

TENDER SCHEDULE

FOR

INTERIOR AND ELECTRICAL WORKS OF

INDIAN BANK

CHINNA MARKET HINDUPUR BRANCH, TIRUPATHI

Starting of Tenders: 04-04-2026

Last date for submission of Sealed Tender: 25-04-2026 (4 PM)

Opening of Sealed Tenders: 25-04-2026 (5 PM)

Client:

**The Chief Manager
premise department**

Indian bank

Zonal Office

K R Pride

K T Road

Tirupati-517501

08577-2500031

Consultants:

FIROZ AHMED

ARCHITECT

13-6-436/a/33, 2nd Floor, 301

Lakshmi Apartment, Lakshmi Nagar, Pillar no.68,

Mehidipatnam, Hyderabad – 500 028.

Cell: 98481 49737

E-Mail : a_firoz @yahoo.com

Issued to: _____

TENDER SCHEDULE

FOR INTERIOR AND ELECTRICAL WORKS FOR

INDIAN BANK

CHINNA MARKET HINDUPUR BRANCH, TIRUPATHI

Name of the Contractor to whom issued: _____

Address: _____

Client:
The Chief Manager
premise department
Indian bank
Zonal Office
K R Pride
K T Road
Tirupati-517501
08577-2500031

Consultants:

FIROZ AHMED
ARCHITECT
H.no:13-6-436/A/33, Lakshmi Apartments,
2nd Floor 301, Lakshmi nagar, Pillar no.68
Mehidipatnam,
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TENDER NOTICE

Sealed Tender on item rate basis are invited from competent INTERIOR Empanelled contractors having sound technical and financial capacity for INTERIOR works for CHINNA MARKET HINDUPUR BRANCH.

1. Time of Completion ----- 21 days

**Submission and opening of the tender at Chief Manager (Admin), INDIAN BANK,
ZO K R PRIDE KT ROAD TIRUPATI-517505 (08577-2500031)**

The consultants / clients will not be bound to accept the lowest tender and reserves right to Accept or reject any or all the tenders without assigning any reason whatsoever.

For

**FIROZ AHMED
ARCHITECT**

**13-6-436/a/33, 2nd Floor, 301
Lakshmi Apartment, Lakshmi Nagar, Pillar no.68,
Mehidipatnam, Hyderabad – 500 028.
Cell: 98481 49737
E-Mail : a_firoz @yahoo.com**

Date:

Note:

- **No advance payment will be provided by the Bank.**
- **Payment will be made only after certification by the architect and approval by the Branch Manager.**
- **The Bank shall not be responsible for providing accommodation for vendors or workers.**
- **Work must not be interrupted or stopped midway.**
- **Only materials specified by the architect shall be used; no deviations are permitted.**
- **The scope of work may be increased or reduced as per the Bank's requirements, and payment will be adjusted accordingly. Page 5 of 35**
- **As the branch is already operational, any temporary arrangements required for the completion of work shall be the sole responsibility of the vendor.**

THE CONDITIONS OF TENDER

1. The tender form must be filled in English and all entries must be made by hand and written in ink.
2. Each and every page of the tender document must be signed by the owner of the firm or the power of attorney holder.
3. The tenders must be submitted in the prescribed format only. The tenders must quote the rates in the Schedule of Quantities, rates and amount. The rates should be written both in words and figures without any erasures and alterations. However if errors are made, the wrong figures or words must be neatly scored out under full signature of the tenderer and the correct figures and words neatly rewritten. Over writing is not permitted, white Slind shall not be used.
4. Errors in the schedule of quantities rates and amount shall be dealt with the following manner:
 - a) In the event of discrepancy between the rates quoted in words and the rates in figures, the Co-efficient of the total amount by the quantity shall be taken into consideration, provided the tender is not rejected.
 - b) In the event of an error occurring in the amount column as a result of wrong multiplication and extension of unit rate and quantities, the unit rate shall be regarded as firm and the amount shall be amended accordingly.
 - c) All the errors in totaling in the amount column and in carrying forward, the totals shall be corrected.
5. The quantities indicated in the schedule of quantities are only probable quantities and are liable to alteration by omission, reduction or addition. Payment shall be made on the basis of actual quantities of work done at the accepted rates.
6. No alterations which are made by the tenderer in the drawings, specifications or in probable quantities accompanying the tender will be recognized and, if such alterations are made the tender is likely to be invalidated. Remarks and explanations should be given in a separate cover along with EMD and will become binding only id specially accepted in writing by Bank at the time of acceptance of the tender.
7. The tenderer must obtain for himself on his own responsibility and at his own expenses all the information necessary for the purpose of filling this tender and to enter into a contract with Bank, he must examine the drawings, specifications conditions etc., and must inspect the site of work and must acquaint himself with all local conditions and matters pertaining thereto.
8. The tenderer shall also bear all expenses in connection with the preparation and submission of this tender5
9. **EARNEST MONEY DEPOSIT (EMD):** The tender shall deposit 1% of estimated amount in the form of a DD drawn on a scheduled Bank in favor of **Zonal Manager**, INDIAN BANK, ZO Tirupati Andhra Pradesh at the time of submission of the tender as Earnest Money. Bank is not liable to pay any interest on Earnest Money.

The EMD for unsuccessful tenderers shall be refunded to them without any interest after the decision to award the work is taken. The EMD of the successful tenders shall be retained as part of Security Deposit and for the due fulfillment of the contract.
10. **SECURITY DEPOSIT (SD):**

Apart from Earnest Money Deposit made as above, Security Deposit shall be deducted from running/progressive bill/s of the Contractor @ 8% of the gross value of the each bill until the total Security Deposit including EMD equals to 5% (including EMD) of the accepted value of the tender. Security Deposit shall not bear any interest.

11. **COMPLETION PERIOD:**

The time is the essence of Contract. The entire work shall be completed by the Contractor within 40 days after the day the tender is accepted by Bank. The work is of urgent nature and the completion time schedule should be strictly adhered to by the Contractor.

12. The tenders submitted shall remain valid for acceptance for a period of 120 days (4months) from the date of their opening. Should any tenderer withdraw his tender before the expiry of the said period or makes any modification to his tender, his EMD will be forfeited and the tender declared invalid.

13. Bank does not bind itself to accept the lowest tender and reserves to himself the right to reject any or all of the tenders received without assigning of reasons thereof.

14. The tenderer whose tender is accepted shall execute a formal agreement with Bank in accordance with this draft agreement which will include the notice inviting tender, these conditions, other papers herein, special conditions, drawings and specifications etc., but his liability, under the contract shall commence from the date of the written acceptance of his tender whether the formal agreement is drawn or not.

The Contractor shall bear all expenses in connection with the execution of the said agreement including fees for stamps and registration of documents as required.

15. The compensation or other sums of money payable by the contractor to the Bank under the terms of contract maybe deducted from his EMD/SD if the amount permits and the contractor shall, unless such deposit has become otherwise payable, within ten days after such deduction make good in cash the amount so deducted.

16. The work shall be carried out under the directions and supervision of and subject to the approval in all respects by the **Consultants / Bank**.

17. On acceptance of tender the contractor shall, in writing, and at once inform Bank and the Consultants the names of his accredited representatives who will be responsible to take instructions from the Consultants/Bank.

18. The work or any part of it shall but be transferred assigned or subcontracted without the consent of Bank.

19. The contractor shall be required to co-operate and work in accordance with and afford reasonable facilities for such other agencies / Specialists as may be employed by the Consultants / Bank on other works / sub-works in connection with the work.

20. The contractor shall insure the work and keep it insured until one month after the date of taking over the works by Bank or otherwise as per the terms of the contract, against loss or damage by fire and other usual risks other than the risks accepted in the terms of the contract with an approved insurance company such as GIC.

21. The contractor is required to comply with all Acts of Govt. relating to Labor and the rules and regulation made there under from time to time and submit at the proper times all particulars and statements required to be furnished to the labor or any other statutory authorities.

22. For all the items of work executed by him, the contractor shall supply, at his own expenses, to the Consultants, copies of post card size photographs in triplicate each of the work, taken from two approved portions of each item of work at intervals of not more than one month during the progress of the work and also at every important stage of the work or as directed by the Consultants/Bank.

23. In carrying out the work the contractor shall comply with the provisions of the safety code, annexed to these papers.

