



TENDER DOCUMENT

ELECTRICAL WORKS FOR  
MADHAVNAGAR BRANCH,  
RBO-5, AO-2 BENGALURU NORTH

STATE BANK OF INDIA,  
REGIONAL BUSINESS OFFICE-5,  
AO-2 BENGALURU NORTH,  
BENGALURU -560009  
KARNATAKA.

PART A

INSTRUCTIONS TO TENDERERS AND GENERAL CONDITIONS.

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Issued to:	M/s.....
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STATE BANK OF INDIA, ADMINISTRATIVE OFFICE – 02, BENGALURU NORTH

TENDER NO. BAN/AO-2/BEN/93

Notice inviting E- Tenders

The Regional Manager, State Bank of India, RBO-5, A.O-02, Bengaluru NORTH invites E-Tenders from the Empanelled contractors in **Group – E- ELECTRICAL LT WORK of Bengaluru Circle**, under **Category E2**. [up to Rs. 25 LAKH] .Eligible contractors can download this whole tender from the website [www.tenderwizard.com/sbietenderfrom](http://www.tenderwizard.com/sbietenderfrom) **10.12.2025** to **29.12.2025** up to **3:00 pm**

Details of the tenders are as under;

e-Tender Contact person Antares Systems Ltd. (Sushmitha –8951944383/ Pooja-9686196751 )

Architects : Nil.

1	Name of the work	ELECTRICAL WORKS FOR MADHAVNAGAR BRANCH, AO-2 BENGALURU NORTH
2	Time allowed for completion.	30 days
3	Quantum of Work	As per BOQ
4	Earnest Money Deposit.	₹ 10,800/- To be submitted in the form of Demand Draft drawn in favour of Chief Manager (Opns.),RBO-5,AO-2 Bengaluru NORTH payable at Bengaluru and to be submitted physically at SBI, Regional Business Office -5, A.O-2, situated at 2nd floor, Mysore Bank Circle, K.G Road, Bengaluru-560009.
5	Initial Security Deposit.	2% of contract value including EMD
6		
7	Last date and time of receipt of E-Tender.	3:00 pm On 29.12.2025
8	Reverse Auction	Not Applicable
9	Mode of tender submission	Tenders will be accepted only in e-tender portal <a href="http://www.tenderwizard.com/sbietender">www.tenderwizard.com/sbietender</a>
10	Date and time of opening of tenders.	3:30 pm On 29.12.2025
11	Defect liability period.	12 months.

12	Validity of tenders.	Rates quoted should remain valid for a period of 3 months.
13	Liquidated damages.	Liquidated damages shall be 0.5% of the contract value per week subject to a maximum of 5% of the accepted contract amount.
14	Value of interim Certificate.	₹ 6.0 LAKHS
15	Submission of Technical Bid	<p>Contractors shall Download the entire Technical Bid to get acquainted with the terms and conditions and <b>shall compulsorily upload Pg.1 To 7 i.e the (i) Notice Inviting E-Tender (ii) Instructions to contractors and (iii) Tender form of the Technical bid without fail in the e-tendering portal after putting the signature and seal. Failing to upload as stated above, the tender will be rejected.</b></p> <p>However, L1 Tenderer should submit the Technical bid containing pages 1 to 62 duly signed with company seal and date physically to the Administrative Office within 3days of receipt of confirmation.</p>
In case the date of opening of tenders is declared as holiday, the tenders will be opened on next working day at the same time.		
SBI has the right to accept/reject any/all tenders without assigning any reason(s).		
<p style="text-align: right;"> <b>Regional Manager,</b>  <b>State Bank of India,</b>  <b>Regional Business Office – 5,</b>  <b>Administrative Office – 02,</b>  <b>Bengaluru North.</b> </p>		

**PART A**  
**INSTRUCTIONS TO TENDERERS AND GENERAL CONDITIONS.**

**INSTRUCTIONS TO TENDERERS**

Online, e tenders are invited in two bids for **above captioned work**, from the Contractors of eligible Category, Empanelled in the State Bank of India. (Proof of empanelment in appropriate category should be submitted)

Submission of BIDs/Tender Documents: **Contractor shall upload compulsorily the pages numbered from 1 to 7 of the Technical bid without fail in the e-tendering portal after putting the signature and seal. Failing to upload as stated above, the tender will be rejected.** Tenders should be submitted online in the website <https://etender.sbi>. The tender document is not required to be sent to us in hard copy. The Tender documents with acceptance of all terms and conditions strictly as described in this tender document will be submitted online through the out sourcing agency approved by the Bank for e-tendering as mentioned in the Notice Inviting Tender.

1. Contractors should submit EMD physically on or before **3.00 PM**, on **29.12.2025** at SBI Administrative Office, situated at 1<sup>st</sup> floor, Mysore Bank Circle, K.G Road, Bengaluru-560 009. The tender will be rejected if the tenderer fails to submit the above documents such as soft copy of complete tender documents, scanned copies of proof of empanelment, declaration and EMD.

Contract documents consist of detailed plans, technical specification, schedule of quantities of the various classes of work to be done, and the set of 'conditions of contract' to be compiled with by the person whose tender may be accepted.

