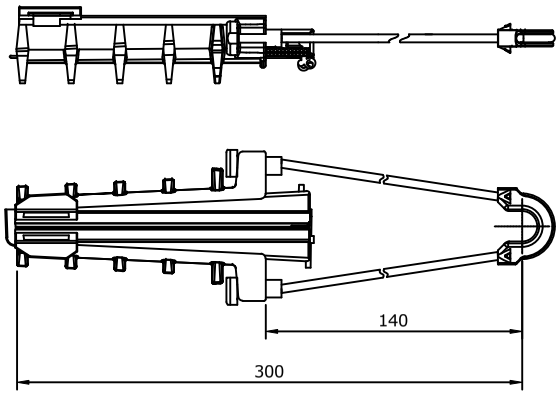
No. of wires & const.	Wire dia (mm)	Min. breaking load of Single wire before stranding (KN)	Min. breaking load of the standard wire (KN)
7(6/1)	2.5	3.44	22.86
7(6/1)	3.15	5.45	36.26
7(6/1)	4.0	8.79	58.45

ANCHORING ASSEMBLY :-





ANCHORING (DEAD-END) CLAMP :-



SPECIFICATION :- AS PER NF C33-041

Messenger Type	Cable Range (mm^2)		Miniumum Breaking Load (KN)
	Min	Max	
INSULATED/BARE	25	50	10

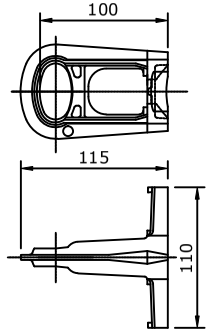
BRACKET :-

NOTE :-

MATERIAL: ALUMINIUM ALLOY

SPECIFICATION :- AS PER NF C33-041

Miniumum Breaking Load (KN)
15



FOR TENDER PURPOSE ONLY

Rural Electrification Corporation Ltd.

PROJECT:

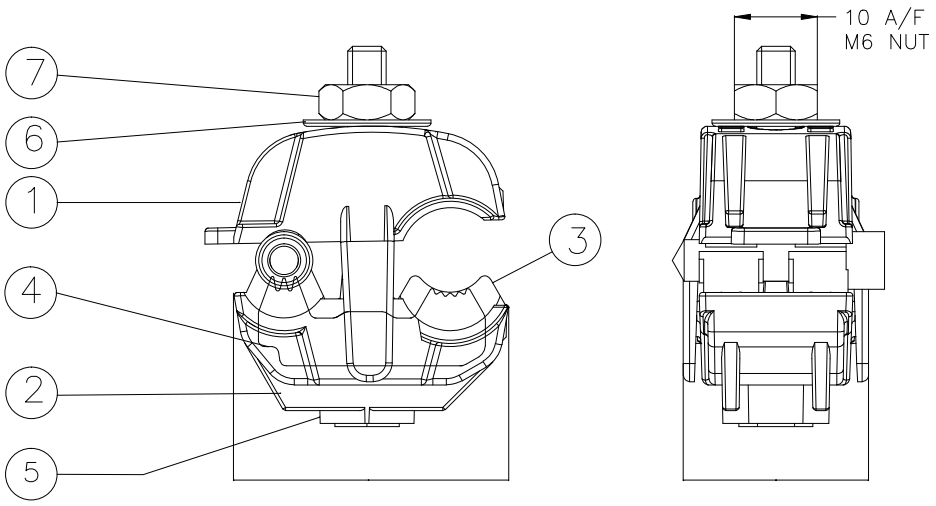
Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE

ANCHORING ASSEMBLY (Cable Range-25-50 sq. mm)

REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT
R0					

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A4	1:100	REC/DDUGJY/LT-ACC-ABC/03A	1 OF 1	0



CABLE RANGE:

SUITABLE FOR 10 TO 95 SQ.MM MAIN (Bare/Insulated) & 1.5 TO 10 SQ.MM TAP(Bare/Insulated)

WEIGHT: "W" Grams (Approx)

RATED TIGHTENING TORQUE: "X" Nm

REP	QTY	DESCRIPITION	MATERIAL
7	1	NUT M6	STEEL
6	1	WASHER	STEEL
5	1	SCREW	STEEL
4	2	BLADE	AL ALLOY
3	1	SEAL	T.P.ELASTOMER
2	1	LOWER BODY	THERMO PLASTIC - BLACK
1	1	UPPER BODY	THERMO PLASTIC - BLACK

FOR TENDER PURPOSE ONLY

Rural Electrification Corporation Ltd.