FORM OF TENDER FOR WORKS

To:

The Zonal Manager,
INDIAN BANK,
Tirupati Zonal Office,
1th Floor, K R Pride, K T Road
Tirupati – 517501

Dear Sir,

Having duly examined the tender documents including the drawings, specifications, designs, schedule of quantities relating to the works specified in the underwritten memorandum and having visited the site of the said work having acquired all the requisite information relating there to as affecting this tender, I/We hereby offer to execute the works specified in the underwritten memorandum within the time specified therein at the rates specified in the schedule of quantities and in accordance, in all respects with the specifications, designs, drawings and instructions in writing referred to in the conditions of the tender, the Articles of Agreement, special conditions, the schedule of quantities, and conditions of the contract and with such conditions of the contract and with such materials as are specified, by and in all other respects in accordance with such conditions in the schedule of quantities and conditions of contract so far as applicable.

Should this tender be accepted, in whole or in part, I/We hereby agree (i) to abide by and fulfill all the terms and provisions of the said conditions of the contract annexed hereto and the conditions to tender so far as applicable or in default thereof to forfeit and pay to Bank, the sums of money mentioned in the said conditions.

A sum of **1% of Estimated Amount** is hereby enclosed as Earnest Money Deposit in the form of Demand Draft drawn in favor of Zonal Manager, ZO Tirupati

I / We agree (i) that should I/We fail deliver or commence the installation work specified in the above mentioned memorandum Bank shall without prejudice to any other right or remedy be at the liberty Bank towards security deposit mentioned in the above memorandum, (ii) to execute all the works referred to in the tender document upon the terms and conditions contained or referred to therein and to carry out authorized variations as directed by the Consultants/Bank and as per said conditions of the contract.

Our Bankers are:

- 1.
- 2.

The names of the proprietor/Partners/Directors of our firm are:

- 1.
- 2.
- 3.
- 4.

Signature of the tenderer with seal

Date the Day of 2026

ARTICLE OF AGREEMENT

Articles of agreement made this the day of 2026 between
Chief Manager (Admin), INDIAN BANK, ZO TIRUPATI, K R PRIDE KT ROAD TIRUPATI
herein after called "The Employer" of the one part;

AND

M/s.having its registered office at
(herein after "The Contractor" of the other part.)

Whereas the employer is desirous of getting the Interior Works for CHINNA MARKET HINDUPUR BRANCH, Executed as schedule – I to this agreement and has annexed drawings, bills of quantities and specifications describing the work to be done as prepared by FIROZ AHMED, ARCHITECT, H.no:13-6-436/A/33, Lakshmi Apartments,2nd Floor 301, Lakshmi nagar, Pillar no.68 Mehidipatnam, Hyderabad –5000028, Cell:9848149737. (herein after called THE CONSULTANTS and whereas the said drawing as per Schedule-2 inclusive, the bills of quantities marked "BOQ" and the specifications etc., have been signed by or on behalf of the parties hereto; and whereas the contractor has agreed to execute the work subject to the conditions set forth is Schedule-3 hereto attached (herein after to as "The Condition"), the work shown upon the said drawings and described in the said specifications and included in the said bills of quantities for the sum of

Rupees.....
.....

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the sum of Rs. To be paid at the time and in the manner set forth in the said conditions, the contractor will, upon and subject to the said conditions execute and complete the works shown upon the said drawings and described in the said specifications and bills of quantities.
2. The employer will pay to the contractor the said sum of Rs..... or such other sum as shall become payable hereunder at the times and in the manner specified in the said conditions.
3. The terms "The Consultants" in the said conditions shall mean **FIROZ AHMED, ARCHITECT**, or in the event of their ceasing to be the Consultants for the purposes of this contract, such other persons as shall be nominated for that purpose by the employer, not being a person to whom the contractor shall object for reasons considered to be sufficient by the Arbitrator mentioned in the said conditions. Provided always that no person subsequently appointed to be the Consultants under the contract shall be entitled to disregard or overrule any decision or approval or direction given or expressed by the Consultants for the time being.
4. The said conditions, specifications and priced bills of quantities shall be read and construed as forming part of this agreement, and the parties hereto will respectively abide by and submit themselves to the conditions and stipulations and perform the agreement on their parts respectively in such conditions, specifications and priced bills of quantities contained.

As witness our hand the day and year first above written signed by the said

EMPLOYER.

In the presence of witnesses:

Name :

Name:

Occupation:

Occupation:

Address:

Address:

Signed by the said Contractor(s) :

In the presence of Witnesses:

Name :

Name :

Occupation :

Occupation:

Address :

Address:

CONDITIONS OF CONTRACT

1. Interpretation Clauses :

- i. In constructing the conditions, the specifications, schedule of quantities and contract agreement, the following words shall have the meanings herein assigned to them except where the subject to context other requires.
- ii. Headings and marginal notes to the conditions of contract shall not be deemed to form part thereof or to be taken into considerations in the interpretation or construction thereof or of the contract.
- iii. Where the context so requires (I) words importing persons includes firms and corporations and (II) words importing the singular only also include the plural and vice versa.

Employer shall mean **INDIAN BANK, Chief Manager (Admin), INDIAN BANK, ZO K R PRIDE KT ROAD TIRUPATI, AP**

- a. Consultant shall mean **Firoz Ahmed, Architect** or in the event of their ceasing to be Consultant for the purposes of this contract such other person or persons as shall be nominated for that purpose by the employer subject to such qualifying provisions as may agreed upon.
- b. Contract shall mean and include his /their legal representatives, permitted assigns, or successors.
- c. Site shall mean the site where the works are to be executed as shown within boundary in red border on the site plan including any building and erections thereof allotted by the Employer for the contractor's use.
- d. **The Composition of this contract** shall mean the tender documents comprising the notice inviting tender, form of the tender, the tender conditions, the drawings, and priced bills of quantities with their preambles, the acceptance thereof, and the articles of agreement, together with the taken together are deemed to form one contract and shall be complementary to one another.
- e. **Bills of quantities** variously also termed priced bills quantities, schedule of rates, shall means the schedule of quantities originally furnished with the notice inviting tender, duly priced in by the tenderer and accepted by the Employer for inclusion as a part of the contract for determining the consideration payable to the contractor agreement it is also referred to as the contract scheduled.
- f. **Notice of writing** or written notice shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by the registered post to the last known private or business address or to the registered office of the addresses and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- g. **Act of Insolvency** shall mean any Act of Insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any amending such original.
- h. **Net Prices** : if in arriving at the contract amount the contractor shall have added to or deducted from the total of the items in the Tender any sum, either as a percentage or otherwise, then the net price of any item in the tender shall be the sum arrived at by adding to or deducting from the actual figure appearing in a tender as the price of that item a similar percentage or proportionate sum provided always that in determining the percentage or proportion of the sum so added or deducted by the contractor, the total amount of any price cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression "net prices" when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.
- i. **The works** (or the work) shall unless thereby something either in the subject or context repugnant to such construction, be considered and taken to mean the works by or virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or addition. Whether the word "works" is used it shall cover "installation" also under the same definition.
- j. **Excluded risks** are risks due to riots (otherwise than among contractor's employees) and civil commotion (in so far as both these are uninsurable), war (whether declared or not) invasion, act of foreign

enemies, civil war, rebellion, revolution, insurrection, military or unsurpassed power, any acts of Government, damage from air craft, acts of God such as earthquake, lightning and unprecedented floods and other causes over which the contractor has no control and accepted as such by the Employer or causes solely due to use of occupation in manner for which the work /installation in respect of which a certificate of completion has been issued or a course solely due to faculty designs of work.

k. **Provisional items** shall mean items for which only approximate quantities have been included in the tender documents.

1. **Virtual Completion** of works / installations shall mean the substantial completion of the work / installations in accordance with the contract enabling the Employer to take over the same.

2. **Consultants / Bank Instructions:** the Contractor shall execute the whole and every part of the work in the most substantial and workman like manner and both as regard materials and otherwise in every respect in strict accordance with the specifications, conforming exactly, fully and faithfully, to the designs drawings and instructions in respect of the work given by the Consultants/Bank and under the directions of and under the supervision of and subject to the approved in all respects by the Consultants/Bank who may in their discretion and from time to time issue further drawings, and/or written instructions, directions and/or written instructions, details and explanation which are hereafter collectively referred to as "Consultants/Bank" in regard to :

a. Variation or modification of the design quality or quantity of works of 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 specifications.

c. The removal from the site of any materials brought thereon by the Contractor and substitution of any other materials thereof.

d. The dismissal from the works of any persons employed there upon.

e. The opening up for inspection of any work covered up.

f. The amending and making good of any defects under clause 19.

g. The removal and/or re-execution of any work executed by the contractors. On account of defects, under clause 18.