2. Tenders should be submitted online up to **3.00 PM** on **29.12.2025**. The e-Tender will be opened on at **3.30 PM** on **29.12.2025**.
3. Earnest money to be deposited in the form of Demand Draft/ Banker's Cheque drawn in favour of Assistant General Manager(P&E), State bank of India, payable at Bangalore, otherwise the tender is liable for rejection.
4. The successful tenderer will have to pay an amount of Initial Security Deposit, which shall be 2% of the accepted value of the tender including the EMD, by means of D.D. The Initial security deposit is to be paid by the Contractor to Bank within 15 days of intimation to him of the acceptance of the tender. No interest is allowed on the above said security deposit (EMD, ISD)
5. Retention Money: From each running bill, an amount at the rate of 10% of the gross value of the running bill shall be recovered as retention money, till the total retention amount including the EMD and ISD amounts already with the Bank become 5% of the value of the contract amount. This amount is called as Total Security Deposit, which consists of three components a) EMD - Earnest Money Deposit.  
b) ISD - Initial Security Deposits.  
c) RM - Retention Money.

The total security deposit will be kept with the Bank. Out of Total Security Deposit 50% of the total security deposit amount shall be refunded without interest to the contractor on issuance of virtual completion certificate by the Architect/Bank and the Contractor's removal of his materials, equipment, labour force, temporary sheds, stores, site office etc. and on receipt of physical possession of the site by the Bank. The remaining 50% of the total security deposit may be refunded 15 days after the end of defects liability period (one year), provided he has satisfactorily carried out all the works and attended to rectification of all defects in accordance with the conditions of the contract. In case of failure on the part to do so, the cost of rectifying the defects through any other agency shall be deducted from the amount of security deposit due to the contractor.

Completion of work:: i) The work shall be considered as complete only when the certificate of virtual completion is issued by the architects/Bank.ii) The 'defects liability period' as prescribed in the contract shall commence only from date of such virtual completion.iii) Any defect that may appear within the defects liability period shall be rectified by the contractor within reasonable time on receipt of necessary instructions from Bank to that effect.

The acceptance of a tender will rest with the Competent Authority, who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all of the tenders received, without assigning any reasons. All tenders in which any of the prescribed conditions are not fulfilled, or are incomplete in any respect are liable to be rejected.

6. All compensation or other sums of money payable by the Contractor to Clients under the terms of this contract may be deducted from the security deposit, or from any sum that may be or may become due to the Contractor on any account whatsoever and in the event of the Security Deposit being reduced by reasons of any such deductions, the Contractor shall within 7 days of being asked to do make good in by DD any sum which have been deducted from his security deposit.
7. Tender containing any condition leading to unknown / indefinite liability, are liable to be summarily rejected.
8. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
9. The tenderer should quote their (own) rates for undertaking the work.
10. GST as applicable will be reimbursed by bank as specified in NIT.
11. All taxes other than GST, other statutory obligation in respect of this contract, as applicable, shall be payable by contractor including transportation and TA / DA of the workers at site and the Bank will not entertain any claim whatsoever in this respect
12. I. T. will be recovered WITH surcharge or as applicable as per Government Rules

13. Time is the essence of the contract. The work should be completed in 30 days from the date of the work order/handing over the site to the contractor to commence the work whichever is later. The successful Contractor will have to give CPM/PERT chart of various activities of works to be done so that the work gets completed within the stipulated time. The chart shall be submitted within 7 days from the date of acceptance of the tender.
14. Tenders for works shall remain open for acceptance for a period of 90 days from the last date opening of price bid of tenders. If the tenderer withdraws his tender before the expiry of the said period or makes any modifications in terms and condition of the tender which are not acceptable to the Bank, then the bank without prejudice to any other right or remedy is at liberty to forfeit the earnest money.
15. The successful tenderer, after the work is awarded, he will have to enter into an agreement with the competent authority of the bank.
16. The tenderer, must co-ordinate with the other agencies such as (I) Interior (II) Air – Conditioning etc.
17. The tenderer should visit the site to ascertain the working conditions and local authority regulations / restrictions if any and other information required for the proper execution of the work.
18. The work may be carried out on any floor level as per site condition. Please note that materials and machines are required to be carried on head load and the same must be accounted in the costing. Also note that no separate cost shall be allowed for head load.
19. The quantities of various items given in the schedule of quantities are approximate. The quantities of work may vary at time of allotment / execution of work. Bank reserves the right to omit / delete any item(s) of work from the schedule at the time of allotment / before. Contractor will be paid for the actual work done at the site duly verified by the concerned official of the bank.
20. The unit price shall be deemed to be fixed price. In case of extra items, a record of labour charges paid shall be maintained and shall be presented regularly to the Employer's for checking. The settlement will be made based on figures arrived at jointly and taking unit price given in the contract assigned to the successful Tenderer. In case of extra items where similar or comparable items are quoted in the tender, extra rates shall be based on tender rates.
21. If the rate quoted by the contractor for any item / items are not workable or abnormally lower than the market rate, the bank may demand Bank guarantee from the contractor for satisfactory completion of these work. The bank guarantee amount will be not less than 50% of the estimated amount of the items for which the rates are not workable or abnormally low. This bank guarantee will be released after completion of these works (unworkable and abnormally low rated items) to the satisfaction of the bank.