PROJECT:
Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

TITLE
EARTHING CONNECTOR

REV. NO.	PREPARED	CHECKED	APPROVED	DATE	PROJECT
R0					

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
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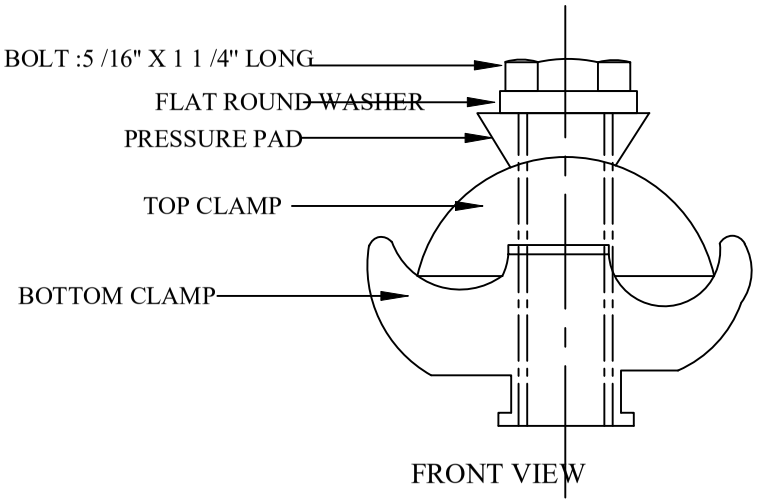
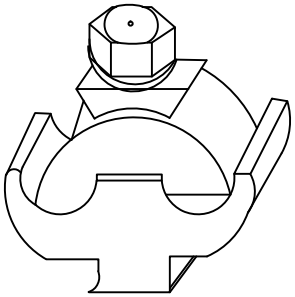
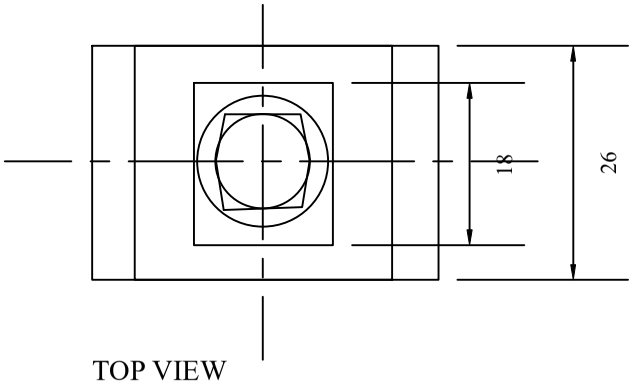


FRONT VIEW



ISOMETRIC VIEW



TOP VIEW

SUITABLE FOR 2.5 mm^2 TO 50 mm^2 CONDUCTOR

All dimensions are in mm.

FOR TENDER PURPOSE ONLY

material of clamp body : extruded aluminium alloy
fginish:natural & degreased
material of bolt & washer : Mild steel
finish: electro-zinc plated
tolerance :± 5% for all dimensions.

REV. NO.	PREPARED BY	CHECKED BY	APPROVED BY	DATE	PROJECT
R0					

Rural Electrification Corporation Ltd.

PROJECT: Deen Dayal Upadhyaya Gram Jyoti Yojana(DDUGJY)

TITLE: EARTHING CONNECTOR

SIZE	SCALE	DRG. NO.	SHT. NO.	REV. NO.
A3	NTS	REC/DDUGJY/LT-ACC-ABC/06B	1 OF 1	0