The contractors shall forth with comply with and duly execute any work comprised in such Consultants/Bank instructions provided always that verbal instructions, directions and explanation given to the contractor or his representative upon the works by the Consultants/Bank shall if involving a variation, be confirmed in writing by the contractor within seven days and if not dissented from in writing within a further seven days by the Consultants/Bank, such shall be deemed to the Consultants/Bank instructions within the scope of the contract.

Manner of execution of work: The Consultants/Bank shall be entitled to direct at what point or points and in what manner the works are to be commenced, and from time to time carried on.

Variation to be approved by Employer: Notwithstanding anything herein contained, the Consultants/Bank or his representative shall not, without the prior concurrence in writing which will result in the Employer having to pay the contractor an additional sum great than Rs. 25000.00 and all such instructions issued to the contractor should forthwith be brought to the notice to the employer. The Contractor shall submit through the Consultants/Bank a statement of analysis of rates, vouchers, etc. The rates on scrutiny and final acceptance of the Employer under the terms and Clauses 16 hereof shall form a supplementary schedule of quantities.

3. **Agreement copies to be supplied:** The contract Document shall remain in the custody of the Consultants/Employer and shall be produced by in at his office and as when required by the Employer/Consultant or the contractor. The Contractor on the signing hereof shall be furnished by the Consultants/Employer free of cost with a certified copy of the agreement and one copy of each of the said drawings issued during the progress of works. Any further copies of such drawings required by the contractor shall be paid for by him. The contractor shall keep one copy each of all drawings on the works and the Consultants/Bank or his representative shall at all reasonable times have access to the same. Before the issuing the final certificate to the contractor he shall, if so required, forth with return to the Consultant/Employer all drawings and specifications.

4. The contractor to provide everything necessary: The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and amounts staged in the schedule of quantities and/or the schedule of the rates and amounts which rates and amounts shall except as otherwise provided over cover all his obligations under the contract, and all matters and things necessary for the proper completion of the works.

The contractor shall provide at his own cost all materials (except such, materials if any, as many in accordance with the contract by supplied by the Employer) machinery, plant, tools, appliances, implements, ladders, cordage, tackle, scaffolding, in fact everything necessary or proper execution of the work, whether original, altered or substituted according to the true intent and meaning of the or substituted taken together whether the same may or may not be particularly shown or described therein provided that the same maybe reasonably inferred there from, and if the contractor finds any discrepancy in the drawings, or between the drawings, schedule of quantities and specifications, he shall immediately and in writing refer to the Consultant/Employer who shall decide which is to be followed, subject to :

- i. Anything shown or contained in any one or other of (a) the drawings, (b) specifications and (c) the contract schedule, and not shown in the others shall be equally binding as if were contained in each of them.
- ii. Figured dimensions are to be followed in preference to the scale, and large scale details in preference to small-scale drawings.
- iii. The following order of preference shall apply:
 - a) The drawings, (b) specifications, covered by bills of quantities, (c) technical Specifications.

5. Contractor to conform to legal regulations: The contractor shall conform to provisions any Act of the Legislature relating to the works and to the Regulations and Bye-laws of any Authority and of any water, lighting and other Companies and/or authorities with whose system the structure is proposed to be connected, and shall, before making any variations from the drawings or specifications the may be necessitated by so conforming, give to the Consultants/Employer written notice, specifying the variation proposed to made and the days receive such instructions he shall proceed with the work, conforming to the provisions, regulations, or Bye-laws in question and any variation so necessitated shall be dealt with under clauses Nos. 12 & 16.

The contractor shall bring to the attention of the Consultant/Bank all notices required by the said Acts, regulations or Bye-laws to be given to any authority and pay to such Authority, or to any Public Office all fees that maybe properly chargeable in respect of the works and ledge the receipts with the Consultant/Bank.

The contractor shall indemnify the Employer against all claims in respect of patent rights and shall defend all actions arising from such claims and shall he pay all royalties, license fee, damage, cost and charges of all every sort that may legitimately be incurred in respect thereof.

The Employer is entitled to deduct all taxes and rates as per existing laws and rules, from any moneys due or that may become due to the Contractor.

5.b The contractor shall indemnify the Employer from and against all claims, demands, proceedings damages cost and expenses which may brought or made against the Employer or to which it be put by reason of the contractor not conforming to or complying with any of the provisions or requirements of any Act or section, Central or State, Rules, Regulations, Bye-laws of local authorities Panchayat, Collector or any other companies relating to or in water, light or other amenities at the site.

6. Contractor responsible for setting out work: The contractor shall on the basic of dimensioned drawings and information necessary for the purpose, furnished by the Consultants/Employer set out the works on site at his own expense and he responsible for the correctness of the positions, levels, dimensions and alignment of all parts thereof. The checking of any setting out by the representative of the Consultant or of the Employer shall not in any way relieve the contractor of the responsibility for the correctness thereof and he shall amend his own cost and to the satisfaction of the Consultant/Bank any error in the setting out or consequential to wrong setting out, found at any stage during the progress of the work or during the effects liability period after completion of work.

7. a) The contractor shall maintain at the site comprehensive registers, posted up-to-date, showing the nature of the materials/articles/goods their identification marks, dates and the results of the tests. Such registers shall be got countersigned by the representatives of the Consultant/Employer at site and extracts from the registers shall regularly be posted to the Consultant and the Employer. The form of the registers shall be mutual settled.

b) The costs of the tests and of the materials and labor and equipment if any way, involved in the testing operations shall be borne by the contractor in all cases except as otherwise provided for in the contract.

8. **Supervision by Contractor:** The contractor shall give all necessary personal superintendence during the execution of works, any as long thereafter as the Consultant/Bank may consider necessary until the expiration of the defects "Defects Liability Period" satisfied in Clause 19 herein. The contractor shall also during all the time the works are in progress, employ a competent and qualified representative whose name shall be approved by the Consultant/Bank and who shall be constantly in attendance at the works while the men are at work. Any directions, explanations, instructions, or notices given by the Consultant/Employer to such representative shall be held to have been given to the contractor.

If the contractor fails to appoint and keep on the works a competent and qualified representatives as aforesaid the Consultant/Employer shall have powers to suspend the works till such time a competent qualified representative as aforesaid is posted and the contractor shall not be entitled to claim extension of time on the plea of such suspension of the works.

9. **Dismissal of workmen:** The contractor shall on the request of the Consultant/Employer immediately dismiss from the works any person employed thereof by him who may, in the opinion of the Consultant/Employer be incompetent or mal-conduct himself, and such persons shall not be again employed on the works without the permission of the Consultant/Employer.

10. **Access to works:** The contractor, the Consultant and his respective representative shall at all reasonable times have free access to the works and/or to the workshops, factories or other places where materials are laying or from which they are being obtained and the contractor shall give the Employer, the Consultant and his respective representative, all reasonable facilities necessary for inspection and examination and tests of the materials and workmanship. No person unauthorized by the Employer or the consultant except the representatives of Public Authorities shall be allowed on the works at any time.

11. **Work not be sublet:** The whole of the works included in the contract shall all be executed by the contractor who shall not directly or indirectly transfer, assign or undulate the contract or any part share thereof or interest therein without the written consent of the Employer, and no undertaking shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the works during their progress.

12.1 **variation not to vitiate the contract :** No alternation, omission or variation shall vitiate this contract but in case the Consultant/Employer thinks proper at any time during the progress of the works to make any alteration in or additions to or omissions from or substitutions for the original drawings, specifications, designs and instruction or any alterations in the kind of quantity of the materials to used in the work shall give notice thereof to the contractor, in writing the contractor shall alter, and to or omit from or substitute for as the case may require, in accordance with such notice and carry out the amended work on the same conditions in all respects on which he agreed to do the main work, but the from or substitutions in the works or any deviation from any of the provisions of the contract stipulations, specifications or contract drawings without the previous consent in writing of the Consultant/Employer and the value of such extra, alterations, additions or omissions or substitutions shall in all cases be set mined by the Consultant/Employer with the prior approval in writing of the Employer in accordance with the provisions of Clause 16 hereof, and shall be added to or deducted from the contract amount accordingly.

12.2 : The supply and execution of any part of the carrying out of any works incidental to the execution of any item or class of work shown in the schedule of quantities shall not constitute a variation entitling the contractor to extra paying provision that the said item or class of work cannot be executed satisfactorily according to the intent and meaning of the drawings and specifications without the said part thereof or the said work incidental thereto whether the same may or may not be particularly shown or described in the drawings and specifications and schedule of quantities and provided the same may be reasonably inferred thereof.