22. The contractor shall submit the bar chart/ CPM/ PERT as well as shall submit the insurance cover for the work in the form of CAR policy and Third Party Insurance within seven (7) days from the acceptance of work order.
23. The work has to be started within 7 (Seven) Days from the date of receipt of work order/ mark out at site; whichever is later. In case of work not being started within this stipulated period, the bank reserves the right to cancel the work order duly forfeiting the Earnest money deposit
24. No employee of the Bank is allowed to work as a contractor for a period of 2 years of his/her retirement from Bank Services without previous permission of the Bank. This contract is liable to be cancelled, if either the contractor or any of his employees is any time to be such a person who had not obtained the permission of Bank as aforesaid before submission of the tender or engagement in the contractor's service.
25. Contractor should get approval of the samples of materials in advance with Bank's Engineer before use of the same in the work'
26. Bank has the right to offer the contractor to modify the old material wherever/ whenever necessary instead of new supplies
27. The quoted rate should be inclusive of materials, labour, wages, fixtures, transportation, installation, all taxes(excluding GST), wastages, Octroi, machinery, temporary works such as scaffolding, cleaning, overheads, profit, statutory expenses, incidental charges and all related expenses to complete the work
28. The tenders shall summarily rejected, if any one of the above said requirements has not been complied with.
29. The Bank will not be bound to accept the lowest tender and reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever
30. The contractor should fulfill the labour regulation guidelines stipulated by the governments
31. No advance payment in any form will be granted for the works proposed
32. Period of taking up the final bill will be one month from/ after satisfactory virtual completion or the date of submission of the final bill whichever is later.

**SIGNATURE OF THE CONTRACTOR WITH SEAL**

**DATE**

## FORM OF SUBMISSION OF TENDER

(To be filled by the tenderer)

Deputy General Manager (B&O)

State Bank of India

AO-2, Bengaluru NORTH- 560 009

Dear Sir/s,

Ref: Electrical Work FOR \_\_\_\_\_

I/We hereby declare that I/ We have carefully gone through the conditions laid down in the Notice Inviting Tender, General notes, General Conditions of Contract, Special conditions, Schedule of approximate quantities and rates, Form of Agreement, General Specification, Approved manufacturers/ natural source of materials Technical Specifications of schedule of quantities, and clearly understood all the same and on the basis of the same I/ We have quoted our rates in the Schedule of Quantities (i.e. BOQ) attached with the tender documents.

I / We do here by undertaken to execute and complete the whole or part of the work (as desired by you) at the respective rates quoted.

I/ We are depositing a sum of ₹ \_\_\_\_\_/- as earnest money deposit by way of demand draft drawn in favor of CM(HR & Admin.),AO-2, State Bank of India, payable at Bangalore ; along with this tender for due execution of the work at my/ our tendered rates.

In the event of this Tender being accepted I/ We agree to enter into the agreement and submit the declaration on requisite non-judicial stamp papers as and when required and execute the contract according to your form of Agreement etc., in default whereof, I/ We do hereby bind my-self / ourselves to forfeit the aforesaid deposit.

In the event of this Tender being accepted I/ We agree to obtain the labour license and the CAR insurance policy and deposit the balance E.M.D. amount and adhere/comply to all other instructions as given in TENDER DOCUMENT.

I / We further agree to complete the work included in the said schedule of quantities within \_ \_ \_ \_ \_ days time from the date of the work order issued to commence the same.

Date of commencement shall be either one week from the date of work order issued to the contractor or the date on which mark out of work at site has been given to contractor; whichever is later.

I / We agree not to employ sub-contractors other than those that may be approved by Employer.

I / We agree to pay all taxes(except GST), insurance charges as prevailing from time to time, on such items for whom same is to be levied by/ for the government, and the rates quoted by me / us are inclusive of all the same.

Yours Faithfully,

Signature of Witness:

Contractor's Signature\_\_\_\_\_

1.

Name: \_\_\_\_\_

2.

Address: \_\_\_\_\_

3.

\_\_\_\_\_



## **GENERAL NOTES**

### **1. PROCEDURE OF FILLING AND SUBMISSION OF TENDER**

- i) Submission of BIDs/Tender Documents: Tenders should be submitted online in the website <https://etender.sbi>. In addition, scanned copy of the declaration given in pages (Page no 39) to be signed with seal and scanned proof of empanelment should be submitted online with our service provider on the website at: <https://etender.sbi>. The tender document is not required to be sent to us in hard copy. The Tender documents with acceptance of all terms and conditions strictly as described in this tender document will be submitted online through M/s e-Procurement Technologies Ltd., Ahmadabad, the out sourcing agency approved by the Bank for e-tendering on the website <https://etender.sbi>
- ii) In the event of the tender being submitted by a firm, it must be signed by a member or members of the firm having legal authority to do so, and if called for, the legal documents in support thereof must be produced for inspection and the same in the case of the firm carried out by one member of a joint family. It must disclose that the firm is duly registered under the India Partnership Act. Any tender signed by a member not holding a power of attorney shall be treated as informal.
- iii) The employer reserves to itself the right to accept the lowest or any tender or split up and distribute any items of work to any specialist firm or firms without assigning any reason. The employer reserves the right to split up and distribute the work to more than one tenderer, if necessary. Person tendering shall submit and return together with his tender, this condition of contract, specifications and the priced schedule of quantities and all set of papers signed on all the pages in a sealed cover. Signature will be deemed to be the acceptance of the contents of these tender papers by the tenderer.  
Tenderer shall note that their tenders shall remain open for acceptance for a minimum period of three months from the last date of opening of price bids. The tenders must be unconditional. Conditional tenders may be summarily rejected.

### **2. RATES TO INCLUDE:**

While quoting their rates the tenderer should include the following if otherwise not stated herein before.

- a) Necessary cost of taking samples of materials supplied by them for work at Govt's / approved laboratory including transportation, cost of the samples, as and when required.
- b) Submission of test reports of other materials as may be specified by Bank's Engineer.

### **3. STORAGE OF MATERIALS:**

The contractor shall not store their materials and debris within the premises other

than the work site handed over to him.

**5. LABOUR HUTMENT:**

Shelter or stay and other amenities for the labors have to be arranged by the contractor at his own expense and responsibility.

