



PUNJAB NATIONAL BANK

TENDER DOCUMENT

TECHNICAL BID (PART-A)

NAME OF WORK: Interior Furnishing and Electrical works at Punjab National Bank, Nawada, Dist-Nawada- 805110.

Contact Person

**Ranjeet Kumar
Senior Manager (GAD)
Circle Office, Punjab National Bank,
Ramchandrapur, Machhli Market,
Biharsharif (Nalanda)
Mob: 9264499005
Email: coptbgad@pnb.co.in**

ARCHITECT

M/S ARTCON DESIGN CONSULTANTS

**G-4, Laxami Palace, Mitra Compound,
Boaring Road, Patna-800001
Mob: 09386717726, 9931723771
E-mail: amitkumar73@gmail.com**

**Interior Furnishing and Electrical works at Punjab National Bank, Nawada,
Dist- Nawada (Bihar) Pin 805110.**

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1. BID DETAILS

1.	Tender Reference	PNB/GAD/CO BHR /NWD/2021-22/1
2.	Date of commencement of Tender download	10.08.2021 from 1301hrs
3.	Last date and time of acceptance of queries	14.08.2021 till 1700 hrs

4.	Last date and time for downloading tender	18.08.2021 up to 1100 hrs
5.	Bid preparation and Hash Submission	18.08.2021 up to 1100 hrs
6.	Close for Technical and Commercial Bid	18.08.2021 from 1101hrs to 1300 hrs
7.	Last Date for Bid Submission and re-encryption	20.08.2021 till 1400 hrs
8.	EMD & Technical Bid opening	20.08.2021 from 1401 hrs
9.	Cost of Tender Document	Rs. 2,360/- (non-refundable i/c GST @18%) in the form of Demand Draft Punjab National Bank payable at Biharsharif.
10.	Earnest Money Deposit Amount	Nil
11.	Estimated Cost of Project	Rs.2781143/- incl. of all taxes and GST (Rs. Twenty seven lakh eighty one thousand one hundred forty three only)
12.	Place of opening of Bids	Deputy Circle Head, Circle Office, Punjab National Bank, Ramchandrapur, Machhli Market, Biharsharif, Nalanda 803101
13.	Contact Person	Ranjeet Kumar Senior Manager (GAD) Circle Office, PNB Ramchandrapur, Machhli Market, Biharsharif (Nalanda) Mob: 9264499005 Email: coptbgad@pnb.co.in

Bank will be following the e-procurement process. The complete details of the requirements for participation in the e-procurement process of the Bank are available on the website <https://etender.pnbnet.in> which may be referred for details & clarification. It is mandatory for the bidder to get itself registered on Bank's website for submission of online bids.

Note: - Technical bids will be opened in the presence of bidders who choose to attend as above. The above schedule is subject to change. Notice of any changes will be published on Bank's website (www.pnbindia.in or <https://etender.pnbnet.in>) wherever feasible. Further, please note that commercial bid opening date and time will be intimated to the technically qualified bidders at a later date.

2. PURPOSE OF TENDER

Bank intends to take up Interior Furnishing and Electrical works at PNB Nawada, Dist-Nawada, Pin 805110 as per details given in schedule of quantities/tender documents.

3. ELIGIBILITY CRITERIA

1. The Bidder should possess the requisite experience, resources and capabilities in providing the services necessary to meet the requirements, as described herein. The Bidder should also possess the technical know-how and the financial wherewithal that would be required to complete the scope of work. The Bid must be complete in all respects and should cover the entire scope of work as stipulated in the tender

document. Bidders not meeting the Eligibility Criteria will not be considered for further evaluation and bid submitted by them shall be summarily rejected.

2. This invitation of bids is open to all experienced contractors, reputed firms (proprietary/partnership), company / organization registered in India under Companies Act, provided they fulfil the minimum eligibility criteria as below. Consortium/Joint Ventures and Special Purpose Vehicles are not eligible for the tender and the bid, if any, submitted by them shall be summarily rejected. Proposals not complying with minimum eligibility criteria, as enumerated below, will be rejected and will not be considered for evaluation of technical bid. The proposal should adhere to the following minimum eligibility criteria:

S. No	Minimum Eligibility Criteria
1	<p>The Bidder should have satisfactorily completed similar works during last 7 (seven) years ending last day of the month of June 2021 with Central/State Government Department/Central Autonomous Body/Central Public Sector Undertaking/City Development Authority/Municipal Corporation of City formed under any Act by Central/State Government and published in Central/State Gazette/ Scheduled Commercial Banks or its subsidiaries/ Reputed Private organizations should be either of the following :-</p> <ol style="list-style-type: none"> 1. One similar nature work amounting to Rs. 22.25 lakhs <li style="text-align: center;">Or 2. Two similar nature work amounting to Rs. 16.67 Lakhs <li style="text-align: center;">3. 4. Three similar nature work amounting to Rs. 13.90 Lakhs <p>Similar work means '<u>Interior Furnishing & Electrical works</u> ' all composite executed under one agreement. Cumulative works executed under rate contract shall not be treated as one work.</p> <p>Components of work executed other than those included in definition of similar shall be deducted while calculating cost of similar work. Bidder shall submit abstract/break up certified by Client or Work order & Completion Certificate along with certified/verified final bill of cost of work in support of Similar Work. In case of non-receipt of complete information Bank may reject the bid or it may seek the information from client departments by email/telephone for that bidder should not have any objection. The decision of Bank in this regard is final.</p> <p>Certificates of satisfactory completion of similar work should be issued by an Authority not below the rank of Executive Engineer/Chief Manager/Incumbent of client department/branch and to be uploaded on Bank's website along with supporting documents.</p> <p>In case the similar work/s is of private nature other than Central/State Government/Central Autonomous Body/Central Public Sector undertaking/City Development Authority/ Municipal Corporation of city, they shall be required to submit T.D.S. certificates for such works issued by respective Clients.</p> <p>The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple interest of 7% per annum, calculated from the date of completion to the last date of receipt of application for tender.</p>

2	The minimum average annual turnover of Bidder for the last three financial years i.e. 2017-18, 2018-19,2019-20 must not be less than Rs.7.5 Lakhs . Bidder to upload/enclose audited Balance sheet, Profit & Loss statement and trading account details for these financial years, if applicable. The multiplication factor of 7% per annum simple interest is not applicable on the Annual Financial Turnover figures.
3	The bidder should not have been black-listed/ barred by any Public Sector Bank, RBI or IBA or any other Government/PSU agencies during last five years. An undertaking in this regard is to be submitted to Bank by Bidder on Rs.100/- Stamp Paper. Bank has right to verify the same from concerned authorities/agencies.
4	The contractor (Proprietor / Partner) should submit a valid Bihar Electrical Licensing Board Class –A license.
5	The contractor must have valid GST registration, PAN.

** In case, the company/bidder does not have the audited Balance Sheet for period ending March 2021, provisional balance sheet certified by their Statutory Auditors will be acceptable. In case if any bidder does not have presence in 2017-18, in that case they can submit statements for the 2018-19, 2019-20 & 2020-21 (Provisional/Auditor Certified). If any bidder meeting the eligibility criteria for last two years

Note: The bidder must submit the Compliance Statement failing which the bids may not be taken for further evaluation.

3. Bidder must submit documentary evidence in respect of all above mentioned criteria while submitting the proposal. Proposal of bidder who do not fulfil the above criteria or who fail to submit documentary evidence thereon would be rejected.
4. Bidder has to upload scanned and legible copies of all supporting documents on Bank's e-procurement website <https://etender.pnbnet.in> for its scrutiny.
5. The Bank reserves the right to request for any additional information by giving a time as decided by Bank and also reserves the right to reject or accept the bid of a bidder, if in the opinion of Bank the qualification data is incomplete or the bidder is found not qualified to satisfactorily execute the requirements of the project and no communication shall be entertained in this regard in future.
5. Eligible similar work(s) has/have not been got executed by bidder through another contractor on back to back basis. Further that, if such a violation comes to the notice of the Bank, then I/we shall be debarred for bidding in PNB in future forever. Also, if such violation comes to the notice of the Bank before date of start of work, the Bank shall be at liberty to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee."

NOTICE INVITING TENDER

Online tenders are invited on item rate basis on behalf of Punjab National Bank from experienced contractors, reputed firms (proprietary/partnership)/company/ organization registered in India under Companies Act, who fulfil the eligibility criteria mentioned in the tender documents for **Interior Furnishing and Electrical works at Nawada, Dist-Nawada (Bihar) Pin 805110**. against Payment of Rs. 2360/- (non-refundable towards cost of tender and i/c GST @ 18%), in two envelope system containing (1) Technical Bid (2) Commercial bid. Tender purchase fee of Rs. 2360/- may be submitted in form of demand draft in a separate envelope with EMD. **Commercial bid shall be submitted online only.**

1. The Bidders intending to participate in this tender are required to get enrolled on the Bank's website i.e. <https://etender.pnbnet.in> Enrolment on the above mentioned website is mandatory.
2. As the bids of the Bidders have to be digitally signed by the Electronic/Digital Signature of the respective Bidder before submitting the bids online, the bidders are advised to obtain Electronic/Digital Signature Certificates (**Signing and Encryption**) in order to bid for the tender.
3. The Tender Documents containing detailed terms & conditions can be downloaded online directly from the portal <https://etender.pnbnet.in> (or pnbndia.in) as per tender schedule attached and shall be submitted online on <https://etender.pnbnet.in>.
4. All the bidders are required to submit Demand Draft in favour of Punjab National Bank, Bihar Sharif of Rs. 2,360/- towards the cost of tender document by 09.08.2021 till 1400 hrs, failing which, the bids shall be summarily rejected
5. Bidders may submit their queries regarding any technical clarification before 04.08.2021 up to 1700 Hrs. No queries shall be entertained after last date fixed for acceptance of queries.
6. Standardized documents may be downloaded from the "Corrigendum / Addendums" section of the above-mentioned portal up to 1000 Hrs on 09.08.2021 after clarification on queries. No deviation on the above will be entertained by the Bank there after.
7. Based on the clarification of conditions by the Bank, the intending bidder will submit their unconditional acceptance on the prescribed format along with tender document.
8. Price bid of only those bidders shall be opened who bring their tender in line with requirements of tender documents and are acceptable to the Bank and the bidder who do not submit the EMD in the form of Bank draft, their tenders will be summarily rejected.
9. The price bid of technically eligible bidder who meets the eligibility criteria stipulated in tender documents will be opened online in the presence of participated or representatives of participated bidders as per the schedule attached. Date for opening of commercial bids will be intimated later.
10. The Tenders shall be valid for a period of not less than 90 days after the date of opening of price bid/commercial bid online.

11. All disputes arising out of or in connection with this agreement shall deem to have arisen in Biharsharif and only the courts of Biharsharif shall have the jurisdiction to determine the same.
 - Last date for downloading the tender document (as per tender schedule).
 - Last date for Bid Preparation and Hash Submission (as per tender schedule).
 - Last date for submission of bids on line and re-encryption (as per tender schedule).
12. Please note that bid preparation and hash submission and bid submission are compulsory activities, failing which bidder will not be able to submit the bids online.
13. For any further information/Queries please contact Circle Office, Punjab National Bank, Circle office, Ramchandrapur, Machhli Market, Biharsharif, Nalanda, e-mail: coptbgad@pnb.co.in.
14. The Bank reserves the right to accept/reject any or all the offers submitted in response to this advertisement without assigning any reason whatsoever.
15. The Bank will not be bound to accept the lowest tender and reserves the right to accept or reject any or all the tenders without assigning any reasons whatsoever.
16. Please note that, on tendering procedure through the electronic tendering system refer to the Instructions for Using the Electronic Tendering System document available along with the tender documents on <https://etender.pnbnet.in>.
17. Firms registered under MSEs would be exempted from submission of Tender fee/cost and from payment of earnest money. Firms recognized as Startups by Department of Industrial Policy & Promotion (DIPP) are exempted from submitting Earnest Money Deposit (EMD). (An entity shall be considered as a startup up to 10 years from the date of its incorporation.)

Deputy Circle Head

6. LETTER SUBMITTING TENDER

**Deputy Circle Head
Circle Office, Punjab National Bank,
Machhli Market, Ramchandrapur
Biharsharif, Nalanda
Bihar-803101**

Dear Sir,

**Reg: Interior Furnishing and Electrical works at Punjab National Bank, Nawda,
Dist-Nawada**

1. Having visited the site and examined the drawings, conditions of contract, special conditions of contract, general specifications and detailed specifications, schedules and bill of quantities for the execution of the above named works, we offer to complete and maintain the whole of the said works in conformity with the said drawings, conditions of contract, specifications, schedules and bill of quantities for the sum stated in bill of quantities of this Tender Document or such other sum as may be ascertained in accordance with the said conditions of contract.
2. We undertake to complete and deliver the whole of the works comprised in the contract within the time stated in the appendix hereto.
3. We have independently considered the amount of liquidated damages shown in the Appendix to form of tender hereto and agree that it represents a fair estimate of the loss likely to be suffered, by you in the event of the works not being completed in time.
4. We agree to abide by this tender for the period of 90 days from opening of Price Bid/Commercial Bid or extension there of as required by the Bank from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiry of that period.
5. We confirm that the period and rates as referred in the agreement or general conditions of contract are given or summarized in the appendix hereto, to which we give our consent and agree to abide by the same.
6. We understand that if our tender is accepted, we are to be jointly and severally responsible for the due performance of the contract.
7. We understand that you are not bound to accept the lowest or any tender you may receive and may reject all or any tender, accept or entrust the entire work to the Contractor without assigning any reason or giving any explanation whatsoever.

Dated this day of _____ 2021.

Signature _____ in the capacity of _____ duly authorized to sign

tenders for and on behalf of _____ .
(IN CAPITALS)

Tender submitted on _____ before _____ P.M.

6. LETTER OF TRANSMITTAL

Deputy Circle Head
Circle Office, Punjab National Bank,
Ramchandrapur, Machhli Market,
Biharsharif , Nalanda,803101

Reg: Interior Furnishing and Electrical works Nawada, Dist- Nawada

Having examined the details given in bank website and tender document for the above work, I/we hereby submit the relevant information.

1. I/We here by certify that all the statement made and information supplied in the enclosed forms A to C and accompanying statement are true and correct.
2. I/We have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
3. I/We submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works: -

S No	Name of the Work	Value of Work	Date of Completion	Certificate issued by

“Certify that the information given in the enclosed tender documents is correct. It is also certified that I/we shall be liable to be debarred, disqualified / cancellation of bid in case any information furnished by me/us found to be incorrect.”

Enclosures:

Date of submission

SIGNATURE(S) OF APPLICANT(S)
Seal of applicant

7. APPENDIX TO FORM OF TENDER

1	Defects Liability period	12 Months
2	Date of Commencement	Date of start of work shall be reckoned from within 7 days of issue of award letter.
3	Time of completion	45 days from the date of commencement of work.
4	Period of Final Measurements	1 (One) months from the Date of Virtual Completion (Clause No.34 of GCC)
5	Liquidated Damages	1.0% of the contract amount shown in the tender per week subject to the ceiling of 10.0% of the accepted contracted sum (Clause No.16.4 of GCC)
6	Minimum Value of work for Interim Certificate	13.90 Lacs (This value shall be difference of work done of consecutive bills).
7	Retention Percentage	8% of the gross value of each interim bill with maximum of balance amount of the Total Security Deposit (Clause No.14 of GCC)
8	Period of Honouring Certificate	15 days from date of receipt of certificate from the Site Engineer/Architect

8. BIDDERS INFORMATION

1. Name
2. Constitution
3. Address
4. Names & Addresses of the Partners, if applicable
5. Name of Contact Person(s) with their Mobile Numbers
6. Office Telephone, Fax, e-mail
7. PAN No.
8. GST No.
9. Manpower Employed.

9. ARTICLES OF AGREEMENT

AGREEMENT

This agreement is made at Biharsharif on day of 2021 between Punjab National Bank, a body corporate constituted under the Banking Companies (Acquisition and transfer of Undertaking Act) 1970 having its Head office at Plot No. 4, Sector 10, Dwarka, New Delhi – 110075 and its General Administration Division (Hereinafter referred to as "The Bank ") of the one part & (Herein after called "the tenderer") of the other part.

Whereas the Bank has floated tender documents inviting tenders from eligible firms/agencies/companies for the job of Interior Furnishing and Electrical works at **Punjab National Bank, Nawada, Dist-Nawada (Bihar) Pin-805110** .

WHEREAS the Bank is desirous of executing work of Interior Furnishing and Electrical works at **Punjab National Bank, Nawada, Dist-Nawada(Bihar) Pin-805110** and has by letter of acceptance dated.....accepted a tender by the Contractor for Interior Furnishing and Electrical works at **Punjab National Bank, Nawada, Dist-Nawada(Bihar) Pin-805110**. After discussion, the Bank and the bidder agree to enter into this agreement on the terms and condition set out hereunder:

NOW THIS AGREEMENT WITNESSES AS FOLLOWS:

1. In this agreement words and expressions shall have the same meaning as are respectively assigned to them in the said conditions of contract hereinafter referred to :
2. The following documents, terms and conditions contained therein shall form and construe as integral part and parcel of this agreement and be read as part and parcel of this agreement, viz.
 - a. Original tender document.
 - b. Relevant correspondence all letter/ correspondence forming parts of contract and referred to in acceptance letter.
 - c. Acceptance letter
 - d. Bill of quantities.
 - e. Other additional documents as required.
3. The aforesaid documents shall be taken as complementary and mutually explanatory of one another, but in the case of ambiguities of discrepancies the latest documents issued by the Bank shall prevail over the earlier documents.
4. In consideration of payment to be made by the Bank to the successful bidder as hereinafter mentioned, the successful bidder hereby covenants with the Bank to perform execute, complete and maintain the work in due respects and in conformity with the provision of the contract and tender documents.
5. The Bank hereby covenants to pay the Bidder in consideration of the execution, completion of the work such sums as shall become payable hereunder at the time(s) and in the manner prescribed in the said conditions and price schedule of quantities / bill of quantities prescribed in the contract.
6. All disputes or differences whatsoever arising between the parties shall be settled amicably. If parties are not able to solve amicably, the same shall be settled by arbitration in accordance with Arbitration and Conciliation Act 1996. Venue of arbitration shall be at Biharsharif.

SIGNED AND SEALED AND DELIVERED BY THE

Said

Said

(Name)

(Name)

on behalf of the Contractor

on behalf of the Bank

In the presence of

In the presence of

Name:

Name

Address:

Address:

This form is included in the tender documents only for the information of the bidders. Only the successful bidder will be in due course, required to complete the form.

9. GENERAL CONDITIONS OF CONTRACT (GCC)

Except where provided for in the description of the individual items in the Schedule of quantities and in the specification and conditions laid down herein after and in the drawings, the work shall be carried as per standard specifications and under the directions of the Bank.