12.2.1: The time for completion of work shall, in the event authorized variations result in an addition to the contract sum in excess of 10% be extended, on payment by the contractor as follows:

i) In the proportion which the total executed contract value including authorized variations bears to the original contract value, the certificate of the Consultant/Bank being conclusive as to such proportion; plus

ii) 25% of the additional time calculated way of (i) above or such further time as may be considered to be reasonable by the Consultant/Employer.

12.3: Similarly the changing of the position of the work from one to another or to a more difficult position than that shown in the drawings or described in the specifications or the contract schedule, or the carrying out of the work under the contract schedule or carrying out of the work under circumstances not contemplated in the specifications to the contract schedule shall not constitute a variation entitling the contractor to extra payment.

13.a **No compensation for alteration in or restriction of work:** If any time after the commencement of the work the Employer for any reason whatsoever does not require the whole or part of parts thereof as specified in the tender to be carried pout, the Consultant/Bank shall give notice in writing of the fact to the contractor who shall not claim for any compensation whatsoever in account of any profit which he might have derived from the executing of the work in full, but which he did not derive in consequence of the full amount of the work not having been carried out. Nor shall he have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which shall involve curtailment of the work originally contemplated.

13. b **Schedule of quantities on standard of measurement:**

The schedule of quantities unless otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurement.

14. **Errors in bills of quantities:** No error in description of in quantity or by way of omission of items from the schedule of quantities shall vitiate this contract but shall be rectified and the value thereof as pertained under clause 16 herein shall be added to or deducted (as the case may be) from the contract amount provided that there shall no rectification of errors in the contractor's schedule of rates.

15. **Measurement of works:** The Consultant/Employer may from time to time intimate to the contractor and the Employer that he required the works to be measured, the contractor shall forth with attend or send a qualified agent to assist the Consultant/Employer or the Consultant/Employer representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required by either of them.

Provided that the contractor shall give notice of not less than ten clear days to the Consultant/Employer or his representative in charge of the work before covering up or placing beyond the research of measurement any work in order that the same maybe measured and correct dimensions thereof be taken before the same is covered or placed beyond reach of measurement any work without the consent of the Consultant/Employer or his representative in charge of the work who shall within the aforesaid period of ten days inspect the work and cause the measurements to be made if, any work be so covered up without the consent of the Consultant/Employer or his representative in charge of the work, the same shall be uncovered at the contractor's expense, or in default thereof no payment or allowance shall made for such work or materials with which the same was executed.

Should the contractor not attend or neglect or omit to sent such agent then the measurements taken by the Consultant/Employer or a person approved by him shall be taken to correct measurement of the works. Such measurements shall be taken in accordance with the Indian Standard Method of Measurement, unless otherwise provided for else where in this contract.

The Contractor or his agent may at the time of measurement take such notes and details as he may require.

All authorized extra works, omissions and all variations made without the consultant/Employer knowledge, if subsequently sanctioned by him in writing (with the prior approval in writing of the Employer) shall be included in such measurement.

16. Price Variation: The rates of additional, altered substituted work shall be arrived at in accordance with the following rules:

- i. The net 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 priced therein.
- ii. If the rates for extra, altered or substituted (deviated) work are not provided for (available) in the contract schedule, they shall to the extent possible be derived out of the rates given in that schedule for similar or near similar items. For the purpose of such derivation, 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 substantiated by purchase bills/vouchers shall be adopted. Using factors and constants for quantum of material labor T & P and sundries from NBO/CPWD, Standard PWD data/analysis, in the order thus written adding 15% over towards profits and overheads. 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 the schedule pertaining to the work in which the addition, alteration or substitution (deviation) occurs, shall be taken as the lowest applicable rate in the other schedule similarly, in case (ii) above, if similar or 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 schedules shall be adopted.
- iv. In the case of additional, altered or substituted (deviated) work for which rates cannot reasonably be derived as at (ii) above, the rates shall be worked out adopting market prices, substantiated by purchase bills/vouchers, using factors and constants for quantum of material, labor, T & P and sundries from NBO/CPWD/Standard materials, labor T & P and sundries from NBO/CPWD/Standard PWD/DATA analysis in the order thus written, adding 15% towards profits and overheads. When called upon to do so the contractor shall submit his purchase bills/vouchers, to the Consultant/Employer.
- v. The question as to particular items, being similar or near similar to the additional, altered or substituted (deviated) work in the contract schedule are to be adopted for derivation of rates for the addition, altered or 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 Consultant/Employer.
- vi. In case (ii) and (iv) the contractor is required to submit his analysis of rates adopting the principles enunciated and the Consultant/Employer after scrutinizing the analysis and other papers furnished, will allow such rates as he considers reasonable.
- vii. Where extra work is of such a nature that it cannot be properly measured or valued the contractor shall be allowed day work prices 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 wages for the district, notified by the concerned authority, provided that in either case if required by the Consultant/Employer vouchers, muster rolls and other documents required for the proper verification of the labour employed and the materials deployed or his representative at or before the end of the week following that in which the work has been executed. The question as to whether extra work is of such nature that it cannot be properly measured or valued will be decided by the Consultant/Employer. The margin to be allowed on actual costs to the contractor towards profits and overheads shall be 15%.
- viii. **Deviation Limit:** It is the value of which the total executed contract value including authorized variation in excess of the original contract value, expressed as percentage and shall be adjudged on the sum total of all additions, omissions, reductions, alterations or substitutions (deviations) covered by the authorized variations under Clause 2 and 3 of the Conditions of Contract.
The value of prime cost sums shall not be included in calculating the above percentage.

17. **Unfixed Material:** Wherein any certificate (of which the contractor has received payment) the Consultant/Bank has included the value of any unfixed materials intended for and/or placed on or adjacent to the works such materials shall become the property of the Employer and then shall not be removed except for use upon the works, without the written authority of the Consultant/Employer. The contractor shall be liable for any loss or damage to such materials.

18. **Removal of improper work, material, etc.:** The Consultant/Employer shall, during the progress of the work, have full powers to orders in writing from time to time, removal from the works within such reasonable time or times as may be specified in the order, of any materials which in the opinion specified in the order, of any materials which in the opinion of the Consultant/Employer are not in accordance with the specifications of the instructions of the Consultant/Employer or do not conform to approved samples, the substitution of the rejected materials by the proper other materials and the removal and proper re-execution of any work executed with unsound, imperfect or unskilled workmanship or with materials not in accordance with the contract, notwithstanding that the same may have been passed or certified or, and paid for and the contractor shall forthwith carryout such orders at his own cost.

In case of default on the part of the contractor to carry out such order, the Employer shall have the power to being answerable or accountable for any loss or damage that may happen or arise to such materials removed and all expenses consequent on or incidental thereto as certified by the Consultant/Bank shall be borne by the Contractor, or may be deducted by the Employer from any money due or that may become due to the contractor.

In lieu of re-execution of any work not in accordance with the contract of Consultant/Employer may in their option allow it to remain but will allow for such work reduced rates. The decision of the Consultant/Employer to exercise his option in this regard and the quantum of reduction to be made in the rate for the item in question shall be final and binding on the contractor.

19. **Defects Liability Period:** Any defect, shrinkage, settlement or other faults which any appear within the 'Defects Liability Period' staged in the appendix hereto, or if nine so staged, then within 6 months after the virtual completion of the works arising in the opinion of the Consultant/Employer from materials or workmanship not in accordance with the contract, shall on demand which shall be made within the defects liability period, in writing by the Consultant/Employer and within such reasonable time as shall be stated there in specifying the work, materials or article complained of notwithstanding that the same may have been passed or/and certified, paid for, be amended and made good by the contractor, at his own proper charges and cost in the case of default. The Employer may employ and pay other person or persons to aimed and make good such defects, shrinkage, settlements or other faults and all damages, loss and expenses consequent there of or incidental thereto shall made good borne by the contractor and such damages loss and expenses shall upon the Consultant/Employer certificate in writing, be recoverable from the contractor by the Employer or maybe deducted by the Employer from any money due or that may become due to the contractor or the Employer may in lieu of such amending and making and by the contractor deduct from any money due or that may become due to the contractor a sum to be determined by the Consultant/Employer equivalent to the cost of amending and making good such works and in the event of the amount retained under Clause 27 being insufficient, recover the balance from the contractor, together with any expenses the employer may have incurred in connection there with, should any defective have been done or material supplied by any sub-contractor employed on the works who has been nominated or approved by the Consultant/Bank as provide in Clause 11 the contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the contractor himself and been subject to the provisions of clause 2 thereof. The contractor shall remain liable under the provisions of this clause notwithstanding the signing by the Consultant/Employer of any certificate including the final certificate, or the passing of any accounts.