**6. IDLE LABOUR:**

In case the work is held up for any site conditions not attributable to the contractors or for any decisions instructions / want of details from Employer or for any of the conditions, the contractor shall be allowed reasonable extension of time by the employer but any claim for idle labour shall not be entertained by the employer. Contractor's quoted rates should include for all such contingencies.

7. The contractor shall engage one competent person at site who shall take the instructions from the Employer. The work should not suffer due to lack of supervision, manpower and materials.

8. The Contractor is required to co-ordinate his works along with other agencies working at site. He has to reimburse any of the damage made by him or any of his representatives for any of the other agency or owner at site.

9. Making of any cut-out / opening for electrical wiring / fitting in any of false ceiling, partition, Panelling, masonry work etc., and providing panels of the same finish in partitions, panelling shall not be paid extra.

10. The contractor is required to fabricate a sample where required, or any item so installed for approval. Any changes made by the Architect/Employer, in the sample to the specifications as mentioned in the tender, shall not be deducted or paid extra. The bulk production of the furniture can only be taken up after the final approval of the sample of the item.

11. The partitions shall be so fixed that all joinery work is in plumb and true in line. The partition frame shall be firmly fixed to the floor and ceiling by using suitable wall plugs and screws.

12. The contractor shall check all dimensions before fabricating and fixing the partitions or any other items in position at site.

13. All measurements given in the schedule hereunder are for the purpose of tender only. Payment will be made on actual measurement of the work done.

14. All measurements shall be as per relevant I.S. standards.

**GENERAL CONDITIONS OF CONTRACT**

Except where provided for in the description of the individual items in the schedule of quantities and in the specifications and conditions laid down hereinafter and in the drawings, the work shall be carried out as per standard specifications and under the direction of Employer.

**1. INTERPRETATION**

In constructing these conditions, the specifications, the schedule of quantities, tender and agreement, the following words shall have the meaning herein assigned to them

except where the subject or context otherwise requires.

- (a) **Employer:** The term employer shall denote **State Bank of India** and any of its employees representative authorized on their behalf.
- (b) **Architects / Consultants:** The term Architects shall mean the Architects appointed by the employer for the purpose of preparing detailed drawing, supervision etc. It is the Bank to decide whether to appoint Architect or not and to change the Architect at any stage of work.
- (c) **Contractor:** The term contractor shall mean \_\_\_\_\_ (Name and address of the contractor) and his / their heirs, legal representatives, assigns & successors.
- (d) **Site:** The site shall mean the site where the works are to be executed, including any building and erection thereon, allotted by the employer for the contractors use.
- (e) **Site Engineer:** Any Engineer appointed from time to time by the Employer and certified in writing to the Architects and the Contractor, to be positioned at site to supervise the work.
- (f) **Drawings:** The work is to be carried out in accordance with drawings, specifications, the schedule of quantities and any further drawings which may be supplied or any other instruction, which may be given by the Employer or Architects during the execution of the work.
- (g) All drawings relating to work given to the contractor together with a copy of schedule of quantities are to be kept at site and the Employer / Architects shall be given access to such drawings or schedule of quantities wherever necessary.
- (h) In case any detailed Drawings are necessary contractor shall prepare such detailed drawings and / or dimensional sketches therefore and have it confirmed by the Employer as case may be prior to taking up such work.
- (i) The contractor shall ask in writing for all clarifications on matters occurring anywhere in drawings, specifications and schedule of quantities or to additional instructions at least 10 days ahead from the time when it is required for implementation so that the Employer may be able to give decision thereon.
- (j) **"The Works"** shall mean the work or works to be executed or done under this contract.
- (k) **"Act of Insolvency"** shall mean any act as such as defined by the Presidency Towns Insolvency Act or in Provincial Insolvency act or any amending status.
- (l) **"The Schedule of Quantities"** shall mean the schedule of quantities as specified and forming part of this contract.
- (m) **"Priced Schedule of Quantities"** shall mean the schedule of quantities duly priced with the accepted quoted rates of the contractor.

- (n) "**Contract**" shall mean the Articles of Agreement, the general conditions special conditions, the appendix, the schedule of quantities, specifications and drawings attached here to and duly signed.
- (o) '**Contract Price**' shall mean the sum named in the Tender subject to such additions thereto or deductions there from as may be made under the provisions hereafter contained.
- (p) '**Notice in Writing**' or written notice shall mean a notice in writing, type or printed characters sent (unless delivered personally or otherwise provided to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- (q) '**Net Prices**' any arriving at the Contract amount the Contractor shall have added to or deducted from the total of the items if 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 the tender as the price of that item a similar percentage or proportionate sum. Providing always that in determining the percentage or proportion of the sum so added or deducted by the contractor, the total amount of any Prime Cost items and provisional sums of money shall be deducted from the total amount of the Tender. The expression 'net rates' or 'net prices' when used with reference to the contract or account shall be hold to mean rates or prices so arrived at.
- (r) '**Virtual Completion**' shall mean the premise is in the opinion of the Employer fit for occupation.
- (s) Words importing persons include firms and corporations. Words importing the singular only, also include the plural and vice verse where the Context requires.

## **2. SCOPE OF WORK/ CONTRACT**

The brief scope of work involves the following.:

- I. Electrical, Data, Telephone wirings etc.
- II. Main Panels, DB's etc.
- III. Lying of main cables, wirings etc.
- IV. UPS, Raw-power, Lightings circuits etc.
- V. Supply/Installation of fixtures etc.
- VI. Installation of protective devises, earthing ,etc as per IS standards.