1. INTERPRETATION

In construing these conditions, the specifications, the schedule of quantities, tender and agreement, the following words shall have the meaning herein assigned to them except where the subject of context otherwise requires:

- i. Employer: The term employer shall denote Punjab National Bank with their Head Office at Plot 4, Sector 10, Dwarka, New Delhi, and any of its employees or representative authorized to act on their behalf.
- ii. The Bank: The term Bank shall mean Punjab National Bank, the Employer.
- iii. The Engineer in charge: The term means Engineer/Officer of the Bank deployed to look after the work.
- iv. Contractor: The term Contractor shall mean M/S -----(name and address of the Contractor) and his/their heirs, legal representatives assigns and successors.
- v. Site: The site shall mean the site where the works are to be executed as shown within boundary on the Site Plan including any building and erections thereon allotted by the employer for the Contractor's use.
- vi. Site Engineer: The Site Engineer/Officer shall be appointed by the Bank. The Bank may also determine the number of Site Engineers and the supporting staff at site office- to assist them and also whether the Site Engineer shall be temporary or permanent. As far as possible, the Site Engineer should assume charge of his post before-the contractor reports onsite of work. Where more than one Site Engineer is appointed, one of them shall be designated as Senior Site Engineer by the Premises Department and the other Site Engineer shall be reporting to the Senior Site Engineer.
- vii. Specifications and Drawings: The work is to be carried out in accordance with drawings, specifications, the schedule of quantities and any further drawings, which may be supplied, or any other instruction, which may be given by the employer during the execution of the work.
- viii. Drawings relating to work given to the Contractor together with a copy of schedule of quantities are to be kept at site and Employer shall be given access to such drawings or schedule of quantities whenever necessary.

In case any detailed drawings are necessary, Contractor shall prepare such detailed drawings and/or dimensional sketches therefore and have it confirmed by the employer prior to taking up such work.
- ix. The Contractor shall ask in writing for all clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at least 10 days ahead from the time when it is required for implementations so that the Employer may be able to give decision thereon.
- x. "The Work" shall mean the work or works to be executed or done under this contract.

- xi. "Act of Insolvency" shall mean any act as such as defined by the Presidency Towns Insolvency Act or Provincial Insolvency Act or any Amending Statutes.
- xii. "The Schedule Of Quantities" shall mean the schedule of quantities as specified and forming part of this contract.
- xiii. Order of precedence for any ambiguity in the schedule of quantities, general conditions, special conditions, specifications and drawings for the Contractor shall be as per the decision of the Employer and the same will be binding on the Contractor, and shall be read as under in the decreasing order of importance.
 - a) Schedule of Quantities.
 - b) Drawings.
 - c) Special Conditions
 - d) General Conditions.
 - e) Standard (Technical) Specifications of Contract.
 - f) C.P.W.D specifications.
 - g) Bureau of Indian Standards specifications.
 - h) State P.W.D./General Engineering Practice.
 - i) Integrity Pact.

xiv. "Consultant Architect" means M/s ARTCON DESIGN CONSULTANTS

Any ambiguity observed shall be brought to the notice of Employer and be executed after obtaining approval from the Employer. In case of any ambiguity between the above, the most stringent will follow.

2. SCOPE OF WORK

The work consists of Interior Furnishing and Electrical works at **Punjab National Bank, Nawada, Dist-Nawada(Bihar) Pin-805110** in accordance with the " and Schedule of Quantities". The Interior Furnishing & Internal Electrical work etc, are within the scope of this tender. It includes furnishing all materials, labour, tools and equipment and management necessary for and incidental to and completion of the work. All work, during its progress and upon completion, shall conform to the lines, elevations and grades as shown on the drawings furnished by the Employer. Should any detail essential for efficient completion of the work be omitted from the drawings and specifications it shall be the responsibility of the contractor to inform the Employer and to furnish and install such detail with Employer's concurrence, so that upon completion of the proposed work the same will be acceptable and ready for use.

Employer or his representative may in their absolute discretion issue further drawings and/or written instructions, details, directions and explanations, which are, hereafter collectively referred to as "The Employer's instructions" in regard to :

- a) The variation or modification of the design quality or quantity of works or the addition or omission or substitution of any work.
- b) Any discrepancy in the drawings or between the schedule of quantities and/or drawings and/or specification.
- c) The removal from the site of any defective material brought thereon by the contractor and the substitution of any other material thereof.
- d) The demolition removal and/or re-execution. of any work executed by the contractors.
- e) The dismissal from the work of any persons employed there upon.

- f) The opening up for inspection of any work covered up.
- g) The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (retention period).

The contractor shall forthwith comply with and duly execute any work comprised in such Employer's or his representative's instructions, provided always that verbal instructions, Directions and explanations given to the contractor's or his representative upon the works by the Employer or his representative shall, if involving a variation, be confirmed in writing to the contractor/s within seven days. No works for which rates are not specifically mentioned in the priced schedule of quantities shall be taken up without written permission of the Employer or his representatives. Rates of items not mentioned in the priced schedule of quantities shall be fixed by the Employer as provided in Clause "variation".

Regarding all factory-made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work unless otherwise specifically requested by Bank.

3. VISIT OF SITE

Intending Bidder shall visit the site and make himself thoroughly acquainted with the local site conditions, nature and requirements of the works, facilities of transport conditions, effective labour and materials, accesses and storage for materials and removal of rubbish. The Bidder shall provide in their tender for cost of carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc. for proper execution of work as indicated in drawings. The successful Bidder will not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site conditions which existed before the commencement of the work or which in the opinion of the Employer might be deemed to have reasonably been inferred to be so existing before commencement of work.

4. TENDERS

The e-tender should be submitted by bidder duly priced and also digitally signed.

The schedule of quantities shall be filled in as follows:

- i. The rates column to be filled.
- ii. The employer reserves the right to reject the lowest or any tender.

The Bank reserves the right to accept the tender in full or in part and the bidder shall have no claim for revision of rate or other conditions if his tender is accepted in parts.

The bidders should note that the tender is strictly on item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct workable and self-supporting. If called upon by the employer detailed analysis of any or all the rates shall be submitted by the Contractor. The employer shall not be bound to recognize the contractor's analysis.

The works will be paid for as "measured work" on the basis of actual work done and not as "lump sum" contract.

All items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the case of lump sum charges in the tender in respect of any item of works, the payment of such items

of work will be made for the actual work done on the basis of lump sum charges as will be assessed to be payable by the Employer.

The employer has power to add to, omit from any works as shown in drawings or described in specifications or included in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the Contractor without authorisation from the Employer, such variation by the Bank shall not vitiate the contract.

The bidder shall note that his tender shall remain open for consideration for a period of 90 days from the date of opening of the tender (Price Bid).

5. AGREEMENT

The successful Contractor may be required to sign agreement as may be drawn up to suit local conditions and shall pay for all stamps and legal expenses, incidental thereto.

6. AMENDMENT OF BIDDING DOCUMENTS

At any time prior to the last Date and Time for submission of bids, the Bank may, for any reason, modify the Bidding Documents through amendments at the sole discretion of the Bank. All amendments shall be uploaded on the Bank's website/s (<https://etender.pnbnet.in>) and will be binding on all who are interested in bidding.

In order to provide prospective Bidders a reasonable time to take the amendment if any, into account in preparing their bid, the Bank may, at its discretion, extend the deadline for submission of bids.

7. CONTACTING THE BANK

Any effort by a bidder to influence the Bank in evaluation of the bid, bid comparison or contract award decision may result in the rejection of the Bidders' bid. Bank's decision will be final and without prejudice and will be binding on all parties.

8. CLARIFICATIONS OF BIDS

To assist in the examination, evaluation and comparison of bids the Bank may, at its discretion, ask the bidder for clarification. The response should be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

9. GOVERNMENT AND LOCAL RULES

The Contractor shall confirm to the provisions of all local Bye-laws and acts relating to the work and to the regulations etc. of the Government and local authorities and of any company with whose system the structure is proposed to be connected. The Contractor shall give all notices required by said act, rules, regulations and Bye-laws etc. and pay all fees payable to such authorities for execution of the work involved. The cost if any shall be deemed to have been included in his quoted rates, taking into account all liabilities for licenses etc. He shall indemnify the employer against such liabilities and shall defend all actions arising from such claims or liabilities.

10. TAXES AND DUTIES

The bidders must include in their tender prices quoted for all duties, royalties, cesses, labour cess, GST or any other taxes or local charges, as applicable. TDS shall be deducted at source and the certificate in respect of TDS shall be issued by the Bank as per rule. Any variation in taxes and duties and/or imposing any new taxes and duties during currency of

contract or extended period shall be borne by the bidder. No claim whatsoever on this account shall be entertained.

11. PROVISIONAL SUM (P.S.)

All provisional sums described in the schedule of quantities as P.S. shall be exclusively allotted to the purchase of materials and not for any handling and fixing to be done by the Contractor. Such cost of handling and fixing with profit (including transport charges if required) shall be separately included in the contract price as described in the schedule of quantities. The disposal of the amounts covered under this head will be absolutely at the discretion of the employer. Contractor is to make payments for these materials to the suppliers on certificate or orders issued by the employer and realize them through his bills from the employer.

12. QUANTITY OF WORK TO BE EXECUTED

The quantities shown in the schedule of quantities are intended to cover the entire furnishing work but the Employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason therefore.

13. OTHER PERSONS ENGAGED BY THE EMPLOYER

The employer reserves the right to execute any part of the work included in this contract or any work which is not included in this contract by other agency or persons and Contractor shall allow all reasonable facilities and use of his scaffolding for the execution of such work.

14. TOTAL SECURITY DEPOSIT

The Total Security Deposit on the contract should be 8.00% of the contract amount. Total Security Deposit comprises of the following:

i) Earnest Money Deposit

The bidder will have to submit declaration in place of EMD at the time of submission of tender as an Earnest Money. **Firms registered under MSEs and Start up India would be exempted from payment of earnest money.**

ii) Retention Money

- a) The retention percentage (i.e. deduction from the interim bill) shall be 8% of the gross value of each interim bill.
- b) The maximum amount of retention money shall be the balance amount of the Total Security Deposit.
- c) The retention money will be refunded within 30 days after expiry of defects liability period provided he has satisfactorily carried out all the works, attended to all defects in accordance with the conditions of the Contract, including the site clearance.
- d) After completion of work, retention money can be refunded after obtaining a Bank Guarantee of equivalent amount for a time period till the end of defect liability period plus claim period. Bank Guarantee should be from any Scheduled Commercial Bank other than Punjab National Bank. Claim period would be considered as mentioned on Bank Guarantee or 3 months after the end of defect liability whichever is later.
- e) Performance Security: performance security/guarantee if any submitted by the contractor/bidder shall remain valid for a period of 60 days beyond the date of completion of all contractual obligations

15. CONTRACTOR TO PROVIDE EVERYTHING NECESSARY

The Contractor shall provide everything necessary for the proper execution of work according to the intent and meaning of the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancies therein, he shall immediately and in writing refer the same to the employer whose decision shall be final and binding.

The rates quoted against individual items will be inclusive of everything necessary to complete the said items of work within the contemplation of the contract and beyond the unit price. No extra payments will be allowed for incidental or contingent work, labour and/or materials inclusive of all taxes and duties whatsoever except for specific taxes, if any, stipulated in the tender documents.

The Contractor shall supply, fix and maintain at his own cost for the execution of work, all tools tackles, machinery and equipment and all the necessary centering, scaffolding, fencing, boarding, watching and lighting by night as well as by day required not only for the proper execution and protection of the said work but also for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings all other erections, matters and things and Contractor shall take down and remove any or all such centering, scaffolding, planking, timbering, strutting, shoring etc. as occasion shall be required or when ordered to do so and shall fully reinstate and matters and things distributed during the execution of works to the satisfaction of the Employer

The Contractor shall at all times give access to workers by the Employer or any men employed on the buildings.

16. TIME OF COMPLETION, EXTENSION OF TIME & PROGRESS CHART

16.1 Time of completion

The entire work is to be completed in all respects within the stipulated period **30 days** from the commencement date. Time is the essence of the contract and shall be strictly observed by the Contractor.

The work shall not be considered as completed until the Employer have certified in writing that work has been completed and the defects liability period shall commence from the date of such certificate.

16.2 Extension of Time

If, in the opinion of the Employer the works be delayed

- a) By reason of instruction from the employer in consequence of proceedings taken or threatened by or disputes, with adjoining or neighboring owners or
- b) By the works, or delay, of other contractors or tradesmen engaged or nominated by the Employer and not referred to in the specification or
- c) By reason of authorized extra and additions or
- d) By reason of any combination of workmen or strikes or lock-out effecting any of the building trades or
- e) From other causes which the employer may consider are beyond the control of the Contractor, the Employer at the completion of the time allowed for the contract, shall make fair & reasonable extension of the time for completion in respect therefore. In the event of the Employer failing to give possession of the site upon the day specified above the time of completion shall be extended suitably.

In case of such strikes or lock-outs, as are referred to above, the Contractor shall immediately give the employer, written notice thereof. Nevertheless, the Contractor shall use his best endeavours all that to prevent delay, and shall do all that may be reasonably required, to the satisfaction of the employer to proceed with the works and on his doing so that it will be ground of consideration by the employer for an extension of time as above provided. The decision of Employer as to the period to allow for an extension of time for completion hereunder (Which decision shall be final and binding on the Contractor) shall be promulgated at the conclusion of such strike or lock-out and the employer shall then, in the event of an extension being granted, determine and declare the final completion date. *The provision in clause 16.4 with respect to payment of liquidated damages shall, in such case, be read and construed as if the extended date fixed by the employer were substituted for and the damage shall be deducted accordingly.*

16.3 Progress of work

During the period of execution, the Contractor shall maintain proportionate progress on the basis of a programmed chart submitted by the Contractor immediately before commencement of work and agreed to by the Employer. Contractor should also include planning for procurement for scarce material well in advance and reflect the same in the programmed chart so that there is no delay in completion of project. Progress report of the work is to be submitted by the Contractor fortnightly in the format approved by the employer.

16.4 LIQUIDATED DAMAGES

Should the work be not completed to the satisfaction of the Employer within the stipulated period, the Contractor shall be bound to pay to the employer a sum calculated as given below by way of liquidated damages and not as penalty during which the work remains uncommenced or unfinished after the expiry of the completion date.

1.0% of the contract amount shown in the tender per week subject to ceiling of 10.0% of the accepted contracted sum.

17. TOOLS, STORAGE OF MATERIALS, PROTECTIVE WORKS AND SITE OFFICE REQUIREMENTS

The contractor shall provide, fix up and maintain in an approved position proper office accommodation for the contractor's representative and staff which offices shall be open at all reasonable hours to receive instruction notices or communications and clear away on completion of the works and make good all work disturbed.

All drawings maintained on the site are to be carefully mounted on boards of appropriate size and covered with a coat of approved varnish. They are to be protected from ravages of termites, ants, and other insects.

The contractor shall provide at his own cost all artificial light required for the work to complete the work within the specified time.

The contractor shall arrange for temporary latrines for the use of workers and field staff and keep the same in a clean and sanitary condition to the satisfaction of the Public Health Authorities and shall cause such latrines and soil to be cleared away whenever necessary and shall make good all the works disturbed by these conveniences.

Every precaution shall be taken by the contractor to prevent the breeding of mosquitoes on the works during the construction, and all receptacles cisterns, water tanks etc. used for the storage of water must be suitably protected against breeding of mosquitoes. The contractor

shall indemnify the Employer against any breach of rules in respect of anti-malarial measures.

The contractor shall not fix or place any placards or advertisement of any description or permit the same to be fixed or placed in or upon any boarding, gantry, building structure other than those approved by the Employer.

Protective- Measures: The contractor from the time of being placed in possession of the site must make suitable arrangements for watching, lighting and protecting the work, the site and surrounding property by day, by night, on Sundays and other holidays.

Contractor shall indemnify the Employer against any possible damage to the building, roads, or members of the public in course of execution of the work.

Storage of materials: The contractor shall provide and maintain proper sheds for the proper storage and adequate protection of the materials etc. and other work that may be executed on the site including the tools and materials and remove same on completion.

Godown shall be erected for storing about six weeks' requirement of material. Structure shall be water-proof from all the sides and top. Material should be stored one feet-above the ground level and have pucca raised floor.

Tools: The odolite levels, prismatic compass, chain, steel and metallic tapes and all other surveying instruments found necessary on the works shall be provided by the contractor for the due performance of this contract as instructed by the Site Engineer. All measuring tapes shall be of steel and suitable scaffolding and ladders that may be required for safely taking measurement shall be supplied by the contractor.

The mistries and the supervisors on the works shall carry with them always a one metre or two metre steel tape, a measuring tape of 30 metres. a spirit level, a plumb bob and a square and shall check the work to see that the work is being done according to the drawing and specifications. The Site Engineer will use any or all measuring instruments or tools belonging to the contractors as he chooses for checking the works executed or being executed on the contract. The contractor should cover in his rates for making provision for all reasonable facilities for the use of his scaffolding, tools and plant etc., for their work.

18. NOTICE AND PATENTS OF APPROPRIATE AUTHORITY AND OWNERS

The Contractor shall confirm to the provisions or any acts of the legislature relating to the work, and to the regulations and by-laws of any authorities, and / or any water, lighting and other companies, and / or authorities with whose system the structures were proposed to have renovated and shall before making any variation from the drawings or specifications that may be associated to so confirm, give the Employer written notice, specify the variations proposed to be made and the reasons for making them and apply for instructions thereon. The Employer on receipt of such intimation shall give a decision with a reasonable time.

The Contractors shall arrange to give all notices required for by the said acts, regulations or By- laws to be given to any authority, and to pay to such authority or to any public officer all fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

The Contractor shall indemnify the Employer against all claims in respect of patent rights, royalties, and damages to buildings, roads or member of public in course of execution of work and shall defend all actions arising from such claims and shall keep the Employer saved harmless and indemnified in all respects from such actions, costs and expenses.

19. CLEARING SITE AND SETTING OUR WORKS

The site shown on the plan shall be cleared of all obstructions, loose stone, and materials rubbish of all kinds.

20. CONTRACTOR IMMEDIATELY TO REMOVE ALL OFFENSIVE MATTERS FROM THE SITE

The Contractor shall keep the surroundings of work places free from water, debris and excess / waste materials at his own expenses Electrical or other power driven equipment to the satisfaction of the Employer for the purpose, until the site is handed over to the Employer. The Contractor shall arrange for the disposal of the same so accumulated to the satisfaction of the Employer and the local authority and no claims will be entertained afterwards if he does not include in his rates for the purpose.

21. ACCESS

Any authorized representative of the Employer shall at all reasonable times have free access to the works and / or to the workshops, factories or other places where materials are being prepared or constructed for the work and also to any place where the materials are lying or from where they are being obtained, and the Contractor shall give every facility to the Bank or their representatives necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Employer, no person shall be allowed at any time without the written permission of the Employer.

22. MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS

All the works specified and provided for in the specification or which may be required to be done in order to perform and complete any part thereof shall be executed in the best and most workman like manner with materials of the best and approved quality of the respective kinds in accordance with the particulars contained in and implied by the specifications and as represented by the drawings or according to such other additional particulars and instructions as may from time to time be given by the Employer during the execution of the work, and to his entire satisfaction.

If required by the Employer the Contractor shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by the Employer at his own cost to prove that the materials etc. under test confirming to the relevant IS standards or as specified in the specifications. The necessary charges for preparation of sample, transporting, testing etc. shall have to be borne by the Contractor. No extra payment on this account would in any case be entertained.

All the materials (except where otherwise described) stores and equipment required for the full performance of the work under the contract must be provided through normal channels and must include charge for import duties, sales taxes, octroi, GST and other charges and must be the best of their kind available and contractors must be entirely responsible for the proper and efficient carrying out of the work. The work must be done in the best workman like manner. Samples of all materials to be used must be submitted to the Employer when so directed by the Engineer and written approval from Employer must be obtained prior to placement of order.

During the inclement weather the Contractor shall suspend works for such times as the Employer may direct and shall protect from injury all work during course of execution. Any damage (during repair & renovation) to any part of the work for any reason due to rain, storm or neglect of Contractor shall be rectified by the Contractor in an approved manner at no extra cost to Bank.

Should the work be suspended by reason of rain, strike, lock-outs or any other cause, the Contractor shall take all precautions necessary for the protection of work and at his own expense shall make good any damage arising from any of these causes.

The Contractor shall cover up and protect from damage, from any cause, all new work and supply all temporary doors, protection to windows, and any other requisite protection for the execution of the work whether by himself or special tradesmen or sub-Contractor and any damage caused must be made good by the Contractor at his own expenses.

Contractor to carry out all mandatory tests as per CPWD specifications besides the tests required to be done as ordered and desired by the Bank to prove that quality of material conforms to tender provisions. cost of such tests shall be borne by the contractor and no extra payment in this regard shall be payable.

23. REMOVAL OF IMPROPER WORK

The Employer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Employer are not in accordance with specification or instructions, the substitution or proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instruction. In case the Contractor refuses to comply with the order the Employer shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental there to as certified by the Employer shall be borne by the Contractor or may be deducted from any money due to or that may become due to the Contractor.

24. SITE ENGINEER

The term "Site Engineer/Officer" shall mean the person posted at site by Employer to superintend the work. The Contractor shall afford the Site Engineer every facility and assistance for examining the works and materials for checking and measuring work and materials. The site Engineer shall have no power to revoke, alter, enlarge or relax any requirements of the Contractor or to sanction any day work, additions, alterations, deviations, or omissions or any extra work whatever, except in so far as such authority may be specially conferred by a written order of the Employer.

The Site Engineer shall have power to give notice to the Contractor or to his foreman of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Employer is obtained. The work will from time to time be examined by the Engineer from the premises department of the Employer and the Site Engineer, if any, but such examination shall not in any way exonerate the contractor from the obligation to remedy and defects which may be found to exist at any stage of the work or after the same is complete. Subject to the limitations of this clause the Contractor shall take instruction only from the Employer.

25. CONTRACTOR'S EMPLOYEES

The Contractor shall employ technically qualified and competent supervisors for the work who shall be available (by turn) throughout the working hours to receive and comply with instructions of the Employer. The Contractor shall engage at least one experienced Engineer as Site-in-Charge for execution of the work. The Contractor shall employ in connection with the work persons having the appropriate skill or ability to perform their job efficiently.

The Contractor shall employ local labourers on the work as far as possible. No labourer below the age of eighteen years and who is not an Indian national shall be employed on the work. Any Labourer supplied by the Contractor to be engaged on the work on day work basis either wholly or partly under the direct order or control of the Employer or his Representative shall be deemed to be a person employed by the Contractor.

The Contractor shall comply with the provisions of all labour legislations including the requirements of:-

- a. The payment of Wages Act
- b. Employer's Liability Act
- c. Workmen's Compensation Act
- d. Contract labour (Regulation 7 Abolition) Act, 1970 and Central Rules 1974
- e. Apprentices Act 1961
- f. Minimum Wages Act
- g. Any other Act or enactment relating thereto and rules framed thereunder from time to time.

The Contractor shall keep the Employer saved, harmless and indemnified against claims if any of the workmen or any other person and all costs and expenses as any be incurred by the Employer in connection with any claim that may be made by any workman or any other person.

The Contractors shall arrange to provide first-aid treatment to the labourers engaged on the works. He shall within 24 hours of the occurrence of any accident at or about the site or in connection with execution of the works, report such accident to the employer and also to the competent authority where such report is required by law.

26. DISMISSAL OF WORKMEN

The Contractor shall in the request of the Employer immediately dismiss from works any person employed thereon by him who may in the opinion of the Employer be unsuitable or incompetent or who may misconduct himself. Such discharges shall not be the basis of claim for compensation or damages against the Employer or any of their officers or employee.

27. ASSIGNMENT

The whole of the works included in the contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or underlet the Contract or any part, share or interest therein nor, shall take a new partner without written consent of the Employer and no subletting shall relieve the Contractor from the full and entire responsibility of the contract or from active superintendence of the work during their progress.

28. DAMAGE TO PERSONS AND PROPERTY ETC.

The Bidder shall be responsible for all injury to the worker or workmen or persons, animals or things and for all damages to the project works, materials, equipment, structural and / or decorative part of property which may arise from the operations or neglect of himself or employees whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract.

The clause shall be held to include inter-alia any damage to buildings whether immediately adjacent or otherwise and any damage to roads, streets, foot paths or ways as well as damages caused to the buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The Contractor shall indemnify the Employer and hold harmless in respect of all and any expenses arising from any such injury or damages to

persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of compensation or damage consequent upon such claim.

The Contractor shall reinstate, rectify and remedy all damages of every sort mentioned in this clause so as to deliver the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to the property or third party.

29. INSURANCE

Unless otherwise instructed the Contractor shall insure the works for all risk (include fire & third party) of the Contractor for total tender value and keep them insured until the virtual completion of the contract against any loss or damage of the material and of project. The insurance must be placed with a company approved by the Employer in the joint names of the Employer and the Contractor for such amount and for any further sum if called to do so by the Employer. The premiums of such further sum being allowed to the Contractor as an authorized extra. The Contractor shall deposit the policy and receipt premium paid with the Employer within 3 days from the date of issue of work order unless otherwise instructed.

In default of the Contractor insuring as provided above the Employer on his behalf may so insure and may deduct the premiums paid from any money due, or which may become due to the Contractor. The Contractor shall as soon as the claim under the policy is settled or the work reinstated by Insurance Company should they elect to do so, proceed with due diligence with the completion of the works in the same manner as though the fire has not occurred and in all respects under the conditions of the contract. The Contractor in case of rebuilding or reinstatement after fire shall be entitled to extension of time for completion, as the Employer may deem fit.

30. ACCOUNTS RECEIPT & VOUCHERS

The Contractor shall, upon the request of the Employer furnish them with all the invoices, accounts, receipts and other vouchers that they may require in connection with the works under this contract. If the Contractor shall use materials less than what he is required under the contract, the value of the difference in the quantity of the materials he was required to use and that he actually used shall be deducted from his dues. The decision of the Employer shall be final and binding on the Contractor as to the amount of materials. The Contractor is required to use for any work under this contract.

31. MEASUREMENTS

Before taking any measurement of any work the Site Engineer or a subordinate deputed by him shall give reasonable notice to the Contractor. If the Contractor fails to attend at the measurements after such notice or fails to countersign or to record the difference within a week from the date of measurement in the manner required by the Site Engineer then in any such event the measurements taken by the Site Engineer or by the subordinate deputed by him as the case may be is final and binding on the Contractor and the Contractor shall have no right to dispute the same.

32. PAYMENTS

All bills shall be prepared & submitted by the Contractor in the form prescribed by the Employer. Normally one interim bill shall be prepared each month subject to minimum value for interim certificate as stated in these documents. The bills in proper forms must be duly accompanied by detailed measurements in support of the quantities of work done and must show deductions for all previous payments, retention money etc. The bill shall be checked at site by Site Engineer shall issue a certificate after due scrutiny of the Contractor's bill which

may be further verified by the Employer and the Contractor shall be entitled to payment thereof within the period of honouring certificates named in these documents, as per final verified amount by the Employer. In case of delay, an Adhoc advance of 75% of the billed amount /assessed work done may be paid on the request of the Contractor for the smooth progress of work at the sole discretions of the Bank.

The amount as stated in an interim certificate shall be the total value of work properly executed and secured advance on the materials as described under the heading of secured advance less the amount to be retained by the Employer as retention Money vide clause 14 of these conditions and less instalments previously paid under these conditions, provided the such certificate shall only include the value of said material and goods as and from such time as they are reasonably, properly and not prematurely brought to or placed adjacent to the work and then only if adequately protected against whether or other casualties.

The Employer will deduct retention money as described in Clause 14 of these Conditions. The refund of retention money will be made as specified in the said clause.

If the Employer had supplied any materials or goods to the Contractor, the cost of any such materials or goods will be progressively deducted from the amount due to the Contractor in accordance with the quantities consumed in the work.

All the interim payments shall be regarded as payment by way of advance against the final payments only and not as payments for work actually done and completed and shall not preclude the requiring of bad unsound and imperfect of unskilled work to be removed and taken away and reconstructed or re-erected or to be considered as an admission of the due performance of the contract or any part thereof in any respect or the accruing of any claim, nor shall, it conclude determine or affect in any way the powers of the Employer under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the Contractor within one month of the date fixed for completion of the work or of the date of certificate of virtual completion furnished by Employer and payment shall be made within three months.

33. SECURED ADVANCE FOR MATERIAL AT SITE

The secured advance will be paid up to an amount not exceeding 75% of the invoiced value of the materials, (The amount of secured advance should not exceed 75% of the material element cost in the tendered rate of the finished item of work subject to ceiling of 65% of quoted rates) brought to site for permanent incorporation into the work up to the date of bill on production of supporting bills / vouchers. The secured advance on the non-perishable materials will be paid on execution of the indemnity bond/Bank guarantee.

34. FINAL PAYMENTS

The period of Final Measurements will be 1 Month from date of Completion. The final bill shall be accompanied by a certificate of completion from the Employer, payments of final bill shall be made after deduction of Retention Money as specified in clause 14 of these condition, which sum shall be refunded after the completion of the Defects liability period and rectification if defects to the entire satisfaction of the Employer. The acceptance of payments of the final bill by the Contractor would indicate that he would have no further claiming respect of the work executed.

35. VARIATION / DEVIATIONS

The Contractor may when authorized and shall, when directed in writing by the Employer add or omit, or vary the works shown in the drawings or described in the specifications or

included in the priced schedule of the quantities. The Contractor on his own accord shall make no addition omission or variation without such authorization of direction. A verbal authorization of direction by the Employer shall when confirmed correctly by the Contractor in writing within 3 days shall be deemed to have been given in writing.

The Contractor shall send to the Employer once in every month a statement giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Employer which he has executed during the preceding month.

No interim claim for payment for any such work or expense, will be considered which has not been included in such a statement provided always that the Contractor shall be entitled after taking Employer's sanction to authorize payment to be made for any such work or expense, notwithstanding the Contractor's failure to comply with this condition.

The rates for additional, altered substituted work shall be arrived at in accordance with the following rules:-

- i. The net rates or prices in the contract schedule shall determine the valuation of (the rates for) the extra work (items) where such extra work is of similar character and is executed under similar conditions as the work prices therein.
- ii. If the rates for the extra altered or substituted or (deviated) work are not provided for (available) in the schedule of quantities, they shall, to the extent possible be derived out of rate given in that schedule for similar or near similar items. For the purpose of such deviation, where necessary and when so directed, the Contractor shall furnish detailed analysis for the said similar or near similar items in the contract schedule. For such portions of the analysis, for the extra, altered or substituted (deviated) work for which prices cannot be abstracted from the corresponding analysis of rates for the said similar or near similar items in the contract schedule, market rates sustained by purchase bill / vouchers dependable printed price schedule of materials of different type shall be adopted, using factors and constant for quantum of materials, labour, T&P and sundries, from standard analysis of rates adopted by the CPWD, and adding 15% towards profit & overheads and taxes When called upon to do so, the Contractor shall submit the required purchase bills / vouchers.
- iii. In respect of contract which incorporates more than one schedule, the rate applicable in case (i) above if not provided for in the Schedule pertaining to the work in which the addition, alteration or substitution (deviation) occurs shall be taken as the lowest applicable rate in other schedules. Similarly in case (ii) above if similar in near similar items cannot be found in the schedule pertaining to the work in which the addition, alteration or substitution (deviation) occurs, similar or near similar items from the other schedule shall be adopted.
- iv. In the case of additional, altered substituted (deviated) for which rates cannot be reasonably be derived as at (ii) and (iii) above, the rates shall be worked out adopting market prices, substantiated by purchase bills / vouchers using factors and constants for quantum of materials, labour, T&P and sundries from standard analysis of rates adopted by the CPWD and adding 15% towards profit & overheads and taxes. When called upon to do so the Contractors shall submit his purchase bills / vouchers to the Employer.
- v. The question as to what particular items, being similar or near similar to the additional, altered or substituted (deviated) work in the contract schedule are to be adopted for deviation of rates for the additional, altered for substituted deviated work

and whether the said rates cannot be derived from similar or near similar items in the contract schedule will be decided by the Employer.

- vi. In case (ii) to (iv) the Contractor is required to submit his analysis of rates adopting the principles enunciated, after scrutinizing the analysis any other papers furnished will allow such rates as he considers reasonable after obtaining Employer's sanctions.
- vii. Where extra work is of such a nature that it cannot be properly measured or valued, the Contractor shall be allowed day work priced at the net rates stated in the tender or the priced schedule of quantities or if not so stated then in accordance with the minimum local day work rates and wage for the district notified by the concerned authority provided that in either case if required by the Employer, vouchers, muster rolls and other documents, required for proper verification of the labour employed and the materials deployed on the said work and the costs thereof be delivered to the site Engineer or his representative on or before the end of the week following that in which work has been executed.
- viii. The question as to whether extra work is of such nature that it cannot be properly measured or valued will be decided by the Employer. The margin to be allowed on actual costs to the Contractor towards profit and overhead shall be 15% and taxes.

36. DEVIATION LIMIT FOR TENDER QUANTITIES UPTO 25%

The tender rates shall hold good for any increase in the tendered quantities up to variation of 25%. In case tender quantities of an individual item exceeds the deviation limit of 25% the rates for the excess quantities over and above the deviation limit shall be payable as per market rates analysis, sustained by purchase vouchers / bill using constant only of materials, Labour, T&P etc. from all Indian Standard analysis of rates published by DAR with 15% towards Contractors profit. & Overheads and taxes. For non-schedule items, constant of material, labour, T&P etc. shall be decided by the Engineer in charge of Employer, based on the actual observation at site.

37. SUBSTITUTION

Should the Contractor desire to substitute any materials and workmanship, he/they must obtain the approval of the Employer in writing for any such substitution well in advance. Materials designated in this specification indefinitely by such terms as "Equal" or "other approved" etc., specific approval of the Employer has to be obtained in writing.

38. PREPARATION OF BUILDING WORKS FOR OCCUPATION AND USE ON COMPLETION

The whole of the work will be thoroughly inspected by the Contractor and deficiencies and defects put right. On completion of such inspection and Contractor shall inform the Employer that he has completed the work and it is ready for inspection.

On completion, the Contractor shall clean all equipment's and do the painting work etc. He will leave the entire installation neat and clean and ready for immediate use and to the satisfaction of the Bank.

39. CLEARING SITE ON COMPLETION

On completion of the works, the Contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave

the whole of the site and the works clean and in a workman like condition to the satisfaction of the Employer.

40. DEFECTS AFTER COMPLETION

The defects liability period (D.L.P.) shall commence from the certified date of Virtual Completion issued by the Employer. The Contractor shall make good at his own cost and to the satisfaction of the Employer all defects, other faults which may appear within 12 months after completion of the work. In default, the Employer may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damages, losses and expenses shall be recoverable from him by the employer or may be deducted by the Employer, in lieu of such amending and making good by the Contractor, deduct from any money due to the Contractor a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient, recover that balance from the Contractor from the amount retained under clause no. 14 together with any expense the Employer may have incurred in connection therewith.

41. CONCEALED WORK

The Contractor shall give due notice to the Employer whenever any work is to be buried in the earth, concrete or in the bodies of walls or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the option of the employer be either open up for measurement at the Contractor's expense or no payment may be made for such materials. Should any dispute or difference arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or checked, the notes of the Employer shall be accepted as correct and binding on the Contractor.

42. IDLE LABOUR

Whatever the reasons may be, no claim for idle labour, additional establishment cost of hire and labour charges of tools and plants would be entertained under any circumstances.

43. SUSPENSIONS

If the Contractor, except on account of any legal restraint upon the Employer preventing the continuance of the work, abandons, suspends work or in the opinion of the Employer, the Contractor neglects or fails to proceed with due diligence in the performance of his part of the contract, the Employer shall have the power to give notice in writing to the Contractor requiring the work be proceeded within a reasonable manner and with reasonable dispatch, such notices purport to be a notice under this clause.

After such notice shall have been given the Contractor shall not be at liberty to remove from the site of the works or from any ground contiguous thereto any plant or materials to subsist from the date of such notice being given until the notice shall have been complied with. If the Contractor shall fail for 7 (seven) days after such notice has been given to proceed with the works as therein prescribed, the Employer may proceed as provided in clauses 44 (Termination of contract by Employer).

44. TERMINATION OF CONTRACT BY EMPLOYER

In the following circumstances/ events the contract will be terminated by the employer:-

- i. If the Contractor being the company go into liquidating whether voluntary or compulsory.

- ii. Being a firm shall be dissolved.
- iii. If the official assignee in insolvency or receiver of the contractor in insolvency, shall repudiate the contract.
- iv. If receiver of the contractor's firm appointed by the court shall be unable to, within 14 days after notice to him requiring him to do so, to show to the reasonable satisfaction of the employer that he is able to carrying out and fulfil the contract and if so required by the employer to give reasonable security therefore.
- v. If the contractor:
 - a) Shall suffer execution to be issued
 - b) Shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the contractor
 - c) Shall assign, charge or encumber this contract or any payment due or which become due to the contractor hereunder
 - d) Shall neglect or fail to observe and perform all or any of the acts, matters of things by this contract, to be observed and performed by the Contractor within three clear days after the notice shall have been given to the Contractor in manner hereinafter mentioned requiring the Contractor to observe or perform the same
 - e) Shall use improper materials or workmanship in carrying on the works
 - f) Shall in the opinion of the Employer not exercise such due diligence and make such due progress as would enable the work to be completed within due time agreed upon, and shall fail to proceed to the satisfaction of the Employer after three clear days' notice requiring the Contractor so to do shall have been given to the Contractor as hereinafter mentioned,
 - g) Shall abandon the contract then and in any of the said cases.
 - h) Any threat is perceived or observed on the security of Bank's data / property out of any action by the staff deployed for monitoring / configuration etc., by service provider.