20. **Completion Certificate:** The works shall not be considered as completed until the Consultant/Employer has certified in writing that they have been virtually completed and the defects liability period shall commence from such certified date of virtual completion of work.

Within ten days of the completion of work, the contractor shall give notice of such completion to the Consultant/Employer shall inspect the work and if there is no defect in the work shall furnish the contractor with certificate of completion otherwise a provisional certificate of completion indicating defects (a) to be rectified by the contractor and/or (b) for which payment will be made at reduced rates, shall be issued but no certificate shall the work considered to be complete until the work as executed, all scaffolding, surplus materials, floors, or other parts of any building, in upon or about which the work was executed or which he may have had possession for the purpose of the execution thereof and not until the work shall have been measured by the Consultant/Employer. If the contractor shall fail to comply with requirements of this clauses to removal of scaffolding, surplus materials and rubbish aforesaid and cleaning of dirt on or before the date fixed for the completion of the work, original or extended in terms of clause 24 herein, the employer after issuing due notice, may at the expense of the contractor remove such scaffolding, surplus materials and rubbish, etc. and dispose of the same as he thinks fit and clean off such dirt as aforesaid except for any sum actually realized by the sale thereof and the expense, if any, so incurred maybe recovered from any money due or that may become due to the contractor by the Employer.

21. Contractor Liable of Damage done:

21.1 The contractor shall be responsible for all injury to persons, animals, or things, and for all structural and decorative damage to property which any arise from the operation or neglect of himself or if any nominated subcontractors employee whether such injury or damage arises from carelessness, accident or any other cause whatever in any way connected with the carrying out of the contract. This clause shall be held to include, inter-alia, any damage or building, whether immediately adjacent or otherwise, and any damage to roads, streets, footpaths, bridges, or ways as all damages caused to the building and works for ing the subject of this contract by frost or other inclemency of weather. The contractor shall indemnify the employer and hold him harmless in respect of all any of Governments otherwise and also in respect of any awards of compensation of damages consequent upon such claims.

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

21.3 The contractor shall indemnify the employer against all claims which maybe made against the employer by any member of the public or other third party in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own expense arrange to effect and maintain, until the virtual completion of the contract, which an approved insurer a policy of insurance in the joint names of the employer and contractor against such risks and deposit such policy or policies with the Employer from time to time during the currency of this contract. The contractor shall also similarly indemnify the employer against all claims which may be made upon the employer whether under the workman's compensation Act or any other statue tin force during the currency of this contract or at common law in respect of any employee of the contractor or sub-contractor and shall at his own expenses effect and maintain, until the virtual completion of the contract, which an approved insurer a policy of insurance in the joint names of the Employer and contractor against such risks and deposit such policy and policies with the Employer from time to time during the currency of the contract.

The contractor shall be responsible for anything, which may be excluded from the insurance policies above referred to and also for all other damages to any property arising out of and incidental to the negligent or defective carrying out this contract. He shall also indemnify the employer in respect any costs, charges or expenses arising out of claim or proceedings and also in respect of award of compensation for damage arising therefore.

The Employer with the concurrence of the Consultant/Employer shall be at liberty and is hereby empowered of deduct the amount of any damage, compensation, costs, charges and expenses arising or accruing from or in respect of any such claims or damage from any or all sums due or to become due to the contractor.

22. Responsibility for safety or building:

The contractor shall be responsible for the safety of the works (including the materials, temporary building and plant) until they are taken over by the Employer and they shall stand at their risks, and be in sole charge of the contractor, who shall be responsible for and must with all possible speed make good all damage or loss from whatever cause.

22. a Insurance of the works:

The contractor shall within 7 days from the date of commencement of the work insure the works at his cost and keep them insured until one month after the works are taken over by the Employer or three months after the date of completion whichever is earlier, against loss or damage by fire and usual risks other than fire against which insurers generally provide cover in a **CONTRACTOR'S ALL RISK POLICY**, with the names of the employer and Contractor (the name of the former being placed first in the policy), for the full amount of the contractor. Such policy shall cover the property of the Employer only a Consultant and surveyor's fee of assessing and claim and in connection with his services generally in reinstatement subcontractor or employee. The contractor shall deposit the policy and receipts for the premium paid with the Consultant within a week of the date commencement of the work unless otherwise instructed by the Consultant/Employer. In default of the contractor insuring as provided above, the employer of the Consultant/Employer on his behalf may be due or that may become due to the contractor.

The contractor shall as soon as the claim under the policy is settled, or the work reinstated by the insurers should they elect to do so, proceed with all due diligence with the completion of the works in the same manner as though the fire or other such risks had not occurred and in all respects under the same conditions of contract.

The contractor in case of rebuilding or Reinstatement State the fire or other such usual risk shall be entitled to such extension of time for completion as the Consultant/Employer.

23. Liquidated damages:

If the contractor fails to complete the works by the date stated in Appendix or within any extended time under clause 24 herein below the contractor shall pay or allow the Employer the sum named in Appendix as "Liquidated Damages" for the period during which said works shall so remain incomplete by the date of completion of the works as defined in the contract, and employer may deduct such damages from any moneys due or that may become due to the contractor.

24. Extension of time:

If the contractor shall desire an extension of time for completion of the work on the grounds of his having been unavoidably hindered by such causes as (a) force major or (b) any exceptional inclement weather or (c) proceedings taken or threatened by or dispute with adjoining or neighboring owners or public authorities arising otherwise than through the contractor's own defaults or (d) the work or delays of other contractors or tradesmen engaged or nominated by the Employer or the Consultant/Employer and not referred to in the schedule of quantities and or specifications or (e) strike or lockout affecting any of the building trades or directly the work or (f) delay in the supply of materials stipulated to be supplied by the Employer on any other valid ground, he shall apply in writing to the Consultant/Employer within 15 days of such hindrance on account of which he desires such extension as aforesaid and the Consultant/Employer, in his opinion reasonable grounds have been shown therefore, may with the previous approval in writing of the Employer make a fair and reasonable extension of time for completion of the contract works, but the contractor shall nevertheless constantly use his endeavors to prevent delay and shall do all that may reasonably be required of him to proceed with the work expeditiously provided.

a. That the contractor shall have no claim other than the extension of time for the delay in completion of the work due to such hindrance and

b. That the contractor shall suspend the works whenever called upon to do so in writing by the Consultant/Bank and shall be allowed reasonable extension of time for completion of work due to such suspension of work and nothing else.

25. Termination of Contract by Employer:

If the contractor, after receipt of written notice from the Consultant/Employer requiring compliance within in a week fails to comply with such further drawings and/or Consultant/Employer instructions, the Employer may employ and pay other persons to execute may such work whatsoever that may be necessary to give effect thereto, and all costs incurred in connection there with shall be recoverable from the contractor by the Employer on the certificate of the Consultant/Employer as a debt or may deducted by him from any moneys due or to become due to the contractor.

26. Termination of Contract by Employer:

If the contractor being an individual or a firm commits any “act of Insolvency”, or shall be adjudged an insolvent or being an Incorporated Company shall be an order for compulsory, voluntarily or be subject to the supervision of the court and of official assignee of the Liquidator in such acts of insolvency or winding up, as the case may be, and shall be unable within 7 days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Consultant/Employer that he is able to carry out and fulfill and contract and give security therefore, if so required by the Consultant/Employer, OR if the contractor (whether an individual, firm of incorporated company) shall suffer execution to be issued.

OR shall suffer any payment under this contract to be attached by or behalf of any of the creditors of the contractor.

OR shall assign or sublet this contract without the consent in writing of the Employer first obtained.

OR shall charge or encumber this contract any payments due or which may become due to the contractors there under,

OR if the Consultant/Employer shall certify in writing to the Employer than the contractor.