All the works involves latest finishing as per instruction of Architects/Engg and specifications.

The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Employer. The Architect with approval of Employer or Employer issue further

drawings and/or written instructions, detailed directions and explanations which hereafter collectively referred to as 'Instructions' in regard to:

- a) The variation or modification of the design quality or quantity of works or the addition or omission or substitution of any work.
- b) Any discrepancy in the drawings or between the schedule of quantities and / or drawings and / or specification.
- c) The removal from the site of any defective material brought thereon by the contractor and the substitution of any other material thereof.
- d) The demolition removal and / or re-execution of any work executed by the contractor/s.
- e) The dismissal from the work of any persons employed there upon.
- f) The opening up for inspection of any work covered up.
- g) The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (Defect Liability Period).

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

Regarding all factory made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work.

### **3. TENDERER SHALL VISIT THE SITE**

Intending tenderer shall visit the site and make himself thoroughly acquainted with the local site condition, nature and requirements of the works, facilities of transport conditions, effective labour and materials, access and storage for materials and removal of rubbish. The tenderer shall provide in their tender for cost of carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc., for proper execution of work as indicated in the drawings. The successful tenderer will not be entitled to any claim of compensation for difficulties faced or losses incurred on account of any site condition.

### **4. TENDERS**

The Employer reserves the right to reject the lowest or any tender and also to discharge any or all of the tenders of each section or to split up and distribute any item of work to any specialist firm or firms, without assigning reasons.

The tenderers should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be

correct, workable and self-supporting. If called upon by the Employer/Architects detailed analysis of any or all the rates shall be submitted. The Employer/Architects shall not be bound to recognize the contractor's analysis.

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

All items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved, directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be allowed in this connection. In the case of lump-sum charges in the tender in respect of any items of work will be made for the actual work done on the basis of lump sum charges as will be assessed to be payable by the Employer / Architects.

The employer has power to add, omit from any work as shown in drawings or described in specifications or include in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the contractor without authorization from the Employer. No variation shall vitiate the contract.

The tenderer shall note that his tender shall remain open for consideration for a period of three months from the date of opening of the tender.

#### **5. AGREEMENT**

The successful contractor will be required to sign agreement in accordance with the draft agreement enclosed and the schedule conditions. The contractor shall pay for all stamps and legal expenses, incidental thereto. However the written acceptance by the employer of a tender will constitute a binding contract between the employer and the person so tendering such formal agreement is subsequently executed.

#### **6. AUTHORITIES, NOTICES, PATENT RIGHTS AND ROYALTIES:**

The contractor shall conform to the provisions of any Acts of the Legislature relating to the work, and to the Regulations and Bye-Laws of any authorities, and / or any water, lighting and other companies, and / or authorities with whose systems the structures were proposed to have connection and shall before making any variations from the drawings or specifications that may be associated to so conform, give the Employer / Architects written notices specifying the variations proposed to be made and reasons for making them and apply for instruction thereon. The Employer / Architects on receipt of such intimation shall give a decision within a reasonable time. The contractor/s shall arrange to give all notices required for by the said Acts, Regulations or Bye-laws to be given to any authority, and to pay to such authority or to any public officer all fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer

The Contractor shall identify the Employer against all claims in respect of patent rights, designs, trademarks or name or the protected rights in respect of any constructional plant, machine, work or material used for or in connection with the works or temporary works and from and against all claims, demands, proceedings,

damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto. The Contractor shall defend all actions arising from such claims, unless he has informed the Architects, before any such infringement and received their permission to proceed and shall himself pay all royalties, license fees, damages, cost and charges of all and every sort that may be legally incurred in respect thereof.

#### **7. TAXES AND DUTIES**

The tenderers must include in their tender prices quoted for all taxes(**except GST**) and duties royalties, cess ,local charges if applicable. No extra claim on this account will in any case be entertained.

#### **8. NOTICES AND STATUTORY REGULATIONS:**

The contractor shall give all notices and pay all fees and shall comply all Acts and Regulations for the successful completion of the contract works.

The whole of the work is to be complied with as per the requirements and bylaws of the relevant statutory authorities including contract labor (Regulation and Abolition) Act 1970.

#### **9. QUANTITY OF WORK TO BE EXECUTED**

The Schedule of Quantities unless otherwise stated shall be deemed to have been prepared in accordance with the Standard Procedure shall be considered to be approximate and no liability shall attach to the employer for any error may be discovered therein. The Employer reserves the right to execute only a part or the whole or any excess thereof without assigning any reason therefore.

The Contractor shall be deemed to have satisfied himself before tendering to the correctness and sufficiency of his tender for the works and of the prices stated in the Schedule of Quantities and / or the Schedule of Rates and Prices, which rates and prices shall cover all things necessary for the completion of the works.

#### **10. OTHER PERSONS ENGAGED BY THE EMPLOYER**

The Employer reserves the right to execute any part of the work included in this contract or any work, which is not included in this contract by the other Agency, or persons and contractor shall allow all reasonable facilities and use of his scaffoldings for the execution of such work. The main contractor shall extend all cooperation in his regard.

#### **11. Tenderer should deposit EMD as mentioned in the NIT.**

#### **12. CONTRACTOR TO PROVIDE EVERYTHING NECESSARY**

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

binding.

### **13. TIME OF COMPLETION, EXTENSION OF TIME & PROGRESS CHART**

The Contractor shall be allowed admittance to the site on the 'Date of Commencement' stated in the Appendix, and he shall thereupon and forthwith begin the works and shall regularly proceed with to complete the same within 30 days. On or before the 'Day of Completion' stated in the Appendix subject nevertheless the provision for the extension of time hereinafter contained.