The Bank may notwithstanding previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned, but without thereby effecting the powers of the employer & the obligations & liabilities of the contractor the whole of which shall continue in force as fully as if the contract, had not been so determined and as if the works subsequently executed had been executed by or on behalf of the contract (without thereby creating any trust in favour of the contractor).

Further the employer or his agent, or servant:

- i. may enter upon and take possession of the work and all plants, tools, scaffoldings, sheds, machinery, steam and other power utensils and materials lying upon premises or the adjoining lands or roads and sell the same as his own property
- ii. may employ the same by means of his own servants and workmen in carrying on and completing the works
- iii. by employing any other Contractors or other persons or person to complete the works and the Contractor shall not in any way interrupt or do any act, matter of thing to prevent or hinder such other Contractors or other persons or persons employed for completing and finishing or using the materials and plants for the works.

When the works shall be completed, or as soon thereafter as conveniently may be, the Employer shall give notice in writing to the Contractor to remove his surplus materials and plants, and should the Contractor fail to do so within a period of 14 days after receipt of the notice by him, the Employer may sell the same by public auction and shall give credit to the Contractor for the amount so released.

Any expenses or losses incurred by the employer in getting the works carried out by other Contractors shall be adjusted against the amount payable to the Contractor by way of selling

his tools and plants, or due on account of work carried out by the Contractor prior to engaging other Contractors or against the Security Deposit.

45. DISPUTES AND ARBITRATION:

All disputes or differences, whatsoever, arising between the parties out of or in relation to the terms and conditions, meaning and operation or effect of this Agreement or breach thereof shall be settled amicably.

In case they are not able to settle the disputes or differences between them amicably, the matter may be referred to a sole arbitrator mutually agreed upon after issue of at least 30 days notice in writing to the other party clearly setting out there in the specific disputes and the same shall be settled by arbitration in accordance with the Indian Laws relating to arbitration, i.e. in accordance with the provision of the Indian Arbitration and Conciliation Act, 1996 and the award made in pursuance thereof shall be binding on the parties.

In the event of absence of consensus about a single arbitrator, the dispute may be referred to three arbitrators, one to be nominated by each party and the said arbitrators shall appoint the third presiding arbitrator before commencing the arbitration proceedings.

The venue of arbitration shall be Biharsharif.

All arbitration proceeding shall be conducted in English and a daily English record of such proceeding shall be maintained.

Any appeal against the arbitration award will be subject to the jurisdiction of courts at Biharsharif only.

Bidder shall continue to work under the work Contract during the arbitration proceedings unless otherwise directed in writing by the bank, unless the matter is such that the works/services cannot possibly be continued until the decision of the arbitrator or of the presiding arbitrator, as the case may be, is obtained.

46. EXCEPTED MATTERS FROM ARBITRATION

If the dispute or difference pertains to the under noted matters (called excepted matters) the decision in writing of the Employer shall be final, conclusive and binding on the parties.

- a. Instruction
- b. Transactions with local authorities.
- c. Proof of quality of materials.
- d. Assigning or under letting of the contract
- e. Certificate as to the causes of delay on the part of the Contractor and justifying extension of time.
- f. Rectifying of defects pointed out during the defects liability period.
- g. Notice to the Contractor to the effect that he is not proceeding with due diligence.
- h. Certificate that the Contractor has abandoned the contract.
- i. Notice of the determination of the contract by the Employer.

47. RIGHTS OF TECHNICAL SCRUTINY BY CHIEF TECHNICAL EXAMINER

The work is liable to be technically audited by the Chief Technical Examiner of the Central vigilance Commission Government of India from time to time. Any defects, improvements or testing etc. pointed out by the Chief Technical Examiner should be carried out by the Contractor at his own cost and any deduction suggested by the CTE will be effected.

The Employer shall have a right to cause a technical examination and audit of works and the final bills of the Contractor including all supporting vouchers, abstract etc. to be made at the time of payment of the final bill. If as a result of this examination or otherwise any sum is found to have been over paid in respect of any work done by the Contractor under the contract the Contractor shall be liable to return the amount of over payment and it shall be lawful for the Employer to recover the same from him from any sum or sums due to him and in any other manner legally permissible and if it is found that the Contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by the Employer.

Any sum of money due and payable to the Contractor (including Security Deposit returnable to him) under this contract may be appropriated by the Employer and set off against any claim of the Employer of the payment of a sum of money arising out of or under any other contract made by the Contractor with Employer.

48. WATCH AND LIGHTING

The Contractor shall provide and maintain at his own expense all lights, guards, fencing and watching when and where necessary or required by Employer for the protection of the works or for the safety and convenience of those employed on the works or the public.

49. CONTROL RECORDS

The under noted record books at the site of work shall be maintained in addition to normal routine requirements by the Contractor.

- a. Work site order book.
- b. Instruction by Bank's officers.
- c. Test registers of other materials / fittings fixtures equipment as stipulated in the tender.
- d. Register of drawings and working details.
- e. Log book of defects.
- f. Hindrances register giving details of commencement and removal of each hindrance.
- g. Dismantled materials account register.
- h. Specifications C.P.W.D. & I.S.I. as applicable to the contract.

These registers are to be got signed by the Site Engineer.

50. SECURITY ARRANGEMENT

- i. Proper arrangements shall be made to keep all records under lock and key.
- ii. It shall be ensured that the Contractor provides watch and ward and security of materials.
- iii. Movement of material and stores, shall be through Bank gate pass only
- iv. When the work is completed and handed over to the Bank, the responsibility of proper security arrangement shall rest with the Bank.

51. LABOUR RECORD

The Contractor shall maintain relevant records and fulfil all conditions and requirements in accordance with following Act and Rules made there under.

- i. The payment of Wages Act. b) Employer's Liability Act.
- ii. Workmen's Compensation Act.
- iii. Contract Labour (Regulation & Abolition) Act, 1970 and Central Rules 1971.
- iv. Apprentices Act 1961.

- v. Minimum Wages Act 1948.
- vi. Industrial Disputed Act. 1947.
- vii. Maternity Benefit Act 1961.
- viii. ESI Act.
- ix. Payment of Bonus Act.
- x. Payment of Gratuity Act.
- xi. Any other Act are enactment relating thereto and rules framed there under from time to time.

Bank shall not be responsible for any violation by the contractor on the above mentioned acts/ rules. Contractor will be wholly/ solely responsible for any claim in the above referred subjects.

52. HANDING OVER BUILDING / PROJECT WORK TO THE EMPLOYER

Handing and taking over report and inventories / statement (in quadruplicate) at handing over shall be prepared. The reports and inventories shall be signed by:

- i. The Contractor (only the relevant papers).
- ii. The Site Engineer, and
- iii. Competent Authority in the Bank.

The following inventories / statements shall be prepared:

- i. Inventory of all equipment's
- ii. Information folders & test reports for installations and as built drawings

The Engineer on behalf of the Employer associated with this operation, shall be apprised of the importance to carry out periodic inspections (at two months interval) for defects not rectified or fresh ones that crop up and issuing notice for their rectification to the concerned Contractors and the final inspection just before the expiry of the defects liability period.

53. DELINQUENCIES OF CONTRACTORS

The under noted delinquencies / defaults / misconduct / misdemeanours on the part of bidder or enlisted contract will attract disciplinary action.

- i. Incorrect information about credentials, about his performance, equipment, resources, technical staff etc.
- ii. Non-submission of the fresh / latest Income Tax Clearance certificate.
- iii. Irregular tendering practice.
- iv. Submission of tender containing for too many arithmetical errors and freak rates. e) Revoking a tender without any valid reasons.
- v. Tardiness in commencing work.
- vi. Poor organization at site & lack of his personal supervision.
- vii. Ignoring Employer's Notices for replacement / rectification of rejected materials, workmanship etc.
- viii. Violating any of the important conditions of contract, i.e. site facilities, insurance, labour laws, ban on subletting etc.
- ix. Lack of promptitude and co-operation in measurement of work and settlement of final account.
- x. Non-submission of vouchers and proofs of purchase etc.
- xi. Tendency towards putting up - false and untenable claims.
- xii. Tendency towards suspension of work for frivolous reasons.
- xiii. Bad treatment of labour.
- xiv. Bad treatment of Sub-Contractors (piece workers) and un-business like dealing with suppliers of materials.

- xv. Lack of co-operation with nominated Contractors or Employer's Labour.
- xvi. Contractor becoming Bankrupt or insolvent.
- xvii. Contractor's conviction by a court of law.
- xviii. Failure to satisfactorily rectify defects during Defects Liability period (DLP) and discovery of latent defects in Contractors work after the expiry of DLP of his contract.

54. DISCIPLINARY ACTION AGAINST (DELINQUENCIES OF) CONTRACTOR.

The award of the under noted disciplinary action shall be considered.

- i. Placing embargo on issue of tenders of temporary suspension from the Employer's approved list.
- ii. Permanent ban on issue of tenders & removal from the Employer's approved list.
- iii. Circulation of the Contractor name to other public Undertaking or Government Department for non-entertainment of this publication for contract work.

55. FORCE MAJEURE

Any failure or delay by bidder or Bank in performance of its obligations, to the extent due to any failure or delay caused by fire, flood, earthquake or similar elements of nature, or acts of God, war, terrorism, riots, civil disorders, rebellions or revolutions, acts of governmental authorities or other events beyond the reasonable control of non-performing Party, is not a default or a ground for termination. The affected Party shall notify the other party within reasonable time period of the occurrence of a Force Majeure Event.

56. SAFTY CODES

56.1 SCAFFOLDING

- a. Suitable scaffolds shall be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except in the case of short duration work which can be done "safely from ladders" when a ladder is used, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450 mm and a maximum rise of 300 mm. Suitable hand hold of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal and 1 vertical).
- b. Scaffolding or staging more than 4M, above the ground floor, swung or suspended from an overhead support or erected with stationery support shall have a guard rail properly bolted, braced or otherwise secured, at least 1M, above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- c. Working platforms, gangways and stairway shall be so constructed that they do not sag unduly or unequally and if the height of the platform, gangway or stairway is more than 4m, above ground level or floor level, they shall be closely boarded and shall have adequate width and be suitably fenced as described in (ii) above.
- d. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1M.

- e. Where ever there are open excavations in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.
- f. Safe means of access shall be provided to all working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9M, in length while the width between side rails in rung ladder shall in no case, be less than 290 mm, for ladder up to and including 3M, in length for longer ladders this width shall be increased at least 20 mm for each additional meter of length.
- g. A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the Engineer obtained prior to construction.

56.2 OTHER SAFETY MEASURES

- a. All personnel of the Contractor working within the site shall be provided with safety helmets. All welders shall wear welding goggles while doing welding work and all metal workers shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.
- b. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

56.3 DEMOLITION/DISMANTLING

Before any demolition/dismantling work is commenced and also during the process of the work:

- i. No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.
- ii. All practical steps shall be taken to prevent danger to persons employed from the risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

57. PERSONAL SAFETY EQUIPMENTS

All necessary personal safety equipment as considered adequate by the Engineer should be kept available for used of the person employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.

- i. Those engaged in white washing and mixing or stacking or cement begs or any materials, which are injurious to the eyes, shall be provided with protective goggles.
- ii. Those engaged in welding works shall be provided with welder's protective eyesight lids.
- iii. Stonebreakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- iv. The Contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precaution should be taken:
 - a) No paint containing lead or lead products shall be used except in the form of paste or ready- made paint.

- b) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.
- c) Overalls shall be supplied by the Contractor to the workman and adequate facilities shall be provided, to enable the working painters during the execution of work.
- v. When the work is done near any public place where there is risk of drowning all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

58. MODIFICATION AND WITHDRAWAL OF BID BY THE TENDERER

58.1. Modification of the submitted bid shall be allowed on-line and the bidder may modify and resubmit the bid on-line only before the deadline of Bid Hash Preparation. For modification of e-bid, bidder has to rework and upload/resubmit digitally signed modified bid on bank's e-tendering portal i.e. <https://etender.pnbnet.in> .

59.2. Bids once submitted will be treated as final and no bid may be modified subsequent to the deadline for Bid Hash Preparation.

58.3. No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of period of bid validity specified in tender documents. For withdrawal of bid after the end date of online bid submission, the bidder will have to make a request in writing to Tender Inviting Authority of Bank. Withdrawal of bid may be allowed till issue of work order with the following provision of penal action:

58.3.1. If the request of withdrawal is received before fixing the date for opening of price bid, the EMD submitted by bidder will be forfeited and bidder will be debarred for 6 months from participating in tenders in PNB. The price bid of remaining technically qualified bidders will be opened and the tender process shall go on.

58.3.2. If the request of withdrawal is received after fixing the date for opening of price bid, the EMD submitted by bidder will be forfeited and bidder will be debarred for 1 year from participating in tenders in PNB. The price bid of all technically qualified bidders including this bidder (if he found technically eligible) will be opened and action will follow as under:

- a) If the bidder withdrawing his bid is other than L-1, the tender process shall go on.
- b) If the bidder withdrawing his bid is L-1, the re-tender will be done.

59. RELATIONSHIP BETWEEN PARTIES:

The engagement of bidder shall not constitute the appointment of either Party as the legal representative or agent of the other Party. This engagement is on a principal to principal basis between the Parties hereto. No Party to this engagement shall have any right or authority to assume, create or incur any liability or any obligation of any kind, express or implied, against or in the name of or on behalf of the other Party to this Agreement except as may be specifically provided.

60. PUBLICITY

In connection with the transactions contemplated by this engagement each Party agrees that it will not use other Parties name, marks, symbols, or logos in any advertising, promotional

material, press release, publication, public announcement, or through other media, whether written or oral, without the prior written consent of such other Party.

61. NON-EXCLUSIVITY:

It is expressly agreed that the engagement between the parties, shall be on a non-exclusive basis. Bank reserves its right to appoint/engage one or more contractors/agencies/service providers to provide the like services or/and work concurrently during the currency of engagement.

62. OTHER TERMS & CONDITIONS:

Bank shall not entertain any claim arising on account of damages, compensation or expenses payable as a result of any accident or injury sustained by any workman/staff of the bidder or any claim under the Workman's Compensation Act. The bidder may obtain necessary insurance cover to meet any of the above contingencies.

The bidder and his staff shall abide by the regulations/requirements of Security Department and strictly follow the rules. Bank's security staff will have right to check, search or interrogate any of the bidder staff while entering/ remain present/ leaving the Bank premises for security purposes.

The bidder shall be responsible for any loss/damage to the materials and other assets of the Bank by his staff deployed for duty.

The bidder shall also be wholly responsible for theft, burglary, fire or any other mischievous act and conduct done by their staff.

10. INSTRUCTIONS TO BIDDERS

1. **BIDDING PROCESS (TWO STAGES)**

For the purpose of the present job, a two-envelope bidding process will be followed. The response to the present tender will be submitted in two parts:

- Technical bid
- Commercial bid

The bidders will have to submit the technical bid in Banks e-procurement system as well as in hard copy and commercial bids in only online form through Bank's e-procurement system.

1.1 **TECHNICAL BID**

TECHNICAL BID will also contain the Compliance statement as per the Terms & Conditions mentioned in the Tender Documents, and **NOT contain any pricing or commercial information at all. Technical bid documents with any commercial information will be rejected.**

In the first stage, only TECHNICAL BIDs will be opened and evaluated. Only those bidders confirming compliance to all the terms & conditions of Tender document shall be short-listed for commercial stage.

1.2 **COMMERCIAL BID**

In the second stage, the COMMERCIAL BID of only those bidders, whose technical bids are short listed, will be opened.

2. **SUBMISSION OF BIDS**

2.1 Bidders are required to strictly submit their bids in electronic form using the e-procurement system at <https://etender.pnbnet.in> the Bank by using their digital certificates of class II and above (both encryption and signing). All the interested bidders should register themselves in the e procurement system <https://etender.pnbnet.in> for submitting the bids online, if they have not done earlier. The Tender document and further corrigendum, if any can also be downloaded from Bank's website www.pnbnet.in. Bids received after closing of the bid in the e-procurement system are summarily rejected without any reason. The commercial bid should be submitted online only.

2.2 It is to be noted that all the technical supporting documents should be submitted manually in a sealed envelope shall be super scribed as "**Technical bid for Interior Furnishing and Electrical works at Nawada, Dist-Nawada(Bihar) Pin-805110**" before the final date & time of bid submission at the following address.

2.3 Cost of Tender Document of Rs.2,360/- shall be submitted in a sealed envelope shall be super scribed as "**Interior Furnishing and Electrical works at Punjab National Bank, Nawada, Dist-Nawada(Bihar) Pin-805110**" before the final date & time of bid submission at the following address.

**The Deputy Circle Head
Circle Office, Punjab National Bank,
Ramchandrapur, Machhli Market,
Biharsharif, Dist- Nalanda(Bihar)- 803101**

2.4 At the time of physical submission of bid, bidder has to show acknowledgement e-mail received after completion of the bid submission in proof of having submitted the bid online.

3. CONTENT OF DOCUMENTS TO BE SUBMITTED

- i. Documents required in Technical Bid Envelope (Sealed Cover):
- ii. An undertaking on Rs.100/- stamp paper by Bidder stating that they not have been black-listed/ barred by any Public Sector Bank, RBI or IBA or any other Government/PSU agencies during last five years.
- iii. Abstract/break up/certified/verified final bill of cost of work in support of Similar Work or
- iv. LETTER SUBMITTING TENDER
- v. Letter of Transmittal
- vi. Bidders undertaking letter
- vii. Supporting documents as per Eligibility Criteria
- viii. Performance/Completion Certificate from clients
- ix. Bidder Information
- x. REFERENCE LIST
- xi. Acceptance of Compliance Statement
- xii. Duly signed Tender document and corrigendum, if any
- xiii. Copy of last three years PL Statement, ITRs and audited balanced sheet.
- xiv. Bid Earnest Money & Tender Document cost.
- xv. Power of attorney/Board resolution copy in favour of authorized person signing the Bid documents.
- xvi. Copy of PAN and GST Registration
- xvii. Copy of EPF/ ESI, if applicable. If not, undertaking with regards to the same to be provided.
- xviii. Copy of Partnership deed in case of partnership firm, MOA, AOA and Certificate of Incorporation in case of companies.
- xix. Copy of TDS certificate's in support of completion works for Private Organization Clients. Copy of work orders
- xx. In case of MSME/Start up the registration certificates to submitted for exemption from EMD.