- i. Has abandoned the contract , or
- ii. Has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
- iii. Has failed to commence the works, or has without any lawful excuse under these conditions suspend the progress of the works for 14days after receiving the Consultant/Employer notice to proceed, or
- iv. Has failed to remove the materials from the site or to pull down and replace work for seven after receiving from the Consultant/Employer written notice that the said materials or work were condemned and rejected by the Consultant/Bank under these conditions, or
- v. Has neglected or failed persistently to observe the perform all or any of the acts, matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall haven given to the contractor requiring the contractor to observe or perform the same, or
- vi. Has to the detriment of good workmanship or without the consent if writing of the employer sublet any part of the contract,

Then and in any of the said cases the employer may not withstanding any previous waiver, after giving seven day’s in writing to the contractor, determine the contract but without thereby affecting the powers of the Consultant/Employer or the obligations and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been so determined as if the works subsequently executed had been executed by or on behalf of the contractor. And further the employer by his agents or servants may enter upon and take possession of the works and all plant, tools, scaffolding, sheds, machinery, steam or other power utensils and materials lying upon the premises or the adjoining lands or roads, and use the same as his own property or may deploy the same by means of his own servants and workmen in carrying on and completing the works or by employing other contractor or person or persons to complete the work and the contractor shall nor in any way interrupt or do not act, matter or thing to prevent or hinder such other contractor’s or other person or persons employer for completing and furnishing or using the material and plant for the works. When the work shall be completed or as soon thereafter as convenient the Consultant/Bank shall give notice in writing to the contractor to remove his surplus materials and plant, and should be contractor fail to do so within a period of 14 days after receipt thereof by him the Employer shall be entitled to sell the same by public auction and give credit from the contractor fro the amount realized.

The Contractor's account shall also be credited with the amount that would have been payable to him, for the uncompleted work (completed by the employer through other contractor/s or persons as aforesaid) in terms of his agreement as if the contract had not been determined and he (the contractor) had continued to execute the work to its completion. The actual gross expense to the Employer including incidental charges in completing the uncompleted work through other contractor/s or person or persons shall be debited to the contractor's account if it be not less than the credit for the uncompleted work as above referred; if, however, the said debit to be made be less than the said credit, then the amount to be debited shall be equal to the value of the credit given as above referred.

The consultant/Employer shall thereafter ascertain and certify in writing what (if any thing) in the final accounting is due to or payable to the contractor for the sale of the surplus materials and plant and loss the employer shall have been put any owing, to the contractor and which shall be so certified shall there upon be paid by the employee to the contractor and vice versa; and the certificate of the Consultant/Employer in this regard shall be final and conclusive between the parties.

27. Certificate of Payment:

A bill in triplicate shall be submitted by the contractor along with detailed measurements of the work completed at site provided that at least 50% of the work of the accepted value of the tender has been completed at site by the Contractor. The consultant shall check/take the measurements or cause the measurements to be checked/taken for the purpose of having the same to be verified and to the extent work has been executed in accordance with the contract, issue interim certificates within the period specified for honoring interim certificates (in the appendix to the conditions of the contract) subject to retention of SD at the percentage marked in the said appendix till the whole SD is collected.

During the venture of this contract, only two bills shall be accepted. The first bill shall be as per interim certificate as above and the second bill shall be the 'Final' bill as detailed under.

And when the works have been virtually completed and the Consultant/Employer shall have certified in writing that they have been so completed, the contractor shall submit the final bill in respect of the contract work within one month thereafter and in accordance with the certificate to be issued by the Consultant/Employer payment shall be made by the Employer within the time named in the Appendix as "Installment after virtual completion". And the contractor shall be entitled to the payment of the final balance in accordance with the final certificate to be issued in writing by the Consultant/Employer after the expiration of the period referred to as "the defects liability period" in the Appendix hereto from the date of virtual completion or as soon after the expiration of such period as the works shall have been intent and meaning thereof whichever shall last happen. Provided always that the issue by the Consultant/Employer of any certificate during the progress relieve the contractor of his liability in case of fraud, dishonesty, or fraudulent concealment relating to the works or; material or any matter dealt and insufficiencies in the works or materials which is reasonable examination would not have disclosed. No certificate of the Consultant/Employer shall of itself be conclusive that any work or materials to which it relates are in accordance with the contract neither will be contractors have a claim for any amounts which the Consultant/Employer might have subsequently be discovered as not payable and in this respect the Employer's decision shall be final and binding.

The Consultant/Employer shall have power to withheld any certificate if the works or any parts thereof are not being carried out of his satisfaction.

The Consultant/Employer may be any certificate may any correction in any previous certificate which shall have been issued by him. No certificate of payment will be issued by the Consultant/Employer if the contractor fails to insure the works and keep them insured the issue of the virtual completion certificate. Also certificate of payment maybe refused if the contractor fails to execute the formal agreement within two weeks of his being called upon to do so.

28. Security Deposit/Retention moneys bear no interest:

Retention money/security Deposit, or the balance of it available with Employer, shall be refunded to the contractor in the manner specified in the Appendix to the conditions of contract and shall bear no interest whatsoever until the date of its return, notwithstanding any provision to the contrary elsewhere in this contract.

29. Matters excepted from Arbitration:

The decision, opinion, direction certificates (except for payment) with respect all or any of the matters under clauses 2,4,7,9,12,16,18,19,24,26 hereof (which matters are herein referred to as the excepted matters) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other decision, opinion, direction, certificate or valuation of the Consultant/Employer to give any of the same shall be subject to the right of Arbitration and review in the same way in all respect (including the provisions as to opening the reference) as if it were a decision the Consultant/Employer under the following clause.

30. Settlement of Disputes and Arbitration:

Except where otherwise provided in the contract all questions and disputes and disputes relating to the meaning of the specification, design, drawings and instruction hereinbefore mentioned as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising to of or relating to the contract, designs, drawings, specifications, estimates, instructions orders or these conditions or otherwise concerning the work or the execution or failure to execute the same who there arising during the progress of the work or after the cancellation, termination, completion or abandonment there of shall be dealt with as mentioned here in after.

- i. If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forth with give notice in writing of his claim, or dispute to the Assistant General Manager (premises & \estate)/ Assistant General Manager (Premises), Indian Bank ZO Tirupati and endorse a copy of the date of disallowance there of or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim not shall the bank be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the Asst. General Manager (Premises & Estate) / Assistant Manager (Premises) in the manner and within the time as aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the Asst. General Manager (Premises & Estate) / Assistant Manager (Premises) in writing in the manner and within the time afore said.
- ii. The Asst. General Manager (Premises & Estate) / Assistant General Manager (Premises) shall give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of the Asst. General Manager (Premises & Estate) / Assistant General Manager (Premises) submit his claims to the conciliating authority namely the General Manager (Premises), ZO Tirupati for conciliation along with all details and copies of correspondence. Exchanged between him and the Asst. General Manager (Premises & Estate)/ Assistant General Manager (Premises).
- iii. If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination there of shall give a notice to the concerned Chief General Manager (Premises & Estate)/ Assistant Managing Director & Corporate Development Office of the bank for appointment of an arbitrator to adjudicate the notified claims failing which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.
- iv. Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out the notified claims of the contractor as afore said and all claims of the Bank shall be referred for adjudication through arbitration by the sole Arbitrator appointed by the Chief General Manager (Premises & Estate)/ Assistant Manager Director & Corporate Development Officer. It will also be no objection to any such appointment that the Arbitrator so appointed is Bank Officer and that he had to deal with the matters to which the Contract relates in the course of his duties as Bank Officer. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due

to any reason what so ever another shall be appointed in the manner aforesaid by said Chief General Manager / Assistant Managing Director & C.D.O. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each dispute along with the notice for appointment of arbitrator.

It is also a term of this contract that no person other than a person appointed by such Chief General Manager / Assistant Managing Director & Corporate Development Officer as aforesaid should act as arbitrator.

The conciliation and arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act 1996 or any statutory modification or reenactment there of and the rules made there under.

It is also a term of the contract of that if any fees are payable to the arbitrator these shall be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a Bank Officer.

It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such piece as may be fixed by the arbitrators in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part there of, shall be paid and fix or settle the amount of costs to be so paid

31. Right of Technical Scrutiny of final bill:

The employer shall have a right to cause a technical examination of the works and the final bill 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 or over certified it shall be lawful for the employer to recover the sum.

32. Employer entitled to recover compensation paid to workmen:

If, FOR ANY REASON THE Employer is obliged, by virtue of the provisions of sub-section (1) of Section 12 of the workmen compensation Act 1923, to pay compensation to a workmen employed by the contractor, in the execution of the works, the Employer will recover from the contractor the amount of compensation so paid, and without prejudice, to the right of the Employer under sub-section(2) of Section 12 of the said Act, the Employer will be at liberty to recover such amount or any part thereof by deduction it from the Security deposit or from any sum due by the Employer shall not be bound to contest any claim made against him under sub-section (1) of Section 12, of the said Act, except on the written request of the contractor and upon his giving to the employer full security for all cost for which the employer might become liable in consequence of contesting such claim.

33. Labour Laws /Regulations:

The contractor shall employ labour in sufficient numbers directly through sub-contractors to maintain throughout the period of the contract the rate of progress required according to the approved program of work and of quality to ensure proper workmanship in accordance with the specifications and drawings and Consultant/Bank instructions.