If in the opinion of the Employer/Architect the works be delayed:

- a) By force major or
- b) By reason of any exceptionally inclement weather or
- c) By reason of proceedings taken or threatened by or dispute with adjoining or neighboring owners of public authorities arising, than through the Contractor's won default or
- d) By the works or delays of the contractors tradesmen engaged or nominated by the Employer / Architect and not referred in the Schedule of Quantities and / or specifications or
- e) By reason of civil, commotion, local combination of workmen or strike or lock-out effecting any of the buildings traders or
- f) In consequence of the Contractor not having in due time, necessary instructions from the Employer for which he shall have specifically applied in writing ahead of time, giving reasonable time to prepare such instructions, the employer shall make a fair and reasonable extension of time for completion of the Contract works

In case of such strike or lock-out, the Contractor shall as soon as possible give written notice thereof to the employer, but the Contractor shall nevertheless constantly use his endeavors to prevent delay and shall do all they may reasonably be required, to the satisfaction of the employer to proceed with the work.

The Contractor on starting the works shall furnish to the Employer / Architect a PERT / CPM Program for carrying out the work stage in the stipulated time for the approval of Architect / Employer and follow strictly the approved time schedule incorporating charges if any, to ensure the completion of the work in stipulated time. A graph or chart on individual work shall be maintained showing the proportionate progress of work week by week a weekly progress report stating the number of skilled and un skilled laborers employed on the work, working hours done, place, type, and quantity of work done during the period.

The Contractor must inform the employer within 10 days in advance of all drawings and detailed required by him from time to time. The Contractor shall adhere to the approved program and arrange for the materials and labour etc accordingly.

Despite repeated instructions, if the Contractor fails to show proportionate progress of the work, the Architect / Employer may take suitable action and deemed fit without prejudice to any terms and conditions of the contract



#### **14. LIQUIDATED DAMAGES**

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

If the contractor fails to complete the work by the Scheduled date of completion or within any sanctioned extended time, he will have to pay liquidated damages at 0.5% of contract amount for each week beyond the date that the work remains incomplete subject to maximum of 5%of the contract value (without extra items).

#### **15. MATERIALS, WORKMANSHIP, SAMPLES, TESTING OF MATERIALS.**

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

All mandatory tests shall be carried out as per CPRI/CPWD specifications. If required by the Employer / Architects, the contractor shall have to carry out tests on materials and workmanship in approved materials testing laboratories or as prescribed by the Employer / Architects at his own cost to prove that the materials etc., under test conform to the relevant I.S Standards or as specified in the specifications. The necessary charges, transporting, testing etc., shall have to be borne by the contractor. No extra payment on this account should in any case be entertained.

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

Any damage (during the work) to any part of the work or to the premises for any reasons due to rain, storm or neglect of contractor shall be rectified by the contractor in an approved manner at no extra cost.

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

The contractor shall cover up and protect from damage, from any cause, all new work

and supply all temporary doors, protection to windows, and any other requisite protection for the execution of the work whether by himself or special tradesmen or sub-contractor and any damage caused must be made good by the contractor at his own expenses.

Contractor should take all precaution to safeguard the flooring and if any damages to the flooring should be rectified by the contractor in the same quality at his own cost.

#### **16. REMOVAL OF IMPROPER WORK**

The Employer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or times as may be specified in the order of any materials which in the opinion of the Employer / Architects are not in accordance with specification or instructions, the substitution or proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instructions. In case the contractor refuses to comply with the order the Employer shall have the power to employ and pay other agencies to carry out the work and all expenses consequent thereon or incidental thereto as certified by the Employer / Architects shall be borne by the contractor or may be deducted from any money due to or that may become due to the contractor. No certificate, shall relieve the contractor from his liability in respect of unsound work or bad materials.

#### **17. SITE ENGINEER**

The Employer may appoint a Site Engineer or clerk of works who shall be representative of the Employer. The duties of the Employer representative are to watch and supervise the works and to test any materials to be used of workmanship employed in connection with the works. He shall have no authority either to relieve the Contractor of any of his duties or obligations under the Contract, or except those expressly provided hereunder, to order any work involving delay or any extra payment by the Employer or any variation of or in the works.

The contractor shall afford the Employer's representative every facility and assistance for examining the works and materials and checking the measuring time and materials. Neither the Employer's representative nor any assistant to the Architect shall have power to revoke, alter enlarge or relax the requirements of this Contract, or to Sanction any day-work, additions, alterations, deviations or omissions unless such an authority may be specially conferred by a written order of the Employer.

The Employer's Representative shall have to give notice to the Contractor or his foremen about the non-approval of any work or materials and such works shall be suspended or the use of such material should be discontinued until the decision of the employer/Architect is obtained, the work will from time to time be examined by the Architect or the Employer's representative but such examinations shall not in any way exonerate the Contractor from the obligation to remedy defects which may be found to exist at any stage of the work of after the same is completed. Subject to the

limitations of this cause, the Contractor shall take instruction from the Architect / Employer.

## **28. CONTRACTOR'S EMPLOYEES**

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

The contractor shall not employ labour below the age of sixteen years and who is not an Indian National.

Any labourer supplied by the contractor to be engaged on the work on day work basis either wholly or partly under the direct order or control of the Employer or his representative shall be deemed to be a person employed by the contractor.