Note: a. All pages of the bid documents must be signed by authorized person.
b. All pages of the bid documents should be numbered in serial order i.e. 1, 2, 3...
c. Commercial bid to be submitted in e-procurement process only. No hardcopy of the same be enclosed with the supporting documents.

4. PRELIMINARY EXAMINATION

4.1 Bank will examine the bids to determine whether they are complete, whether any computational errors have been made, whether required information has been provided as underlined in the bid document, whether the documents have been properly signed, and whether bids are generally in order.

4.2 The bid determined as not in order as per the eligibility criteria will be rejected by the Bank. The decision of the Bank is final towards evaluation of the bid documents.

5. EVALUATION AND AWARD CRITERIA

5.1 After opening of the technical bids, all the documents and annexure (except commercial documents/offer) will be evaluated first by the Bank. First, received bids will be

evaluated based on the eligibility criteria. Technical bids of only those bidders satisfying the eligibility criteria will be evaluated.

5.2 Only those bidders satisfying the technical requirements and accepting the terms and conditions of this document shall be short-listed for further steps.

5.3 PNB will determine to their satisfaction whether the bidder selected as having submitted the best evaluated responsive bid is qualified to satisfactorily perform the contract. The decision of PNB will be final in this regard.

5.4 The determination will take into account bidder's financial, technical and support capabilities, based on an examination of documentary evidence submitted by bidders in support of eligibility criteria.

5.5 The award of contract will be based on evaluation of technical and commercial bids.

Form A

I. Bidders Information

Name:

Constitution:

Address:

Names & Addresses of the Partners if applicable:

Contact Person(s) _____

Telephone, Fax, e-mail _____

Number of years of experience _____

Please give brief financial particulars of your firm for the last three accounting years along with the volume of business handled.

(The information will be kept confidential)

Year	2017-18	2018-19	2019-20
Total Turnover			

Seal of company

Signature:

II. REFERENCE LIST

PROFORMA FOR PERFORMANCE STATEMENT

NAME OF BID

Sr.No	Name of Organization	No of Sites Connected	Duration of Contract	Contract Amount	Date of Order	Contact Person and Telephone no.	Whether services satisfactory? (Attach certificate from customer)*

Signature and Seal of Bidder

NOTE:

- Bidder to provide relevant certificates from the above-mentioned organizations.
- The name and address of the organization along with key persons, their designation, telephone no. and email address should be provided.

* Satisfactory completion and performance certificate from the client for satisfactory execution of similar work as defined in eligibility criteria.

III. COMPLIANCE STATEMENT

DECLARATION:

Please note that any deviations mentioned elsewhere in the bid will not be considered and evaluated by the Bank. Bank reserve the right to reject the bid, if bid not submitted in proper format as per Tender Document.

Compliance	Description	Compliance (Yes/No)
Terms and Conditions	We hereby undertake and agree to abide by all the terms and conditions including all annexure, corrigendum(s) etc. stipulated by the Bank in this Tender Document. (Any deviation may result in disqualification of bids).	

Signature:

Seal of company

11. SPECIAL CONDITIONS FOR CONTRACT

1. The bidder shall acquaint himself with the proposed site of work before quoting his rates. The contractor should note and bear in mind that the Bank shall bear no responsibility for the lack of acquaintance of site and other conditions or any information relating thereto or on their part.
2. If for any reasons, any part of the site is not available temporarily for some time for part of the work under the contract, the agreed construction schedule shall be suitably modified and contractor shall diligently divert his men and materials to utilize them appropriately, profitably and no claim of damages whatsoever shall be entertained on this account. However, the contractor shall be allowed extension of time for completing the work as deemed fit by the competent authority. The contractor shall also not be entitled to any compensation for any loss suffered by him and revision in the rates quoted by him.
 - a) On account of delay in commencing the work by the contractor.
 - b) On account of reduction in the scope of work.
 - c) On account of suspension of work or abandoned after award of work.
3. The contractor shall provide, at his own cost instruments for weighing and measuring purpose at the site of work as may be necessary for execution of the work.
4. The contractor shall construct a sample unit of different activities complete in all respect as per the directions of the Engineer-in-charge. This sample unit shall be got approved from the Engineer-in-charge before commencing the mass work.
5. The contractor shall take care of all safety precautions pertaining to construction of work, such as scaffolding, ladder, working platforms, gangways, electric arc/ gas welding, use of hoist and construction machinery.
6. On account of security consideration, some restrictions may be imposed by the security staff on the working and/ movement of men and materials etc. The contractor shall be bound to follow all such restrictions/ instructions and he shall organize his work accordingly. No claim on this account, whatsoever, shall be payable.
7. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit boards, red flags, red lights and providing barriers. He shall be responsible for all damages and accidents caused to existing/ new work due to negligence on his part. No hindrance shall be caused to traffic during the execution of the work.
8. The contractor shall be responsible for the watch and ward of all materials brought by the contractor to site against pilferage and breakage during the period of installation and thereafter till the works are physically handed over to the Bank.
9. The contractor shall take all preventive measures against any such damage caused by rain, snowfall, floods or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the owner's property and to the work for which the payment has been advanced to him under the contract.
10. The work will be carried out in the manner complying, in all respects, with the requirements of relevant bye-laws of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and nothing extra shall be paid on this account.

11. The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by their rules and regulations and pay all fees and charges which may be liable.
12. The contractor shall give due notices to Municipal, Police and/or other authorities that may be required under the law/rules under force in the area and obtain all requisite licenses for temporary obstructions / enclosures and pay all charges which may be leviable on account of his execution of work under the agreement. Nothing extra shall be payable on this account.
13. All materials to be incorporated in the work shall be arranged by the contractor and shall be in accordance with the specifications laid down. Samples of all items are to be fabricated by the Contractor prior to taking up the mass production. These samples are to be got approved by them from the Bank before proceeding for mass production.
14. The bidder shall use materials bearing ISI Certification Mark unless otherwise specified or allowed in writing by the Engineer-in-Charge. Any material banned by the Bank shall not be used in the work.
15. The contractor shall submit to the Engineer-in-charge samples of all materials for approval. Such samples of materials which affect aesthetics of the work shall also be got approved from the Engineer-in-charge of the project before procuring bulk supplies. These approved samples shall be preserved and retained in the custody of the Engineer-in-charge as standards of materials till the completion of the work. The cost of such samples shall be borne by the Contractor and nothing shall be payable on this account over the Agreement rates.
16. The contractor shall be required to get all the necessary mandatory and other tests as per the specifications/ IS codes, carried out on materials/ work from an approved laboratory as per the direction of the Engineer-in-charge. The testing charges and conveyance from the site shall be borne by the contractor.
17. In case any material / work is found sub-standard the same shall be rejected by the Engineer-in-charge and the same shall be removed from the site of work within 48 hours, failing which the same shall be got removed by the Engineer-in charge at the risk and cost of the contractor without giving any further notice and time. In order to ensure quality of work during its execution, the Engineer-in-charge may require samples for mandatory or routine testing of materials. All costs of these samples, their packaging, conveyance from the site to the testing laboratory and return, shall be borne by the contractor.
18. Even ISI marked materials May be subjected to quality test at the discretion of the Engineer in-charge. Whenever ISI marked materials are brought to the site of work the contractor shall, if required by the Engineer-in-charge, furnish manufacturer's test certificate or test certificate from approved testing laboratory to establish that the materials procured by the contractor, satisfy the provisions of relevant ISI codes. The testing charges shall be borne by the contractor.
19. The contractor shall supply free of charge the material required for testing. The cost of tests shall be borne by the contractor.
20. The work shall be executed and measured in metric system. The metric dimensions given in the schedule of quantities and drawing etc. shall be followed. (The dimension in FPS units wherever indicated are for guidance only) The figures in the drawings shall be followed.

21. The contractor shall be responsible for completing the work and for satisfying all terms and conditions of the Contract without any extra payment over his quoted rates unless otherwise specified. The contractor shall quote his rate for various items of work accordingly and no claim whatsoever shall be entertained for any incidental or extra work involved in the execution of the work as per nomenclature of the item and the specifications indicated in the tender documents.
22. Subject to the nomenclature of the item as per schedule of quantities, the specification indicated in the tender documents, the rates quoted shall include cost of all materials including royalty and taxes if any, labour, sundry inputs, execution of work at all heights, levels, pattern and design for all leads, lifts and depths including overhead charges and contractor's profit. Nothing extra shall be paid on this account.
23. The rate shall be inclusive of making design, pattern and execution of work as per Architectural drawings, at all levels and heights.
24. Other agencies doing works related with this project will also simultaneously execute the works and the contractor shall afford necessary co-ordination for un-hindered completion of these sub-works.
25. The contractor shall give a satisfactory performance test of installations individually and as a whole to ensure their proper functioning before the work is finally declared and completed and accepted.
26. The contractor shall continue to maintain watch and ward to safeguard the Owner's property in his possession until the same is formally handed over as per directions of the Engineer-in-charge. Nothing extra over agreement rates shall be paid on this account.
27. All tools, plants and measuring or weighing equipment shall be arranged by the contractor himself and nothing extra shall be paid to the contractor on this account.
28. The quantities of various items incorporated in the tender are approximate. However, the payments shall be made to the contractors on the basis of actual measurements taken at site.
29. The contractor shall protect the adjoining buildings or works and the work under execution from fire and shall make adequate arrangements for fire protection and fire fighting and if any property is damaged, by fire due to the negligence of the contractor, the same shall be made good by the contractor at his own cost, to the entire satisfaction of Engineer-in-charge.
30. The contractor shall provide adequate lighting arrangements as approved by the Engineer in-charge for carrying out the work during night time, if so required and also provide all other facilities for the labour employed to carry out the work as per direction of Engineer in-Charge.
31. In order to achieve the targeted date of completion the contractor May have to work in multiple shifts, round the clock including public and gazetted holidays and nothing extra shall be paid on this account.
32. All materials, articles and workmanship shall be of respective best quality and kind for the class described in the schedule of quantities and specifications. All materials, so used in different items of work shall be subject to the approval of the Engineer-in-charge.
33. The contractor shall be responsible for all statutory provisions and deductions towards ESI, PF or any other, as the case May be or any other levies and taxes shall be borne by

the contractors. The TDS or any other statutory levels/taxes incorporated from time to time shall be deducted progressively from the running account bills, as applicable at the time of payment. No claim in this regard shall be entertained.

34. The contractor is supposed to abide the minimum wages act, and shall produce all records to the Engineer-in-charge or any other statutory authority as and when called for. The Engineer- in-charge does not hold any responsibility on account of any lapses in this regard.
35. No extension of time shall be granted to the contractor on account of rains or inclement weather conditions.
36. For any clarification/ doubt, the Bank may organize regular meetings with Contractor. The contractor shall attend such meetings invariably as and when required.
37. In respect of the work of other agencies, where the commencement or progress of such work of any other agency is dependent upon the completion of particular portions of the contractor's work or generally upon the contractor maintaining progress in accordance with the approved coordinated construction programme, it shall be the responsibility of the Contractor to complete such portions and maintain such progress.
38. The contractor shall have to do all drilling of holes and cutting of walls, chases or other elements of the building for the complete and proper installation of the pipe lines/ ducts and other equipments by using electrically operated tools such as drills/ chases cutting machine etc. Manual drilling or chiseling or cutting shall be permitted on special request only. Prior permission for the same is to be obtained from the Bank.
39. No chiseling or cutting or drilling of RCC columns, beams, girders and other principal structural members shall be done unless prior permission has been granted by the Engineer in charge in writing.
40. All chases and openings made by the contractor for his pipe lines shall be filled/ covered over with cement plaster in reasonable manner. Before rough plastering on the pipe surfaces the concealed pipes shall be secured to the wall by using proper supports/ clamps.
41. The contractor shall be provided adequate storage/ office space for his use. The space has to be maintained/ constructed by the contractor as per his usage requirements.
42. All spaces allotted to the contractor as described above shall be vacated and all structures removed from site at any time as and when required and directed by the Engineer-in charge, unconditionally and without any reservation. The Engineer-in-charge will not be obliged to give any reason for such removal. Upon receiving instructions to vacate the space, the contractor shall immediately remove all his structures, materials, etc. from the sources and clear and clean-up the site to the satisfaction of the Engineer-in-charge.
43. It shall be the responsibility of the Contractor to safeguard the site and ensure that no illegal encroachments are made by outside elements within the area allotted to the contractor. Upon completion of the work or earlier as required by Engineer-in-Charge, the contractor shall vacate the land totally without any reservation.
44. The security of workmen, materials, equipment stores etc. within the area allotted to the contractor shall be the responsibility of the contractor.

45. The site of work shall have required equipments for various tests at site by the contractor at his own cost and nothing extra shall be payable on this account.
46. The contractor shall arrange following minimum plant and equipments at site for the execution of work. These May have to be increased depending on the requirement site.
47. The quantities indicated are for guidance only however it May vary to any extent and the contractor should not have any financial or other implications for such variations. The Bank reserves to reduce the scope of work of any item if the contractor fails to deliver the works in time and the contractor shall not ask for any financial consideration for such deletion of scope of the work.
48. Any extra item shall be worked out as actual cost of the materials and actual cost of the labour plus 15% as overhead and profit. The decision of Engineer-in-charge will be conclusive and final binding on the contractor.
49. The contractor shall take photographs of site prior to commencement of work, during construction and after completion of work as suggested and shall submit the photographs in soft and hard copies to Bank for which no extra payment will be made.
50. Layout of works shall be got checked by Engineer-in -charge & only then further work shall be taken by after approval.
51. All electrical works shall be got carried out through licensed Electrical Contractor having experience of similar work. Successful bidder to submit the details of licensed Electrical Contractor before start of Internal Electrification Work. The work shall be executed as per BOQ specifications and strictly in keeping with relevant IS code and rules and regulations of authorities
52. The work should be carried out as per latest CPWD specification and as per the standard engineering practice. All measurements shall be made as per CPWD norms. Partition and panelling shall be measured up to bottom of false ceiling, however, its anchoring shall be done at bottom of RCC slab.
53. Site should be cleaned every day and all the unusable material/malba shall be removed from the site and unusable materials shall be stacked properly so that there is no hindrance for staff and public failing which bank will remove the same at their level and suitable amount shall be recovered from the contractor's bill.
54. The contractor shall be required to maintain the coordination with the Building Maintenance Contractor, if required.
55. No old / dismantled material shall be used by the contractor in the work under any circumstances. Unless otherwise specified or under instruction of the bank.
56. The bidder to visit the site and examine the rebate items and site condition before quoting the rates.
57. Dismantling & taking away includes the disposal of unserviceable material / malba to approved municipal yard.
58. The Rebate items will be the property of the contractor. Rates of rebate item shall be considered as negative while calculating the value of tender and the same are to be quoted in negative only.

59. The Contractor shall comply with the provisions of Contract, Labour (Regulation & Abolition) Act, 1970, Minimum Wages Act and all other Labour Laws and other Statutory Regulations (both Central and State) that may be enforced from time to time by the appropriate authorities. Bank shall not be held responsible for any penalty on failure of the any Labour Regulations. Bank shall have the power to inspect the Wage Register and for physical verification of salary paid to the staff with reference to any records of the Contractor and to insist the Contractor to comply with Laws.
60. Contractor should obtain necessary permission that may be required for the purpose of this Contract from such authorities as may be prescribed by Law from time to time.
61. Contractor or his authorized representative should visit the site frequently as required by the Bank and meet Bank's Engineer with prior appointment for any clarifications and to receive instructions, take measurements, etc. at the site.
62. The Contractor should arrange to issue photo identity card to his workers.
63. Any act of indiscipline / misconduct / theft / pilferage on the part of any employee engaged by the Contractor resulting in any loss to Bank in kind or cash will be viewed seriously and Bank will have the right to claim damages or levy fine and / or terminate the Contract forthwith, if necessary.
64. In case of any default or failure on Contractor's part to comply with all / any one of the Terms/ Conditions, Bank reserves to itself the right to take necessary steps to remedy the situation including, inter-alia, the deduction of appropriate amount / s from dues otherwise payable to Contractor and / or by taking recourse to appropriate recovery proceedings.
65. Keeping the area clean and removal of debris: Contractor shall arrange to dispose off debris, any other waste product created while carrying out the work, outside Bank's premises. The Contractor shall take due care while disposing of such waste materials and ensure that any rules / regulations laid down by Municipal Corporation or any other statutory body are not violated. The Contractor shall be responsible and answerable to any complaint arising out of improper disposal of waste material. Quoted rates shall involve the cost of same and no extra payment shall be made towards this account.
66. It is mandatory to provide purchase voucher of the material where basic rates are given in BOQ. However, Bank may instruct the contractor to submit purchase voucher/test certificate of any material.
67. BOQ nomenclature shall prevail over any drawing/detail.
68. The specifications for the entire electrical work and other works shall be in accordance with latest CPWD specifications and latest IS codes. Whenever these codes are silent, the same shall be governed by sound engineering practice and the decision of the Bank in matter of interpretation shall be final and binding on the contractor.
69. Electricity & Water will be provided by Bank to Contractor at one point. Further necessary arrangement/extension, if required, shall be done by the contractor at his own cost with the approval of Bank.

12. LIST OF PREFERRED MAKE OF MATERIAL

The material of standard quality from the following preferred makes is to be used. In case it is established that the brands specified below are not available in the market, contractor shall submit alternative proposal for the approval of Bank.

S.No	MATERIAL NAME	BRAND / MANUFACTURER
1	Plywood (BWR Ply)	Greenply (Gold Platinum) / Archid(Classic) /Century Ply (Club Prime) / Nikon Ply (Club) / Mayur Ply(Royal Ply)
2	Glass	Asahi, Modi, Saint Gobain
3	Door Closers, Floor Spring, Pivot, Patch fittings, Hinges, Mortice door locks, Door handles, Tower bolts.	Dorma, Enox, Kich, Ozone, Dorset.
4	Gypsum Board	INDIAN GYPSUM LTD., Saint Gobain, Diaken
5	Mineral Fibre False Ceiling Tiles	Armstrong, Us Boral, Rock strength
6	Particle Board	Ken Board, Euro Board
7	Veneer (Natural) - 4 Mm Thick	Samrat, Century, Archid/ Merino
8	Laminates	Century Mica, Formica, Greenlam, Merino, Archid.
9	Adhesive	FEVICOL, Vamicol, Araldite
10	Cabinate Handles, Locks , Hinges.	Dorma, Enox, Kich, Ozone, Dorset, Ebco.
11	Sliding Channels	Earl Bihari, Everite
12	Roller Blinds	VISTA LEVOLOR, Mac, Hunter Douglas
13	Beach Wood	As approved by Architect.
14	Flush Door – Confirming To IS : 2202 (Part – 1) – 1991	Green Ply/ EGG Wood/ Rama/ Nikon
15	Metal studs	Gyproc, USG Boral, British gypsum saint gobin.
16	Supporting system for Ceiling	Gyproc, USG Boral, British gypsum saint gobin.
17	Plaster Boards	LAGYP/ Saint Gobain Make / Us Boral
18	Soft Board	Jolly Board
19	Screws	GKW/ Nettlefold
20	Paint	Asian Paints, Nerolac, Nippon, Berger.
21	Writing Board	White Mark
22	Mobile pedestal	Godrej, Featherlite, Steelcase.
23	Keyboard tray, Metal foot rest, CPU Trolley	Ebco, Steelcase.
24	Acrylic solid surface	Dupoint, Merino, LG, HI-Macs.