The contractor will comply with the provisions of all Act of Government relating to labour and the rules and regulations made there under from time to time. He shall also submit at the proper time all particulars statements required to be furnished to the labour authorities on being directed to do so by the Consultant/Employer.

The contractor shall register and obtain necessary licenses, maintain all registers, records, notices and documents and submit returns as prescribed by various enactment's required under various statutes including the contract labour (Regulations and Abolition) act, 1970 and rules made there under as applicable to the contractor and ensure compliance of all the statutory regulations that are in time in all matters concerning this contract.

The Contractor will also comply with all the rules and regulations stated in the minimum wages Act 1948 and the subsequent amendments. The contractor shall indemnify the employer against any liability that may arise due to the non-compliance of any provisions under minimum wages Act 1948 or any enactment affecting the work contemplated under this contract.

34. Apprentice Act:

The contractor will also comply with the provisions of the Apprentice act 1961 and the Rules and Orders issued there under from time to time. Failure to do so will amount to a breach of contract and the employer may in his discretion terminate the contract. The contractor shall also be liable for any or other liability arising on account of any violation by him of the provisions of the act.

35. When Contractor Dies:

Without prejudice to any rights or remedies under the contract, if the contractor dies, the employer shall have the option of terminating the contract without compensation to the contractor.

36. General Indemnify:

The contractor shall indemnify the employer from and against all claims, demands, proceedings, damages, costs and expenses which may be brought or made against employer or to which it may be put by reason of the contractor not conforming to or complying with any of the provisions or requirements of any act or status, Central or State Rules, Regulations, Bye-laws of Local Authorities, Panchayat, Collector or any companies relating to or in connection with the works or to labour or for supply of water, light or other amenities at the site.

SAFETY CODE

1. The contractor shall maintain in a readily accessible place "**FIRST AID APPLIANCES**" including adequate supply of sterilized dressings and cotton wool.
2. The injured person shall be taken to Public Hospital without loss of time, in case where the injury necessitates hospitalization.
3. Suitable and strong and scaffolds should be provided for workmen for all works that cannot safely be done from ground.
4. No portable single, ladder shall be over 9 meters in length. The width between the side rails shall not be less than 30cm. (clear) and the distance between two adjacent rungs not more than 30 cms. When a Ladder is used an extra helper shall be engaged for holding the ladder.

5. Every opening in the floor of 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, the minimum height of which shall be one meter.
6. No floor, roof or any other part of the structure shall be so loaded with materials as to render it unsafe.
7. workers shall be provided with protective glasses, footwear, headwear, and rubber hand gloves whenever required.
8. Those engaged in welding works shall be provided with welder's protective eye and gloves.
9. I) No paint containing lead or lead products shall be used except in the form of paste or ready-made paint.
ii) Suitable face masks should be supplied for use by the workers when the paint is applied in the form of spray or a surface having lead paint if dry rubbed and scraped.
10. Overalls shall be supplied by the contractor to the painter and adequate facilities shall be provided to enable the working painters to wash themselves during the period of cessation of work.
11. Hoisting machines and tackle used in the works including their attachments, anchorage and supports shall be maintained in perfect conditions.
12. Ropes used in hoisting or lowering material or as a means of suspension shall be of durable quality and of adequate strength and free from defects.

GENERAL AND TECHNICAL SPECIFICATIONS

1. These specifications are for the work to be done, items to be supplied and materials to be used in the works as shown and defined on the drawings and described herein all under the supervision and to the satisfaction of the Consultant/Bank.
2. The workmanship is to the best available and of a high standard, use must be made of 'specialist' tradesmen in all aspects of the work and allowances must be made in the rates for doing so.
3. The materials and items to be provided by the contractor shall be the best of their respective kind and as approved by the Consultant/Employer in accordance with samples, which may be submitted for approval and generally in accordance with the specifications.
4. Samples of all materials including those specified by name of the manufacturer or the brands, trader name or by the reference to catalogue nos. are to be submitted to the Consultant/Bank for their approval before the contractor either orders or delivers in bulk to the site. Samples together with their

packing are to be provided by the contractor free of any charge and should any materials are rejected, the same will be removed from the site at the expense of the contractor.

5. The contractor is also required to submit specimen finished of all colors, fabrics, polish shades etc. for approval of the Consultant/Employer before proceeding with such works.

6. Should it be necessary to prepare shop drawings, the contractor at his own expense prepare and submit at least four sets of such drawings to Consultant/Employer approval.

7. The contractor shall produce all invoices, vouchers or receipts account of all purchases done by him for materials if called upon to do so either by Consultant or the Employer.

8. The contractor should verify all measurements given in the drawing at the site before commencing the work. Any difference should be clarified with the Consultant before the commencing the work.

9. Partition line out shall be done at the site before starting the work and got approved from the Consultants.

10. The contractor shall submit Bar Chart (CPW method) for the complete work within one week of letter of acceptance of tender and get the same approved from Consultant/Bank in advance to co-ordinate the work with other agencies.

11. In order to complete the work in time, the contractor may have to work in more than one shift and beyond office hours. He will do so without any extra charges and without causing any disturbance/inconvenience to the neighborhood.

12. The contractor shall make necessary security arrangements at the site for the safety of his tools, materials and equipment etc. at his own cost.

13. The contractor shall quote his rate including the cost of materials as specified, corresponding wastage, labor, sales tax or any other taxes & duties, octroi, transportation to work site etc.

The rates are firm and no escalation on any account shall be allowed on accepted rates.

14. Timber: Hardwood or Teakwood shall be the best wood locally available and should be well & properly seasoned of nature growth, free from worm holes, large loose or dead knots or other defects and will not suffer warping, splitting or other defects through improper handling.

Teakwood to be either CP or Ballarshah and shall be of best quality, free from soft heart, worm & bee holes and other defects.

All Wrought timber is to be sawn, planned or works to correct sizes and shapes as shown in the drawings. An allowance of 2mm shall be permitted for each wrought face.

All wooden members shall be liberally coated and treated with indeterminate paint before fixing.

15. **Plywood:** Plywood shall be BWR ply bonded with phenol formaldehyde, water resistant grade, make and brand etc., as per details given in the Tender/Drawings.

16. Workmanship for joinery: Timber is to be cut to required size and length and the joinery should start immediately after the line out is finalized. It should be framed up (but not bonded) and stored until required for fixing in position. At this stage it should be bonded and wedged up. Any portion that warp or develops shakes or others defects shall be replaced before wedging up, The whole work is to be framed and finished in a proper line and level and as detailed in the drawings and fitted with all necessary metal ties, straps bolts, screws.

Twining bonded joints are to be cross-tongued with teak tongues.

17. The contractor shall responsible for providing and maintaining temporary coverage required for the protection of dressed, finished or semi-finished works if left unprotected. He is also to clean out all shavings, cuts ends and other wastage from all parts of the work at his experience.

18. Laminate sheeting shall be of specified thickness, make and either plain, sued, satin or with design finish and samples showing the surface texture and pattern are to be submitted in proper sizes for approval before use.

The laminates shall be fixed with proper adhesive of approved grade and brand.

19. The contact surfaces of dowels, tenors, wedges, et. Shall be glued with proper adhesive. Wherever joinery and carpentry works is likely to come in contact with moisture the adhesive shall be waterproof.

20. **Hardware:** shall be of approved make and quality. Samples of each and every hardware item should be submitted and got approved before using. The hardware shall generally confirm to following.

Butt Hinges: Shall be either brass oxidized or powder coated Aluminum with pins and washers heavy duty type.

Mortise: Six levers

Tower Bolts: Brass oxidized or powders coated aluminum

21. **Glass & Glazing:** The glass used for glazing shall be plain, complying with IS: 3548, unless otherwise specified.

The glass shall be free from any defects such as bubbles, undulations, waves and cracks etc.

22. **Painting & Polishing :**

All materials required for this work shall be of specified and approved manufacturer, delivered to the site in manufacturers containers with seals etc. unbroken and clearly marked with manufacturers name of trademark with a description of the contents and color. All materials to be stores at the site.

All brushes, tools, pots, kettles etc. used in carrying out of the work shall be clean and free from foreign matter.

Surfaces of the new wood work which are to be painted are to be rubbed down, knotted and stopped to the approval of Consultant/Employer.

Surfaces of previously painted woodwork which are to be repainted shall be cleaned down with soap solution of approved solvent to remove dirt, grease etc. Whilst wet the surface shall be flatted down with suitable abrasive and then rinsed down and allowed to dry. Minor area of defective paint shall be removed by scrapping back to firm edge and the exposed surface touched in with primer as described and stopped with putty. Where the wood work has been previously painted or polished and is to be down. Surfaces of previously painted metal surfaces which are to be repainted shall be cleaned down flatted down and any rust and loose scale shall be removed completely by chipping. Scrapping and wire brushing back to bare metal and touched in with Primer as directed by Consultant.