## **LOCAL LAWS, ACTS, REGULATIONS**

The contractor should abide by the central labour regulation and also shall strictly adhere to all prevailing labour laws inclusive of contract labour (Regulation and abolition act of 1970) and other safety regulations. The agency shall comply with the provision of all labour legislation including the latest requirements of all the acts, laws, any other regulations that are applicable to the execution of the tests.

- a) Minimum wages act, 1948 (Amended)
- b) Payment of wages act, 1936 (Amended)
- c) Workmen's compensation act 1923 (Amended)
- d) Contract labour Regulation and Abolition act 1970 and Central rules 1971 (Amended)
- e) Chief Labour Commissioner( C) , Ministry of Labour & Employment vide Gazette notification No.F.No.1/13(3)/2017-LS-II dated 20<sup>th</sup> April 2017 on minimum wages
- f) Apprentice act 1961 (Amended)
- g) Industrial employment (Standing order) Act 1946 (Amended)
- h) Personal injuries (compensation insurance ) Act 1963 and other modifications
- i) Employees' Provident Fund and Miscellaneous Provisions Act 1952 and amendment thereof
- j) Shop and Establishment Act
- k) Employer's Liability Act.
- l) Any other Act or enactment thereof and rules framed there under from time to time.

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

The contractor shall comply at his own cost with the order for requirement of any

Health Officer of the State or any local authority or of the Employer regarding the maintenance of proper environmental sanitation of the area where the contractor's laborers are housed or accommodated, for the prevention of small pox, cholera, plague, typhoid, malaria and other contagious diseases. The contractor shall provide, maintain and keep in good sanitary condition adequate sanitary accommodation and provide facilities for pure drinking water at all times for the use of men engaged on the works and shall remove and clear away the same on completion of the works. Adequate precautions shall be taken by the contractor to prevent nuisance of any kind on the works or the lands adjoining the same.

The contractor shall arrange to provide first aid treatment to the laborers engaged on the works. He shall within 24 hours of the occurrence of any accident at or about the site or in connection with execution of the works report such accident to the Employer and also to the competent Authority where such report is required by law.

#### **19. DISMISSAL OF WORKMEN**

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

#### **20. ASSIGNMENT**

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

#### **21. INSURANCE & DAMAGE TO PERSONS AND PROPERTY ETC.**

The contractors under the terms of the contract are required to keep the works duly insured under CAR Policy(Contractor All Risk Policy) as well as third Party Insurance for the value of 110% of the Project value or Tender value until the Completion of the project or handing over whichever is later. The insurance policies should be taken in the joint names by the contractors and the same should be renewed at appropriate time.

The contractor shall be responsible for all injury to the work or workmen to persons, animals or things and for all damages to the structural and / or decorative part of property which may arise from the operations or neglect of himself or of any sub-contractor or of any of his or a sub-contractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this contract. The clause shall be held to include inter-alias, any damage to buildings whether immediately adjacent or otherwise, and any damage to roads, streets, foot paths or ways as well as damages caused to the

buildings and the works forming the subject of this contract by rain, wind or other inclemency of the weather. The contractor shall indemnify the Employer and hold harmless in respect of all and any expenses arising from any such injury or damages to the person or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts on compensation or damage consequent upon such claim.

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

The contractor shall affect the insurance necessary and indemnify the Employer entirely from all responsibility in this respect. must be effected jointly in the name of the Employer and contractor and the policy lodged with the Employer. The scope of insurance is to include damage or loss to the contract itself till this is made over in a complete state. Insurance is compulsory and must be affected from the very initial stage. The contractor shall also be responsible for anything, which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of this contract.

The Employer shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or accruing from or in respect of any such claim or damages from any sums due to or to become due to the contractor.

## **22. MEASUREMENTS**

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

The Employer / Architect shall issue a certificate after due scrutiny of the contractor's bill stating the amount due to the contractor from the Employer and the contractor shall be entitled to payment thereof, within the period of honouring certificates named in these documents.

## **23. PAYMENTS**

All bills shall be prepared by the contractor in the form prescribed by the Employer's / Architects. Normally one interim bill shall be prepared each month subject to minimum value as stated in these documents. The bills in proper forms must be duly accompanied by detailed measurements in M-book in support of the qualities of work done and must show deductions for all previous payments, retention money, etc.

The Architect shall issue a certificate after due scrutiny of the contractor's bill stating

the amount due to the contractor from the Employer and the contractor shall be entitled to payment thereof, within the period of honoring certificates named in these documents.

The Employer will deduct IT, other applicable taxes if any (but GST is reimbursable) and retention money as described in this document. The refund of retention money will be made as specified.

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

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

#### **Final Payment**

The final bill shall be accompanied by a certificate of completion from the Architects. Payments of final bill shall be made after deduction of Retention Money as specified, which shall be refunded after the completion of the Defects Liability Period after receiving the Branch Manager/Engineer's certificate that the contractor has rectified all defects to the satisfaction of the Employer. The acceptance of the payment of the final bill by the contractor would indicate that he has no further claim in respect of the work executed.

#### **24. VARIATION / DEVIATION**

The tender rates shall be fixed and applicable for any increase or decrease in the tendered quantities. The Employer / Architect can increase or decrease any quantities to any extent or even delete particular item as per the site requirements and the contractor shall not be paid anything extra on this account. Nothing extra will be paid by the Bank on account of omission / deletion of items or decrease in the quantity of items. The Bank shall not entertain any claim whatsoever from the contractor on this account.

The price of all additional items/non-tendered items will be worked out on the basis of rates quoted for similar items in the contract wherever existing. If similar items are not available, the rates for such items will be derived as per standard method of rate analysis based on prevalent fair price of labour, material and other components as

required with 15% towards contractor's profit and overheads.