Electrical Works

S.No	MATERIAL NAME	BRAND / MANUFACTURER
1.	Switches/Sockets/Fan Regulators/Front.	MK India (MK blenz) / Legrand(myrius) /Havells Crabtree (Verona)/Wipro North west (nowa)
2.	Telephone/Computer and LAN Sockets	Legrand /Havell/ AMP/Systimax/Panduit
3.	Cables/Copper Conductor wires	Finolex / Polycab / Havells
4.	PVC conduits & Accessories	Precision (Dt) / Sudhakar/ Avon plast / Mecury / VIP.
5.	MS Conduits & Accessories	Gupta / Bharat / BEC.
6.	Metal clad Sockets	MDS / Clipsal / BCH / Legrand.
7.	MCBs / RCBO / RCCBS / MCB Distribution boards	L&T- Hager / Schneider/ BCH / Siemens / ABB / Legrand.
8.	MCCBs/Switchgear	L&T- Hager / Schneider/ BCH / Siemens / ABB / Legrand.
9.	Under ground Cables	polycab / finolex / Havells
10.	Cable Glands	HMI /Comet /Havells
11.	Capacitor Bank	Epcos /Neptune / Siemens.
12.	Cable Lugs	Dowell's / 3D /Havells
13.	MV Panels (PCCs)	Manufacturers with CPRI Test Certificate.
14.	ELRs/CBCT	Prokdvs /Nagoba
15.	Krone box	Krone,
16.	Indication Lamps LED (protected type)	Schneider / Vaishno / Binay
17.	Resign cast CTs	AE / Kappa
18.	CAT6 / RG 6 / RG 11	Legrand /Havell/ AMP/Systimax/D-Link
19.	LAN (RJ45) Sockets	Legrand /Havell/ AMP/Systimax/D-Link
20.	Light Fixtures	Philips / Wipro / Havells /Crompton
21.	Ceiling Fans & Exhaust Fans	Crompton Greaves or Equivalent

DATA WORKS

S.No	MATERIAL NAME	BRAND / MANUFACTURER
1.	Cat6 E UTP cable	Legrand/Havell/AMP/D-link
2.	PVC casing/pipe/flexible pipe	Modi/sudhakar/ VIP/ Universal
3.	Cat6 24-Port jack Panel	Legrand/Havell/AMP/D-link
4.	Cat6 Information out Let, Faceplate with SMD	Legrand/Havell/AMP/D-link
5.	Cat6 Mounting Cord 3ft (1Mtr) Factory made	Legrand/Havell/AMP/D-link
6.	Cat6 Mounting Cord 7ft (1Mtr) Factory made	Legrand/Havell/AMP/D-link
7.	Communication Rack with Cable Manager, Cantilever shelf, Power manager, mounting fasteners pack of 20, Front Glass Door and Lock	Legrand/Havell/AMP/D-link

NOTE: The contractor shall use only above-mentioned material or equivalent make to be approved by the consultant/Bank. All other materials shall confirm to the specifications laid down. The tenderer shall take this into account while tendering rates / prices.

13. TECHNICAL SPECIFICATIONS FOR WORK

1. GENERAL

1.1 This Specification is for work to be done, item to be supplied and materials to be used in the works as shown and defined on the drawings and described herein, all under supervision and to the satisfaction of the Bank.

1.2 The workmanship is to be the best available and of a high standard, use must be made of special trades men in all aspect of the work and allowance must be made in the rates for so doing.

1.3 The materials and items to be provided by the Contractor shall be approved by the Bank in accordance with any samples which will be submitted for approval by Contractor and generally in accordance with the Specifications. Also if products are specified in the Specification and/or bill of brand, trade name or catalogue reference, the Contractor will be required to obtain the approval of the Bank before using the materials. The Contractor shall produce all in voices, Vouchers or receipts for any material if called upon to do so by the Bank.

1.4 Samples of all materials are to be submitted to the Bank for approval before the Contractor orders or deliver the materials at site. Samples together with their packing are to be provided free of charge by the Contractor and should any materials be rejected, they will be removed from the site at the Contractor's expense. All samples will be retained by the Bank for comparison with materials which will be delivered at the site. Also, the Contractor will be required to submit specimen finishes of Colours, Fabrics etc. for the approval of the Bank before proceeding with the work.

1.5 The contractor shall be responsible for providing and maintaining and boxing or other temporary coverage's required for the protection of finished work if left unprotected. He is also to clean out all shelving, out ends and other waste from all pairs of the works before coverings or in-fillings are constructed.

1.6 Templates, boxes and moulds shall be accurately set out and rigidly constructed so as to remain accurate during the time they are in use.

2 CARPENTRY AND JOINERY (WOOD WORK)

2.1 Timber

All timber shall be of the kind and of first-class quality as described and indicated on drawings and schedules. It shall be uniform in texture, free from large, loose head or cluster knots, veneer, injurious open shakes, bore holes, rot, decay discoloration, soft or spongy spots, hollow pockets, pit and all other defects and blemishes. The sizes shown or described are to be taken as net sizes when finished.

Delivery and Storage

All timber delivered to the site shall be stored above ground in such a manner as to provide proper drainage, ventilation and protection from the weather and shall be stored in the proper manner according to each material type.

2.2 Seasoning

All timber shall be fully seasoned, if necessary, in kilns, and the contractor shall produce satisfactory proof of the same.

The moisture content of timber during manufacture, delivery to site, storage, site working, assembly installation, shall not exceed 12% for internal work and 16% for external work with Tolerance of average moisture content of all the samples in a given lot +/- 2 % and moisture content of individual sample +/-3% of the maximum permissible moisture content as per CPWD specifications.. The timber shall remain stable, free from expansion or contraction or any other movements, when fixed in position. The timber shall be free from drying defects and shrinkage.

Timber used shall conform to specifications described under materials, shall be in accordance with the drawing in every detail and all joiner's work shall be accurately set out, framed and finished in a proper workman like manner. Frames of partitions and opening, etc., shall be of accurately planned smooth and rebates, rounding and mouldings shall be made as shown on the drawings. Patching or Plugging of any kind shall not be allowed. Joints shall be simple, neat and strong. Framed joints shall be coated with suitable adhesive like glue or synthetic resin before the frames put together. All mortise and tenon joints shall fit in fully and accurately without wedging or filling. The joints shall be pinned with hardwood or rust resisting star shaped metal pins of 8 mm dia., after the frames are put together and pressed in position by means of a press. The frames shall be protected during the progress of work by providing suitable boxing. All portions of timber abutting against or embedded in masonry or concrete shall be treated against termites by giving a coat of any approved wood preservative. All T.W.work should be painted with a coat of approved wood primer.

Frames and Shutters shall not be painted or erected before being approved by the Bank.

2.3 Rough carpentry

Material

All framing and other concealed wood members shall be of sound wood or approved specials and shall be seasoned. All surfaces in contact with masonry or concrete, and in general, all surfaces hidden from view, shall be treated with two coats of approved wood preservative paint.

Workmanship

All carpenters' work shall be done by skilled workmen, with the longest nails that may be used without splitting the wood. In general top nailing and cross nailing shall be used. Wherever it is necessary, or an adequate joint can not be formed by nailing, the members shall be lapped or jointed by GI straps or extra wood blocks. All jointing and nailing shall be done with neatness, especially in exposed positions. Joints and nailing shall be approved by the Architect/Project Manager and done according to his direction when required. Cross bracing, solid blocking and bracing shall be provided according to best practice.

2.4 Joinery

Materials

Finished woodwork and joinery including doors shall be with straight grained specified wood of approved quality, unless noted otherwise. Wood shall be free from knots, and other blemishes and imperfections. All finished wood for joinery shall be seasoned as prescribed

before. All joinery work shall be securely mortised and tenoned and glued with best quality synthetic waterproof glue equivalent of FEVICOL or as approved. All sections and dimensions shall be as shown on drawings. For all joinery work, nails shall not be permitted, and only wood screws of appropriate sizes shall be used. Wherever practicable, means of fastening the various parts together shall be concealed.

Running beaded joints are to be cross-tongued with teak tongues wherever 1(1/2) thk. Double cross tongued. Joiners work generally to be finished with fine sand/glass paper.

Joints:

All joints shall be standard mortise and tenon, dowel, dovetail, and cross halved. Nailed or glued butt joints will not be permitted, screws, nails' etc. will be standard iron or wire of oxidized Nettle fold tenons should fit the mortises exactly.

Nailed or glued butt joints will not be permitted, exceptional cases with approval of Bank.

Where screws shown on a finished surface, those will be sunk and the hole plugged with a wood plug of the same wood and grain of the finished surfaces will be neatly punched and the hole filled with wood filler to match the colour.

Should joints in joiner's work open, or other defects arise within the period stated for defect liability in the contract and the clause thereof be deemed by the Architects to be due to such defective joinery shall be taken down, and refilled, redecorated and/or replaced if necessary and any work disturbed shall be made good at the Contractor's expense.

Nails, spikes and bolts shall be of lengths and weights approved by the Bank. Nails shall comply with IS 1959-1960. Brass headed nails are to comply with B.S.1210. Wire staples shall comply with B.S.1494 or equivalent.

The contact surface of dowels, tennons, wedges etc., shall be glued with an approved adhesive.

Where glued, joinery and carpentry work is likely to come into contact with moisture; the glue shall be waterproof grade.

d) Installation

Doors and cabinetwork shall be installed in position only after the plaster in the section for, which it is intended, is sufficiently dry.

All interior and exterior doors, cabinetwork and other fixed wooden equipment shall be fixed plumb and true. Wherever possible, the joints shall be beveled. All exterior angles shall be mitered. Adjoining interior wood members shall match and harmonize. All woodwork in contact with masonry shall be painted with approved bitumen paint before placing in position. All concealed wood members shall be treated with two coats of fire retardant and anti-termite coating (Viper or as approved make) before placing in position.

e) Plywood

Plywood shall be best quality closed grained suitable for veneering, painting or bonded with plastic laminate. It shall conform to IS 303 and BWR grade quality. Exposed edges shall be finished with an edge strip of solid maple wood.

f) Veneers

Type: As specified in the Item Specifications.

- i) Wood species, grain and color shall be as specified and match samples held by the Architect / Project Manager and which have been approved for use:
- ii) Provide Particle Board Core, medium density fiber board, or Architectural Specialty Grade hardwood plywood as a substrate for face veneers as scheduled laminated using hot press application. Pre-selection and acceptance of veneer flitches by Project Manager/ Architect shall be required.
- iii) Provide solid wood edge treatment of species to match face veneer. Thickness of plywood shall be as shown, or as approved on final shop drawings. Use balancing grades of the same veneer on the back and all edges of all wood cores.
- iv) Face veneers for all veneered woodwork for transparent finish shall be from flitches selected for grain, figure, and color by the Superintendent. Sapwood, mineral streaks and other discoloration, worm holes, ruptured grain, loose texture, doze or shakes shall not be permitted.
- v) Veneer Width: All joint as shall be equal in all panels. Panels shall be modular.
- vi) Defects: Pitch marks, defective eyes, deteriorated wood and other visual defects shall be removed by hand and patched to match the face veneer. Visible patches to the “eye” will not be allowed. All patches shall be of the quality work performed in the approve samples.
- vii) Matching: Veneers shall be modular books matched. Each panel shall consist of no more than 2 or 4 sheets of veneer per panel. Book matching shall be center balanced as determined by Project Manager/ Architect. Panels may be ends matched where available flitch lengths necessitate, as approved.

g) Laminate/High gloss Laminate

Decorative laminate sheeting shall be of the brand, catalogues number and indicated or approved. Plastic laminate shall be fire retardant to class I of BS : 476 or ISI code where specified.

Plastic laminates shall be veneered to mounting surface with an approved adhesive, used in strict accordance with the manufacturer's instruction. Rubber based adhesives shall not be used. Sheeting shall not be applied to timber with moisture content of more than 15 or at a temperature of less than 15DC (60D.F). The sheeting shall be applied only to close-grained plywood such as Fir plywood. Edges not faced with laminate, as at field joints, shall be machined and sealed. Butt joint of laminates shall be minimized by using longest available lengths where required and all but joints shall be perfectly flushed and sealed. Grain direction of wood grain laminated sheeting shall be as follows unless otherwise required by the Architect / Project Manager.

h) MDF (Medium Density Fiber Board)

For Interior Works MDF of approved make/ manufacturer shall be of only EXTERIOR GRADE AS per IS 12406 -1988. It is to be contained that MDF shall be invariably used in place of Ply / Boards .so specified in the specifications of either same thickness or of higher thickness. Wherever feasible the minimum thickness of MDF to be used shall be 8mm. Wood screws are not to be used for MDF and only fully threaded parallel shank screws shall be used after drilling pilot holes. Veneering /lamination to the MDF surface shall be done by exterior grade

adhesive only. Polyurethane primers shall be used for sealing the edges and painting the rear side. For specifications of various applications the MANUFACTURER USERS MANUAL shall be followed.

i) **Adhesives**

The adhesives used for all woodwork and MDF shall be FEVICOL / Anchor of appropriate Grade. Manufacturer's recommendations shall be followed for adhesive other than above required for any specified / specialized work.

j) **Joinery**

Joinery shall be carried out strictly in accordance with the drawings, where joints are not specifically indicated recognized forms of joints should be used. Joinery shall conform to IS Standards.

Panels shall be rendered flame retardant and to conform to local fire regulations. The Contractor shall submit samples of all materials including samples of veneer for approval.

All materials pre-fabricated, delivered and assembled shall be in accordance with the approved sample.

The Contractor shall be responsible for protecting all items of woodwork done by him. The contractor shall replace at his own expense any damaged work caused through lack of adequate protection or care in installation or handling.

3 Hardware

a) All hardware for doors and windows shall be of stainless steel. All hardware shall be installed using routers and counter sunk screws. Panic hardware will be provided in all staircase and escape doors. Drawer slides with steel roller ball-bearings and drawer locking system with master keying option is to be provided for all built in cabinetry work and drawer units.

b) The contractor shall procure all the hardware as specified in the schedule. The rate shall include for making mechanical chases to receive the hardware, and also the cost of approved screws, nails, clamps etc. The fixing shall be done in the best workmanship like manner and in accordance with that employed for fixing hardware. Any damage to the joinery or the hardware shall be made good at no extra cost to the Bank.

c) **Locks**

The entire office shall be on a master keying system. The schedule of master keying shall be prepared by the Contractor and got approved from Engineer-In-charge. All locks will have a stainless steel body with a stainless steel bolt. All cabinets in the pantry should be openable with a single key locking system. Each furniture unit in fixed cabinetry work such as credenzas, drawer units and shutters shall be openable with a single key.

70. Gypsum Board Partition:

Metal Stud Partition which includes two layers of tapered edge 15.0mm thick Fire line board screw fixed with drywall screw of 25mm for first layer and 45mm for second layer at 300mm centres to either side of 70mm studs (0.55mm thick having one flange of 34mm and another flange of 36mm made of G.I.Steel) placed at 610mm centre to centre in 70mm floor and ceiling channel (0.55mm thick having equal flanges of 32mm made of G.I. Steel) with joints staggered on each layer to avoid leakage through joints. Finally square and tapered edges of the boards are to be jointed and finished so as to have a flush look which includes filling and

finishing with jointing compound, Joint paper tape and two coats of Drywall Top coat suitable for Gypboard (as per recommended practices of India Gypsum).

Note:

- a. Angle bead to be used at external angles to get straight line finish & protection from normal impacts. It should be charged extra.
- b. Edge bead to be used to protect the exposed Gypsum core of gypboard specially at cut edges of the openings for doors/ windows/glazing or any other unprotected core. It should be charged extra.
- c. Control joints to be used in excess of 10 Mtr. Long partitions/ walls for which no extra will be payable

5. FLUSH DOORS:

5.1 All flush doors shall be solid core unless otherwise specified. It shall conform to the relevant specifications of IS:2202 and shall be obtained from approved manufacturers. The finished thickness of the shutter shall be as mentioned in the item. Face veneers shall be of the pattern and colour approved by the Bank and an approved sample shall be deposited with the Bank for reference.

5.2 The solid core shall be of Wood Laminate prepared from battens of well-seasoned and treated good quality wood having straight grains. The battens shall be of uniform size of about 2.5 cm width. These shall be properly glued and machine pressed together with grains of each piece reversed from that of adjoining one. The longitudinal joints of the battens shall be staggered and no piece shall be less than 50 cm in length. Alternatively, the core shall be of solid teak particle board. Edges of the core shall be lipped with first class teakwood battens of 4 cm minimum depth, glued and machine pressed along the core.

5.3 The core, surface shall then have two or three veneers firmly glued on each face. The first veneer (called Gross Bond) shall be laid with its grains at right angles to those of the core and the second the 'third veneer with their grains parallel to these of the core. The under veneers shall be, of good quality, durable and well seasoned wood. The face veneer shall be of minimum one mm thickness and of well-matched and seasoned first class teak, laid along with grains of the core battens. The combined thickness of all the veneers on each face shall not be less than 4 mm. Thermo setting synthetic resin conforming to IS 303 for moisture proof plywood. In addition all doors should have 8 mm thick teakwood lipping all around.

6. BUTT HINGES:

These shall be of stainless steel (14 gauge) of sizes specified in the schedule of quantities / drawing of approved make.

7. DOOR CLOSER:

These shall be of approved quality conforming to IS : 3562 as specified in the schedule of quantities.

8. PAINTS:

8.1 All material required for the works like Lime for lime wash, dry distemper, oil bound distemper, cement, primer, oil paint, enamel paint, flat oil paint, plastic emulsion paint, anti-corrosive primer, red lead, water proof cement paint shall be of specified and approved manufacturer, delivered to the site in the manufacturer's containers with the seals etc., unbroken and clearly marked with the manufacturer's name or trade mark with a description of

the contents and colour shall conform to the latest Indian Standards for various paints. All materials are to be stored on the site of the work.

8.2 Spray painting with approved machines will be permitted only if written approval has been obtained from the Bank prior to painting. No spraying will be limited in the case of priming coats nor where the soiling of adjacent surfaces is likely to occur. The buzzle and pressure to be so operated as to give an even coating throughout to the satisfaction of the Bank. The paint used for spraying is to comply generally with the specification concerned and is to be specially prepared by the manufacturer for spraying. Thinning of paint made for brushing will not be allowed.