23. **Aluminum Sections:**

Aluminum Sections shall be factory extruded out of the aluminum ingots with smooth finish without any defects like pores, roughness etc. and shall be accurate in size, shape and weight etc.

24. **List of INDIAN STANDARDS referred to :**

IS: 1200: Latest Measurements of building & civil engineering works, methods of

IS: 287-1973Recommendations for maximum permissible moisture content of timber

IS: 141-1973Code of practice for seasoning of timber.

IS: 3845-1966 Code of practice for joints used in wooden furniture.

IS: 303 for Plywood

IS: 3548-1966 Glazing in buildings

IS: 1137-1965 Specifications for ready mixed paint brushing matt.

IS: 113-1950or egg shell flat/wooden

IS: 133-1975coating/undercoating/finishing. Grey filter etc. for

IS: 110-1968interiors.

IS: 129-1950

25. **INSPECTION AND TESTING:**

The Consultant/Bank shall be entitled at all times at the risk of contractor to inspect and/or test by itself or through an independent agency appointed by the Employer to inspect, and/or test all the materials, components and items of work at the expenses of the contractor. All such tests shall be done as per ISI guidelines and directed by Consultant/Bank.

26. **CIVIL WORKS:**

All civil works shall be carried through experienced Civil Contractors/Tradesmen shall be of high standard. There shall be no compromise either in quality or workmanship.

LIST OF IS-CODES:

OTHER SUBJECTS:

1 Safety code for scaffolding	3698(Part-I)-19966
2 Recommendation of stacking and storage of Construction materials at site.	4082-1977
3 Plywood	
4 Particle boards	3087(1985)
5 Prelaminated particle board	12823(1990)
6 Aluminum	7133 &1285
7 Power coating	1868
8 M.S. Tubes	3601(1984), 7138, 1973, 4923(1985), 713
9 G.I. Pipes	1161
10 GYP board	2095(1982), 2542(1981).
11 Steel	1079(1988)
12 Control board including Electronic Hooter, Manual call point etc.	
13 Smoke detector	2189(1988)
14 Heat detector	11360(1985)
15 Switches	2175(1968)
16 Plug socket	3854
17 Diesel Generators	1293
18 Transformer	4722(1968)
19 Cables	694(1960), 12640(1988)
20 Ncrca Steel	Standard test as per IS 2074 is to be passed
21 Measurement of building	1200: Latest

22 Recommendation for Maximum permissible moisture Content of timber	287-1973
23 Code of practice joints used in wooden furniture	1141-1973
24 Code for practice for joint used in wooden furniture	3845-1966
25 Glazing in Buildings	3548-1966
26 Specification for ready mixed paint brushing matt Or egg shell	137-1950
27 Flat/ wooden coating undercoating / finishing gery Filler etc for interior	113 1950, 133 1975

Through not specification mentioned the sample of all materials shall confirm to respective IS code provision and the tenders are expected to quote for various items of works dully keeping this in view.

Note: All materials or items of works shall confirm to the respective Indian standard Institute codes even not mentioned here in this schedules.

LIST OF APPROVED MANUFACTURERS / NATURAL SOURCES OF MATERIALS TO BE USED IN THE INTERIOR WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY THE ARCHITECT

CARPENTARY / WOOD WORKS:

<u>S. No.</u>	<u>Material Name</u>	<u>Brand Manufacturer</u>
1.	Plywood – BWR 303Ply	Greenply / Century / Truwood / Nikon
2.	Laminate – Confirming to IS : 2045-1995	Greenlam / Archid / Sunmica.
3.	Glass	Modifloat / Asahifloat / Saint Gobain
4.	Hardware	Efficient Gadgets / Earl behari (EBCO) Hardwin / Etalica / Jyoti
5.	Flush door – Confirming to	Greenply / Egg wood / Archid or Kutty

	IS : 2202 (Part-1) – 1991	approved equivalent
6.	Teak wood	Medium teak wood or approved by the consultant
7.	GI support system for false ceiling	Rondo /Indiangypsum or approved equivalent
8.	GI dry wall partition system	Rondo/Indian gypsum or approved equivalent
9.	Plaster boards	Boral, India Gypsum or approved equivalent
10.	Soft board	Jolly board of approved equivalent
11.	Screws	GKW nettlefold or approved equivalent
12.	Adhesives	Movicol / Fevicol SH / Araldite or approved equivalent
13.	Paint	Asian / Dulux or approved equivalent
14.	Floor spring / Door closer	Everite, Ebco or approved equivalent
15.	Textured paint	Spectrum or approved equivalent
16.	Vinyl flooring	Armstrong or approved equivalent
17.	Writing Board	White mark or approved equivalent
18.	Vitrified flooring	Naveen / Granamite / Kaneria / Asian
19.	Venation blinds	MAC / Vista
20.	False ceiling	Indian gypsum / Daiken

NOTE: The contractor shall use only above mentioned material or equivalent make to be approved by the Bank / Consultant. All other materials shall confirm to the sp

**TECHNICAL SPECIFICATIONS
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 & 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.

CHAPER 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 with in 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 with drawl 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 flame 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 bazels, 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 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.

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 in case 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 makers 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.

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.

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.

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 GI 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 overlapping 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 the value shall be as per IS/IE rules

**PROPOSED ELECTRICAL WORKS FOR
INDIAN BANK,**

**LIST OF APPROVED MANUFACTURERS / NATURAL SOURCES OF MATERIALS TO BE USED IN
THE ELECTRICAL WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY THE CONSULTANT.**

APPROVED MATERIALS , MAKES AND MANUFACTURERS					
SL NO	ITEM	MAKE / MANUFACTURER			
1	UPS SOCKET & SWITCHES	MDS / MK NOVAR			
2	WIRES	FINOLEX/ HAVELLS/ L& T			
3	CABLES	CCI / HAVELLS / POLYCAB			
4	MCB / DBs	MDS/ HAVELLS/ SIEMENS			
5	CHANGE OVER SWITCH	HPL / C & S / L & T			
6	LIGHTING FIXTURES	PHILIPS / HAVELLS			
7	CFL FIXTURES	PHILIPS / HAVELLS			
8	MS CONDUIT	GUPTA / BHARAT			
9	PVC CONDUIT	PRECISION / SUDHAKAR			
10	METAL CLAD SOCKET	MDS - SLEEK / HAVELLS			

NOTE :

The contractor shall use only above mentioned material or equivalent make to be approved by the Consultant. All other materials shall confirm to the specifications laid down. The tenderer shall take this into account while tendering rates / prices. The Consultant / Owner has got every right to select any of the above Makes for the Project. However the samples of every material including all fixing accessories shall be got approved by Owner / Consultant before Execution.

MEMORADUM

1. Name of work : Interior furnishing & Electrical Works for **CHINNA MARKET HINDUPUR BRANCH.**
2. Estimated value of work :
3. Earnest Money Deposit : Rs.1% of Estimated Value
4. Date of Commencement of the Tender : From the date of acceptance
5. Period of Completion : 21 days from Commencement.
6. Value of work to taken for issue of "Interim Certificate" for payment : Not Applicable
7. Retention percentage to be deducted From RA Bills : 8% of the gross value of the bill. (Inclusive of E.M.D)
8. Liquidated damages : Half percent per week of the Contract value subject to a Max of 10% of the contract value.
9. Period of Final Measurement : 15 days
10. Period of honoring Interim Certificate For payment : 7 days
11. Period of honoring Final Certificate for Payment : 15 days
12. Total Security Deposit : As per Clause No. 10
13. Refund of Security Deposit : 50% of SD after successful completion of the work along with the final bill and balance 50% after expiry of defect liability period.
14. Defect liability Period : 12 months for completion of the work (2 ½ %).

DECLARATION

I/We have inspected the site of works and have made me / we fully acquainted with the local conditions in and around the sites of works. I/We hereby declare that I/We have gone through the conditions laid down in the Notice Inviting Tender, Conditions of Contract, Technical Specifications and understood the same and on the basis of the same I/We quoted our rates in the Schedule of Quantities attached with the tender documents.

I/We shall also uniformly maintain such progress as may be directed by the Employer / Architect to ensure completion of same within the target date as mentioned in the tender document.

Witness:

Signature of Tender

Address _____

Date: _____

DRAWINGS AND BILL OF QUANTITIES