8.3 Wood preservative shall be Bison or other equal and approved impregnating wood preservative and all concealed wood work shall be treated with wood preservative.

8.4 All brushes, tools, pots, kettles etc. used in carrying out the work shall be clean and free from foreign matter and are to be thoroughly cleaned out before being used with a different type of class of materials.

8.5 All iron or steel surfaces shall be thoroughly scraped and rubbed with wire brushes and shall be entirely free from rust, mill scale etc. before applying the priming coat.

8.6 Surfaces of new wood work which to be painted are to be rubbed down, cleaned , down to the approval of the Architects.

8.7 Surfaces of previously painted woodwork which are to be cleaned down with soap and water, detergent solution or approved solvent to remove dirt, grease etc. While wet the surfaces shall be flatted down with a suitable abrasive and then rinsed down and allowed to dry. Minor areas of defective paint shall be removed by scraping back to a firm edge and the exposed surface touched in with primer as described and stopped with putty. Where wood work has been previously painted or polished and is to be newly polished, scrapping, burning off or rubbing down.

8.8 Surfaces of previously painted metal which shall be painted are to be cleaned down and flattened down as described in surfaces of any rust and loose scale shall be removed completely by chipping, scrapping and wire brushing back to the bare metal and touched in with primer as described.

9. PAINTING SYNTHETIC / PLASTIC EMULSION ETC:

9.1 Ready mixed oil paint, plastic emulsion paint, ready mixed synthetic enamel paint, Aluminium paint, etc., shall be brought in original containers and in sealed tins. If for any reason thinner is necessary the brand and quantity of thinner recommended by the manufacturer or as instructed by the Bank shall be used.

9.2 The surface shall be prepared as recommended by the manufacturers and as instructed by the Bank and cost of approved primer shall be applied. After 24 hours drying, approved of specified quality paint shall be applied evenly and smoothly. If required filler putty coating may be given to give smooth finish. Each coat shall be allowed to dry out thoroughly and then lightly rubbed down with sand paper and cleaned of dust before, the next coat is applied. Number of coats shall be as specified in the item and if however the finish of the surface is not uniform additional coats as required shall be applied to get good and uniform finish at no extra cost. After completion no hair marks from the brush or clogging of paint puddles in the corners of panel angles of mouldings shall be left on the work. The glass panes floor etc. shall be cleaned of stains.

9.3 When the final coat is applied, if directed, the surface shall be rolled with a roller or if directed it shall be stippled with a stippling brush.

TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

CHAPTER 1

INTERNAL ELECTRIFICATION

1.0 Scope :

This specification is intended to cover the requirements of supply, installation, testing and commissioning of electrical wiring installation and other accessories required for its satisfactory operation. This covers the essential requirements or precautions regarding wiring installations for ensuring satisfactory and reliable service.

2.0 Standards :

The Electrical wiring installations and other accessories shall comply with latest IS : 732 - 1989 and National Electrical code - 1985.

3. Construction

Wall mounted switch boards shall be installed such that the bottom is at a minimum height of 1.35 m above finished floor level wherever applicable, as indicated in the drawing.

Equipment which is on the front of a switch board shall be so arranged that inadvertent personnel contact with live parts is unlikely during the manipulation of switches, changing of fuses or similar operation.

In every case in which switches and fuses are fitted on the same pole, these fuses, shall be so arranged that the fuses are not live when their respective switches are in 'OFF' position.

No fuses other than fuses in instrument circuit shall be fixed on the back or behind a switch board panel or frame.

4. Capacity of circuit :

Lighting Circuits shall not have more than a total of ten points of fans, 5A socket outlets and light points and its total load shall not exceed 800 watts. Lights, fans, and 5A socket outlets can be wired on a single common circuit. If fan circuit is drawn separately, circuit shall not be used more than eight points and load shall not exceed more than 800 watts. In the circuit, the neutral and earth wires can be looped up to 10points. From distribution boards Neutral & Earth wires shall be run for every circuit.

The power circuits shall not have more than two outlets per circuit if load to be fed by each outlet is less than 1KW, and if load is more than 2KW, each outlet shall be connected to a separate circuit.

Switches : All switches shall be placed in the live conductor of the circuit and no single pole switch or fuse shall be inserted in the earth or earthed neutral conductor of the circuits. Single pole switches (other than for multiple control) carrying not more than 15amperes may be of the piano flush type and the switch shall be 'ON' When the knob is down.

Lamp holders : Lamp holders for use on brackets and the like shall have not less than 1.3 cm nipple and all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with shade carriers. Where centre contact Edison screw

lamp holders are used, the outer or screw contact shall be connected to the 'middle wire' or the neutral or to the earthed conductor of the circuit.

Lamps : All incandescent lamps, unless otherwise specified shall be hung at a height of not less than 2.5 m above the finished floor level.

Ceiling rose : a) A ceiling rose or any other similar attachment shall not be used on circuit, the voltage of which normally exceeds 250 volts.

A ceiling rose shall not embody fuse terminals as an integral part of it.

Every socket outlet shall be controlled by a switch. The switch controlling the socket shall be on the 'live' side of side line. 5 Amps and 15 Amps socket-outlet shall normally be fixed at any convenient place 60 cm above the floor level or near such level as indicated in drawing. 15 Amps socket outlets in kitchen shall be fixed at convenient place 23cm above the working platform. In a room containing a fixed bath or shower, there shall be no socket outlet and there shall be no provision for connecting a portable appliance.

5. Recessed MS conduit wiring system

a) Making of chase : The chase in the wall shall neatly be made and shall be of suitable dimension to permit the conduit to be fixed in the manner desired by the Engineer-in-charge. In the case of buildings under construction, chases shall be provided in the wall, ceiling, etc. at the time of their construction and shall be filled up neatly after erection of conduit and brought to the original finish of the wall.

b) Fixing of conduit in chase : The conduit shall be fixed by means of staples or by means of saddles not more than 600 mm apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a long radius which will permit easy drawing-in of conductors. All the threaded joints of rigid steel conduits shall be treated with approved preservative compound to ensure protection against rust.

c) Inspection boxes : To permit periodical inspection and to facilitate replacement of wires, suitable inspection boxes shall be provided at convenient locations. They shall be mounted in flush with the wall. The minimum size of inspection boxes shall be 75 x 75 mm. Suitable ventilating holes shall be provided in the inspection box covers.

d) Types of accessories to be used : All outlets, such as switches and sockets, may be either of flush mounting type or of surface mounting type.

The switches and other outlets shall be mounted on such boxes. The metal box shall be efficiently earthed with the earth continuity wire run along the conduit.

When crossing through expansion joints in buildings, the conduit sections across the joint may be through flexible copper bellows of the same size as PVC conduit. The Number of wires that can be drawn through a conduit shall be strictly as per IS 732 and as mentioned in Drawings.

6. MS Conduits :

MS conduit shall be black enameled and of thickness not less than 16SWG and of size minimum 19 mm dia. The Conduit shall conform to IS 9537/ Part II

Bunching of cables : Separate conduits shall be used for bunching of conductors of AC supply and DC supply for lighting and small power outlet circuits.

All outlets of conduit systems shall be properly drained and ventilated, but in such a manner so as to prevent the entry of insects etc. as far as possible.

Bends in conduit : Wherever necessary, bends or diversions may be achieved by bending the conduits or by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings.

In case of plain conduit, heat may be used to soften the conduit for bending and forming joints. Positioning of conduit in close proximity to hot surfaces should be avoided.

7. TESTING OF WIRING:

The following tests shall be carried out on all types of wiring on completion of the work and before energizing the installation :

- i) Insulation resistance test,
- ii) Electrical continuity test,
- iii) Earth continuity test,
- iv) Earth electrode resistance test,
- v) Switch polarity test.

i) Insulation Resistance test :

The insulation resistance shall be measured by using 500 v megger between the following points.

Phase and neutral conductor with all fuses in position and all switches in closed condition and main switch in OFF position with lamps and other devices removed.

Between earth and whole system of conductors with all fuses in place, all switches closed and all lamps in position.

Between all conductors connected to one phase of the supply of the above tests shall not be less than 50 divided by the number of points on the circuit. Where a whole installation is being tested, a lower value than that given by the above formula is acceptable subject to a minimum of one megaohm.

The insulation resistance in megaohm as obtained by each of the above tests shall not be less than 50 divided by the number of points on the circuit. Where a whole installation is being tested, a lower value than that given by the above formula is acceptable subject to a minimum of one megaohm.

(ii) Electrical continuity test :

Each and every circuit shall be tested for electrical continuity by using a multimeter.

(iii) Earth continuity test :

The earth continuity conductor including metal conduit shall be tested for electrical continuity and the resistance of the same along with the earthing lead measured from the connection with the earth electrode to any point in the earth continuity conductor in the complete installation shall not exceed one ohm.

iv) Earth electrode resistance test :

The earth electrode resistance shall be tested as specified in section

(v).Switch polarity test :

Test shall be made to verify that all switches in every circuit have been fitted in the same conductor throughout and such conductor shall be marked for connection to the phase conductor.

8 Distribution Boards :

All the distribution boards shall be with MCBs as described in the respective schedule.

The distribution boards shall be controlled by a switch fuse, miniature circuit breaker or an isolator as described in the respective schedule. Each outgoing circuit shall be provided either with MCB or a fuse on the phase. The neutral shall be connected to a common link and be capable of being disconnected individually for testing purposes.

The distribution boards shall be located as indicated in the respective electrical working drawings and as directed by Engineer - in - charge. The distribution boards shall be fixed on wall in the niche provided and marked with the details of circuits, source of supply, size of incoming wires Etc.,

All marking shall be clear and legible.

The total load of the consuming devices shall be evenly distributed between the number of ways of distribution board.

The consuming devices circuit shall be connected to distribution board in proper sequence, so as to avoid unnecessary crossing of wires.

Cables shall be connected to a terminal only by crimped lugs.

Cables shall be rigidly fixed in such a manner that a clearance of at least 2.5cm is maintained between conductors of opposite polarity or phase and between the conductors and any material other than insulating material.

The incoming and outgoing cables shall be neatly bunched.

9. MOUNTING HEIGHTS :

The Mounting heights of various fixtures shall be as specified in the Drawings.

CHAPTER 2

POWER CONTROL CENTRES

1.0 Scope :

This specification is to cover the requirement of design, supply, installation, testing and commissioning of LT power control centres / main switch boards with all components, Instruments, fittings and accessories for efficient operation without any trouble.

2.0 Standards :

The PCC specified herein, unless otherwise stated shall conform to the relevant and latest revisions of Indian standards and Indian Electricity Rules.

3.0 Design and construction :

3.1 Design requirements : The power control centres shall be suitable for operation on 440volt, 3 phase,4wire 50HZ system to withstand a short circuit level of 50 KA RMS symmetrical.

The PCC shall be designed for operation in high ambient temperature upto 45 degrees centigrade and high humidity upto 95% and tropical atmospheric conditions. Means shall be provided to facilitate ease of inspection, Maintenance and Servicing.

3.2 Constructional requirements :

The power control centre shall be of

i) Metal clad, cubicle, indoor, free standing type suitable for Mounting on Built up Trenches with U Channels of adequate size.

ii) Made up of the requisite vertical sections, which when coupled together shall form continuous dead front switch board.

iii) Dust and damp protected, the degree of protection shall be better than IP - 54 as specified in IS-2147.

iv) Readily extendable on both sides by the addition of vertical sections after removal of the end covers.

v) Single front construction with the circuit breaker feeder and switch fuse feeders suitable for operation from the front of the panel.

The PCC shall have the feeder ratings as per the schematic diagrams enclosed with the schedule and constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity, which are likely to be encountered in normal service.

3.3 Vertical Sections :Each vertical section shall comprise a front framed structure rolled folded sheet steel channel section of minimum 2 mm thickness rigidly bolted together. This structure shall house the components contributing the major weight of the equipment such as circuit breaker, switch fuse units, main horizontal busbars, vertical risers and other front mounted accessories. The structure shall be mounted on a rigid base frame of folded sheet steel of minimum of 2.5 mm thickness and 100mm height. The design shall ensure Structural stability during Transit and also during Operation after Commissioning Suitable cable chamber housing the cable end connections and power / control cable terminations shall be provided. The design shall ensure generous availability of space for ease of installation and maintenance of cabling and adequate safety for working in one vertical section without coming into accidental contact with live parts in the adjacent section.

A cover plate at the top of the vertical section shall be provided with necessary ventilating arrangements. Any aperture for ventilation shall be covered with a perforated sheet having less than 1 mm diameter perforations to prevent entry of vermin.

3.4 Sheet Steel Cubicle :

3.4.1 The sheet steel cubicle shall be designed in fully segregated multitier formation. Each cubicle shall have hinged front access door with easy operating fasteners. All the doors and covers shall be heavily gasketed to make the compartment dust tight. Each cubicle shall have a covering at the bottom to make a dust and vermin proof construction. Door hinges shall be of concealed type.

The cubicle shall be of minimum 2 mm thick sheet steel. Sheet steel shrouds and partitions shall be of minimum 1.6 mm thickness. All sheet steel work forming the exterior of switch boards shall be smoothly finished, leveled and free from flaws. The corners shall be rounded. The minimum Thickness of Gland plates shall be 3mm.

3.4.2 The apparatus and circuits in the power control centers shall be so arranged as to facilitate their operation and maintenance at the same time to ensure the necessary degree of safety.

Apparatus forming part of the control centers shall have the following minimum clearance.

- i) between phases - 25 mm,
- ii) between phase and neutral - 25 mm,
- iii) between phases and earth - 25 mm,
- iv) Between neutral and earth - 19 mm,

When, for any reason, the above clearances are not available suitable insulation shall be provided. Clearance shall be maintained during normal service conditions. Creepage distances shall comply with those specified in relevant standards.

3.4.3 All insulating materials used in the construction of the equipment shall be non hygroscopic duly treated to withstand the effect of high humidity, high temperature and tropical ambient service conditions.

3.4.4 Functional units such as circuit breakers and fuse switches shall be arranged in multitier formation, except that not more than One air circuit breaker housed in a single vertical section.

3.4.5 Metallic/insulated barriers shall be provided within vertical sections and between adjacent sections to ensure prevention of accidental contact with :

- i) Main busbars and vertical risers during operation, inspection or maintenance of functional units and front connected accessories.
- ii) Cable terminations of one functional unit, when working on those of adjacent unit/units.

3.4.6. All doors / covers providing access to live power equipment / circuits shall be provided with tool operated fasteners to prevent unauthorized access.

3.4.7 Provisions shall be made for permanently earthing the frames and other metal parts of the switchgear by two independent connections.

3.5 Metal treatment and finish :

All steel works used in the construction of the switch boards shall have undergone a suitable rigorous metal treatment process so as to remove oxide scales and rust formation and to facilitate a durable coating of the paint on the metal surfaces and also to prevent the spreading of rust, in the event of the paint film being mechanically damaged. Two coats of Anti Corrosive primer followed by a finishing coat of Epoxy spray power coating of the shade 631 of IS : 5 (i.e. Siemens grey) shall be given. The total thickness of paint shall not be less than 25 micron.

3.6 Bus Bars :

3.6.1 The busbars shall be housed in non-segregated sheet steel compartments in the cubicle at convenient locations with provision for access to the buses from the front of the panel. The busbar shall be suitably braced with DMC/SMC supports to provide a through fault withstand capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand capacity 150 KA minimum. The neutral as well as the earth bus shall be capable of withstanding the above fault level.

3.6.3 Large clearance and creeping distance shall be provided on the busbar system to minimize the possibility of a fault.

3.6.4 High tension bolts, nuts and spring washers shall be provided at all busbar joints.

3.6.5 The continuous rating of the busbar shall be 125% of the rated current. Maximum temperature of the bus and the connections shall not exceed 85 degrees centigrade. The busbars shall be of liberal design for the required current rating i.e. 0.8Amp/sq.mm.

The main phase busbars shall have continuous current rating throughout the length of each power control centre and the neutral busbars shall have continuous rating of at least 50% of phase busbars.

3.6.6 Connections from the main busbars to functional circuits shall be arranged and supported so as to withstand without any damage or deformation, the thermal and dynamic stresses due to short circuit currents.

All busbars and tapings shall be provided with color coded sleeves for phase identification.

All joints/tapping points of the buses shall be suitably shrouded to prevent accidental contact.

4.0 Circuit Breakers :

4.1 General :

4.1.1 Circuit breakers shall be of triple pole / four pole, air break, horizontal draw out /Fixed type, as given in the schedule of work and comply with the requirements of relevant IS with latest amendments and shall have the following :

- i) A short circuit breaking capacity of not less than 50 KA RMS at 415 volts, 50 Hz AC.
- ii) A short circuit making capacity of 105 KA.
- iii) A short time withstand capacity of 150 KA for one second.
- iv) Electrical overload performance at 6 times the rated current, 100% of the rated voltage as recovery voltage at 0.5 power factor.

v) Dielectric test of 2.5 KV applied for one minute on main circuits.

4.1.2 The circuit breakers shall be fitted with detachable arc chutes on each pole designed to permit rapid dispersion, cooling and extinction of the arc. Interphase barriers shall be provided to prevent flash over between phases.

4.1.3 Arcing contacts shall be of hard wearing material copper tungsten or silver tungsten and shall be easily replaceable. Main contacts shall be of silver plated copper of high pressure type and generous cross section.

4.2 Operating Mechanism :

The operating mechanism shall be of robust design, with minimum number of linkages to ensure maximum reliability. Manually operated circuit breakers shall be provided with spring operated closing mechanism which are independent of speed of manual operation. Electrically shall be independent of the motor which shall be used slowly for charging the closing spring.

The operating mechanism shall be such that the breaker is at all times free to open immediately when the trip coil is energized.

Mechanical operation indicators shall be provided to show open and close positions of the breaker. Electrically operated breakers shall be additionally provided with mechanical indications to show charged and discharged conditions of the charging spring.

Means shall be provided for slow closing and opening of the breaker for maintenance purposes, and for manual changing and closing of electrically operated breakers during emergencies,

4.3 Protection :

Provisions shall be available for fitting a minimum of five trip devices - three over current, as shunt trip and an under voltage release or two over current and earth fault release, a shunt trip and one under voltage release. The breakers shall be of the shunt or series trip type as specified in the schedule.

4.4 Housing of Circuit Breaker :

Circuit breakers shall be individually housed in sheet metal castle provided with hinged doors. The breaker along with its operating mechanism shall be mounted on a robust carriage moving on guide rollers within the castle. Isolating contacts for both power and control circuits shall be of robust design and fully self aligning. The assembly shall be designed to allow smooth and easy movement of the breakers within its castle.

The breaker shall have three distinct positions within the castle as follows :

- i) `Service' position : With main and auxiliary contacts connected.
- ii) `Test' position : with power contacts fully disconnected and control circuit contacts connected.
- iii) `Isolated' position : with both power and control circuit contacts fully disconnected.

It shall be possible to achieve any of the above positions with the castle doors closed. Mechanical position indicators shall be provided for the three positions of the breakers.

4.5 Interlocking :

4.5.1. The moving portion of the circuit breaker shall be interlocked so that :

- i) It shall not be possible either to isolate it from the connected position, or to plug it in from the Isolated position with the breaker closed.
- ii) The circuit breaker can be closed only when it is in one of the three positions or when it is fully out of the castle.
- iii) It shall not be possible to open the hinged door of the castle unless the breaker is drawn to the isolated position.
- iv) Inadvertent withdrawal of the circuit breaker too far beyond the supporters is prevented by the suitable stops.

4.5.2 Provisions shall be available for the padlocking of the circuit breaker access flange in any of the three positions.

4.5.3 Automatically operated safety shutters shall be provided to screen the fixed isolating contacts when the breaker is drawn out from the castle.

4.5.4 The moving portion of the circuit breaker shall be provided with a heavy duty, self aligning earth contact, which shall make before and break after the main isolating contacts during insertion into with drawl from the service position of the breaker. Even in the isolated position positive earthing contact should exist.

4.5.5 Auxiliary switches directly operated by the breaker operating mechanism and having 4 'NO' and 4 'NC' contacts, shall be provided on each breaker. The auxiliary switch contacts shall have a minimum rated thermal current of 10 amps.

5.0 **Switch Fuse Units :**

5.1 General :

The switch fuse units shall be of the load break, heavy duty, cubicle type conforming to the requirements IS and of AC 23 duty.

The switch fuse units shall be capable of withstanding the thermal and electromagnetic stresses caused by short circuits for the time of operation of the associated fuse links.

The switch fuse units shall be double break and have quick make break mechanism, designed to ensure positive operation.

All switch fuse contacts shall be silver plated at the current transfer surfaces.

The unit shall be provided with a front operating handle. The ON and OFF positions of the switch handle shall be clearly marked.

5.2 Interlocks and Safety :

Interlocks shall be provided so as to prevent opening of the unit door when the switch is in the ON position and also to prevent closing of the switch with the door not properly secured. It should however be possible for a competent person to operate the switch shall be suitable for locking with switch in the OFF position by means of a padlock.

The interior arrangement of the switch fuse unit shall be such that all 'Live' parts are shrouded.

5.3 HRC Fuses :

The switch fuse units shall be fitted with High rupturing capacity cartridge fuse links with ISI marking for a rupturing capacity of not less than 80 KA at 415 volts. The fuse links shall be mounted in a drawout carriage, thus ensuring positive isolation of contacts during fuse replacements.

6.0 Current Transformers.

Current transformers shall comply with the requirements of relevant latest amendment IS. They shall have ratios, outputs and accuracy as specified in the schedule.

7.0 Indicating / Integrating Meters :

All indicating instruments shall be of flush mounted industrial pattern conforming to the relevant latest amended IS. The instrument shall have non reflecting bezels, clearly, divided and indelibly marked scales, and shall be provided with zero adjusting devices in the front. Integrating instruments shall be of flush mounted switch board pattern complying with the requirements of relevant latest IS.

8.0 **Relays** :Circuit breakers shall be provided with integrally mounted relays as specified in the schedule.

The relay shall have a set of three phase characteristics, which shall be adjustable over a wide range, to provide discrimination between a multiplicity of devices. The relay shall be able to provide over current and earth fault protection. Also UV and Shunt trip Relays are to be provided.

9.0 **Control switches/Selector switches** :Control switches/Selector switches shall be of the heavy duty rotary type, with plates clearly marked to show the operating position. They shall be of semi-flush mounted type with only the front plate and the operating handle projected.

Circuit breakers control switches shall be of the spring return to neutral type.

10.0 Indicating lamps and push buttons :

Indicating lamps shall be of the LED type of low watt consumption, provided with series resistors where necessary and with translucent lamp covers. Bulbs and lenses shall be easily replaceable from the front.

Push buttons shall be of the momentary contact, push to actuate type fitted with self-reset contacts and provided with plates marked with its junctions.

11.0 Cable terminations :

Cable entries and terminals shall be provided in the switch board to suit the number, type and size of aluminum conductor power cables and copper conductor control cables as indicated in the schematic diagram.

Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable glands and terminals such that cables can be easily and safely terminated.

Barriers or shrouds shall be provided to permit safe working at the terminals of one circuit without accidentally touching that of another live circuit.

Cable riser shall be adequately supported to withstand the effects of rated short circuit currents without damage and without causing secondary faults.

Cable sockets shall be of copper and of the crimping type/soldering as required.

12.0 Control wiring :All control wiring shall be carried out with 1100/650 V grade single core Copper cable conforming to relevant IS having stranded copper conductors of minimum 2.5 sq.mm. section for CT Wiring and 1.5sq.mm for Control/indicating Instruments.

Wiring shall be neatly bunched, adequately supported and properly routed to allow easy access and maintenance.

Wires shall be identified by numbered ferrules at each end. The ferrules shall be of the ring type of non-deteriorating material. They shall be firmly located on each wire so as to prevent free movement.

All control circuit fuses shall be mounted in front of the panel and shall be easily accessible.

13.0 Terminal blocks and lables :

Terminal block shall be of 500 volts grade of the stud type. Insulating barriers shall be provided between adjacent terminals.

Terminal block shall have minimum current rating of 10 amps and shall be shrouded.

Provisions shall be made for lable inscriptions.

Lables shall be made of anodized aluminum, with white engraving on black background. They shall be properly secured with fasteners. Danger plate of size and descriptions as recommended in the relevant IS shall be provided on the PCC.

14.0 Tests :

i) The power control centre shall be completely assembled, wired, adjusted and tested for operation under simulated conditions to ensure correctness of wiring and interlocking and proper functioning of all components.

ii) Each power control centre and components shall be subjected to standard routine tests as per applicable clauses of relevant standards.

iii) All current carrying parts and wiring of power control centre shall be subjected to power frequency voltage withstand test.

15.0 Drawings :After the award of the contract the contractors shall submit three copies of the following drawings for approval of the Department.

i) Outline dimensional drawing of the PCC showing the general arrangement indicating the following :

- a) Busbar clearances;
- b) power and control cable entry points;
- c) Configuration of busbars;
- d) Details of support insulations and spacings;
- e) Outgoing power cable termination arrangements.

ii) Single line diagram of power control centre showing Protection, Metering etc.

iii) Cubicle wiring diagram.

iv) List of Firements with Ratings & makes / Models

16.0 Installation Testing and commissioning :

The power control centre shall be installed over the cable trench/cable pit using suitable size of MS channel including grouting of the channel with necessary bolts and nuts. Proper earthing of PCC shall be done using two independent copper/GI strip of sizes as indicated in the schedule. The channel shall be painted with one coat of red oxide primer and two coats of anticorrosive enamel paint of proper shade as directed by the Engineer-in-charge.

The pre-commissioning tests as required shall be done and the PCC shall be commissioned.

CHAPTER 3 LAYING OF CABLES

1.0 Scope :

This specification is intended to cover the requirements of installation and energizing of PVC/XLPE/PILCDSTA power cables including jointing of cables.

2.0 Standards :

The power cable and its fixing accessories shall comply with the latest relevant Indian Standards and National Electrical Code.

3.0 Laying of Cables :

3.1 General :

3.1.1 Before the commencement of cable laying, it shall be ensured by the Engineer-in-Charge that only ISI marked cables are used. It shall be the responsibility of the contractor to check the soundness and correctness of the size of the cable while taking delivery of the cable from stores. Any defect noticed shall be brought to the notice of the issuing authorities immediately. If any defects is noticed after the cable is laid or during the process of laying, it shall be brought to the notice of the Engineer-in-Charge and upon his satisfaction, that the cable is not damaged due to bad handling, it will be the entire responsibility of the contractor to retrieve the cable already laid and return the defective cable to store and take fresh length of the cable from the store and relay the same.

3.1.2 The material such as bricks, sand, cable route markers, RCC slab of best quality as approved by the Engineer-in-Charge only shall be used for cable laying works.

3.1.3 The contractor shall provide all the necessary labour, tools, plants and other requisites at his own cost for carrying out pumping of water and removing of water from trenches, if any, where required.

3.1.4 Installation shall be carried out in a neat, workman like manner by skilled, experienced and competent workman in accordance with standard practices.

3.1.5 While laying the cable care shall be taken to avoid formation of kinks and also damage to the cable. In the case of cable bends, it shall not have bent radius lesser than 20 times the overall diameter of the cable.

3.1.6 A cable loop of about five meters length and as directed by the Engineer-in-Charge / APGVB shall be provided at the following locations.

- a) Near the termination points
- b) Near to the straight through joint

3.1.7 The method of cable laying and routing of cables, shall in every case be as directed by the Engineer-in-Charge / consultant / APGVB.

3.1.8 Whenever cable passes through hume pipes/GI pipes embedded across the wall in a building, both the ends of the pipe shall be suitably sealed.

3.1.9 Identification tags indicating the size of the cable and feeder designation shall be securely attached at both ends of the cable. Such tags shall also be attached to the cable at intervals of 50 Mtrs. The materials of the tag shall be of either 12 SWG GI sheet. In case of plastic, the details have to be engraved and incase of GI sheet, the details should be punched. Cable route markers shall be provided at the intervals of 200 M with a

minimum of one number route marker. The details of the route markers shall be as per the drawing. At the locations of straight through joints, necessary joint-markers shall be provided.

3.1.10 When cable runs vertically, it shall be clamped on mild steel flats or angle iron fixed on walls and are spaced at such intervals as to prevent buckling of the cables. All steel work shall be painted with a coat of red oxide and thereafter finished with suitable anticorrosive paints.

3.2 Cable laid in ground :

3.2.1. All MV cables (up to 1.1 KV) shall be laid at a minimum depth of 0.75 M & HT cables (1.1 KV to 11 KV) shall be laid at a depth of 1.0 M when laid in ground. When cable pass through roads, nallahs etc. they must be protected by either hume pipe or GI pipe of suitable dimensions.

3.2.2. Excavations of trenches shall be carried out as indicated in the drawing. The width of the trench at the bottom shall be 0.4 M for one cable. In case the total number of cables laid in trenches is more than one, then the width shall be such that the spacing between the cables is maintained as shown in the drawing. Before the cable is laid in the trench the bottom of the trench shall be cleared from stones and other sharp materials and filled with sand layers of 75 mm, as shown in the drawing.

3.2.3. While removing the cable from the drum, it shall be ensured that the cable drum is supported on suitable jacks and the drum is rotated to unwind the cable from the drum. The cable should never be pulled while unwinding from the drum. It shall be ensured that the cables are run over the wooden rollers placed in the trench at intervals not exceeding 2 M.

3.2.4. After placing the cables in the trench shall be filled in layers ensuring that each layer is well rammed by spraying water and consolidated. The extra earth shall be removed from the place of trench and deposited at a place as directed by the Engineer-in-Charge/consultant / APGVB.

3.2.5. The HT cables shall be provided with RCC slabs (marked HT cable) on top as protection.

3.3 Cables laid in built up trench :

3.3.1. Before the commencement of cable laying the cable trench shall be drained properly. Cable shall be laid as explained in item 3.2. Cable shall be properly clamped to the cable supports, which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports, which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports, as directed by the Engineer-in-Charge / APGVB.

Care shall be taken while removing and replacing the trench cover slab. It is the responsibility of the contractor to make good any damaged trench covers.

3.4. Cable terminations and straight through joints :

3.4.1. All cable jointing materials such as straight through joint boxes, cable compound, cable lugs, insulation tapes etc. shall be of best quality and as approved by the Engineer-in-Charge / APGVB.

3.4.2. Cable glands for strip / armoured cables shall include a suitable armour clamp for receiving and securely attaching the armouring of the cable in a manner such that no movement of the armour occurs when the assembly is subjected to tension forces.

The cable gland shall not impose on the armouring, a bending radius not less than the diameter of the cable. The clamping ring shall be solid and of adequate strength.

Provision shall be made for attachment of an external earthing bond between the metallic covering of the cable and the metallic structure of the apparatus to which the cable box is attached.

3.5 Sealing boxes :

3.5.1 A sealing box, irrespective of the class of insulation of the cable for which it is intended, shall be so designed that it may be filled with compound after connecting the cable specially in flame proof/hazardous areas.

3.5.2 All parts and connection for attaching the armouring, wiping or clamping the metallic sheath in a sealing box, shall be easily accessible. This may be achieved by splitting the box or by providing a suitable cover or other such means.

3.5.3 The joints in the box shall prevent leakage of the compound.

3.5.4 Provision shall be made to ensure that the cores of the cable are efficiently sealed to prevent moisture penetrating along the strands or the cable conductors.

3.5.5 The sealing box shall be provided with compound filling orifices with suitable covers or plugs of size that will permit easy pouring of the compound.

In all cases where screwed plugs are used, one or more air vents shall be provided to ensure complete expulsion of air and total filling of the box with compound.3.5.6 The box shall be of sufficient length to allow for manipulation of the insulated cover without damage to them or to the insulation.

3.5.7 A sealing box intended to be attached directly to the apparatus shall be designed such that the box together with the connected cable may be detached from the apparatus without disturbing the sealing compound.

3.5.8 Cable sealing and dividing boxes intended for use in the flame proof areas shall comply additionally with the relevant requirements of IS:2148-1968.

4.0 Testing

Once cable is laid, following tests shall be conducted in the presence of Engineer-in-Charge, before energizing the cable:

- i) Insulation resistance test (Sectional and Overall).
- ii) Sheathing continuity test.
- iii) Continuity and conductor resistance test.
- iv) Earth test.
- v) High voltage test.

Tests conducted shall be as per Indian Standards and National Electrical Code.

CHAPTER 4 EARTHING

1.0 SCOPE:

This specification is intended to cover the requirements of supply, installation, testing and commissioning of

- a) Pipe earthing
- b) Plate earthing
- c) Strip earthing

2.0 STANDARDS:

Earthing installations shall conform to the Indian Electricity Rules - 1956, as amended from time to time and IS 3043-1989 "code of practice for earthing", with latest amendments.

3.0 Earth electrode arrangement :

3.1 Pipe electrode :

3.1.1 Electrode shall be made of CI pipe having a clean surface and not covered with paint, enamel or poorly conducting material. Galvanized pipe shall not be smaller than 100 mm ID. Earthing with pipe electrode shall be done as per the details indicated in IS : 3043/87 .

3.1.2 Electrodes shall be embedded below permanent moisture level.

3.1.3 The length of pipe electrodes shall not be less than 2.5 m. if rock is encountered, pipes shall be driven to a depth of not less than 2.5 m with suitable inclination. Pipe shall be in one piece and deeply driven.

3.1.4 To reduce the depth of burial of an electrode without increasing the resistance, a number of rods or pipes may have to be connected together in parallel. The distance between two electrodes in such a case shall not be less than twice the length of the electrode. The earthing lead shall be connected by means of a through bolt, nuts and washers and cable socket.

3.2 Plate electrode :

For plate electrodes, minimum dimensions of the electrode shall be as under.

3.2.1 GI plate electrode : 600 x 600 x 6 mm thick.

3.2.2 Copper plate electrode : 600 x 600 x 3.15 mm thick

3.2.3 The electrode shall be buried in ground, with its faces vertical and top not less than 2.5 M from the surface of the ground.

3.2.4 Earthing using plate electrode shall be done as per details, indicated in drawing.

3.2.5 Plate electrodes shall have a galvanized iron water pipe, buried vertically and adjacent to the electrode. One end of pipe shall be at least 5 cm above the surface of the ground and need not be more than 10 cm. The internal diameter of the pipe shall be at least 19 mm. The length of pipe under the earth's surface shall be such that it shall be able to reach the center of the plate. The earthing lead shall be securely bolted the plate with two bolts, nuts, check nuts and washers.

3.3. Strip or conductor electrodes :

3.3.1. Strip electrode shall not be smaller than 25 x 1.6 mm, if of copper and 25 x 3 mm, if of galvanized iron and steel. If round conductors are used as earth electrodes, their cross

sectional area shall not be smaller than 3 sq.mm , if of copper and 6 sq.mm. if galvanized iron and steel.

3.3.2. Conductor shall be buried in trenches not less than 0.5 m deep.

4.0 General :

i) All materials used for connecting the earth lead with electrode shall be of GI in case of GI pipe and GI plate electrodes, and of tinned brass in case of copper plate electrode. The earthing lead shall be securely connected at the other end to the main board.

ii) The earthing lead from electrode onwards shall be suitably protected against mechanical injury by routing the earth wire / strip through a suitable size of GI pipe.

iii) All medium voltage equipments shall be earthed by two separate and distinct connections with the earth. In the case of high and extra high voltages, the neutral points shall be earthed by not less than two separate and distinct connections with the earth, each having its own electrode at the generating station or substation.

iv) All materials, fittings etc. used in earthing shall conform to Indian standard specifications wherever they exist. In the case of materials for which Indian standard specifications do not exist, such materials shall be approved by the Engineer-in-Charge.

v) The earth electrode shall be kept free from paint, enamel and grease.

vi) It shall be ensured that similar materials for respective earth electrodes and earth conductors are used.

vii) Earth electrode shall not be installed in proximity to a metal fence.

viii) Copper/GI strip shall be connected to the respective earth electrodes, either by brazing or welding respectively. The Copper/GI strip shall be jointed only either by brazing or by riveting at the end of over lapping portions. The over lap shall not be less than 50 mm.

ix) Earthing clamps used for supporting earth strips shall be made of such materials so as to avoid bimetallic action between strip and clamps.

5.0 Testing :

The earth resistance of each electrode shall be measured by using a reliable and calibrated earth megger and the value shall be as per IS/IE rules .

LIST OF I.S.CODES FOR INTERNAL ELECTRIFICATION INSTALLATIONS

1.	EXTERNAL ELECTRIFICATION wiring installation (system voltage not exceeding 650V)	IS 732 – 1989
2.	Graphical symbols used in Electro-technology art-XI-Electrical Installation buildings	IS 2032-1969
3.	Fire safety of buildings (General) Electrical Installation	IS 1646-1961
4.	3 pin plugs and sockets	IS 1293
5.	Earthing.	IS 3043-1966
6.	Rigid steel conduits for electrical wiring	IS 9537-PII-1989
7.	Fittings for electrical wiring	IS 2667-1964
8.	Flexible steel conduits electrical wiring	IS 3430-1966
9.	Accessories for rigid steel conduit insulated cables	IS 3837-1966
10.	General and safety requirements for electric lighting fittings	IS 1913-1969
11.	Protecting of buildings and allied structures against lightning	IS 2309-1967
12.	Busbar ratings	IS 8084-1976
13.	On load change over switches	IS 4064-1978