#### **25. SUBSTITUTION**

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

#### **26. CLEARING SITE ON COMPLETION**

On completion of the works the contractor shall clear away and remove from the site all machinery, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and the works clean and in a workmanlike condition to the satisfaction of the Employer/Architects.

#### **27. DEFECTS AFTER COMPLETION**

The contractor shall make good at his own cost and to the satisfaction of the Employer all defects, peeling off laminate, false ceiling cracks, or any other faults, which may appear within 12 months after completion of the work. In the default, the Employer may employ and pay other persons to amend and make good such damages, losses and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor and such damages, loss and expenses shall be recoverable from him by the Employer or may be deducted by the employer, in lieu of such amending and making good by the contractor, deduct from any money due to the contractor a sum equivalent to the cost of amending such work and in the event of the amount retained being insufficient recover that balance from the contractor from the amount retained(retention money) together with any expenses the Employer may have incurred in connection therewith.

#### **28. CONCEALED WORK**

The contractor shall give due notice to the Employer/Architects whenever any work is to be covered up or finished up or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before such covering, in default whereof the same shall, at the opinion of the Employer/ Architect be either opened up for measurement at the contractor's expenses or no payment may be made for such materials. Should any dispute or differences arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or checked, the notes of the Employer / Architects shall be accepted as correct and binding on the contractor.

#### **29. IDLE LABOUR**

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

#### **30. SUSPENSION OF WORKS**

If the contractor except on account of any legal restraint upon the Employer

preventing the continuance of the work or in the opinion of the Employer shall neglect or fail to proceed with due diligence in the performance of his part of the contract or if he shall more than once make default, the Employer shall have the power to give notice in writing to the contractor requiring the work to be proceeded within a reasonable manner and with reasonable dispatch, such notice purport to be a notice under this clause.

After such notice shall have been given, the contractor shall not be at liberty to remove from the site of the works or from any ground contiguous thereto any plant or materials to subsist from the date of such notice being given until the notice shall have been complied with. If the contractor fails to start the work within seven days after such notice has been given to proceed with the works as therein prescribed, the employer may proceed as provided in clause 31 (Termination of Contract by Employer)

### **31. TERMINATION OF CONTRACT BY EMPLOYER**

If the contractor being a company go into liquidation whether voluntary or compulsory or being a firm shall be dissolved or being an individual shall be adjudicated insolvent or shall make an assignment or a composition for the benefit of the greater part, in number or amount of his creditors or shall enter into a Deed or arrangement with his creditors, or if the Official Assignee in insolvency, or the Receiver of the contractor in insolvency, shall repudiate the contract, or if a receiver of the contractor's firm appointed by the court shall be unable within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the employer that he is able to carry out and fulfil the contract, and if so required by the employer to give reasonable security therefore, or if the contractor shall suffer execution to be issued, or shall suffer any payment under this contract to be attached by or on behalf of and of the creditors of the contractor, or shall assign, charge or encumber this contract or any payments due or which may become due to contractor, there under, or shall neglect or fail to observe and perform all or any of the acts matters of things by this contract, to be observed and performed by the contractor within three clear days after the notice shall have been given to the contractor in manner hereinafter mentioned requiring the contractor to observe or perform the same or shall use improper materials or workmanship in carrying on the works, or shall in the opinion of the employer not exercise such due diligence and make such progress as would enable the work to be completed within due time agreed upon, and shall fail to proceed to the satisfaction of the employer after three clear days notice requiring the contractor so to do shall have been given to the contractor as hereinafter mentioned or shall abandon the contract, then and in any of the said cases, the Bank may notwithstanding previous waiver determine the contract by a notice in writing to the effect as hereinafter mentioned, but without thereby effecting the powers of the employer of 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 determine and as if the works subsequently executed by or on behalf of the contractor (without thereby creating any trust in favour of the contractor) further the employer or his agent, or servants, may enter upon and take possession of the work and all plants tools scaffolding sheds machinery, steam, and other power, utensils and materials lying upon premises or the adjoining lands or roads and sell the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other contractors or other persons or person to complete the works, and the contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other contractors or other persons or person employed from completing and finishing or using the materials and plants for the works when the works shall be completed, or as soon thereafter as conveniently may be the employer shall give notice in writing to the contractor to remove his surplus materials and plants and should the contractor to remove his surplus materials after receipt by him the employer may sell the same by Public Auction and shall give credit to the contractor for the amount so realized. Any expenses or losses incurred by the contractor for the amount so realized. Any expenses or losses incurred by the employer in getting the amount payable to the contractor by way of selling his tools and plants or due on account of work carried out by the contractor prior to engaging other contractors or against the Security Deposit.

### **32. ARBITRATION**

When the contractor is dissatisfied with the decision of the Architect/Employer, the contractor is required to give a notice to the Employer within 30 days of the receipt of such decision, for the appointment of the Arbitrator for the settlement of the outstanding disputes.

- b. Assistant General Manager (Premises & Estate), Bengaluru shall be appointed to refer those disputes for adjudication to a sole arbitration.
- c. It is also a term of the contract that if the contractor does not make any demand for Arbitrator in respect of any claims within 90 days of receiving the intimation from the Bank that the final bill is ready for payment, the claims if any received after 90 days period shall be absolutely barred from reference to the Arbitrator.
- d. All disputes or differences of any kind whatsoever, which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof this contract, or the rights touching or of this contract, effect thereof, or to the rights or liabilities of the parties arising out of or in relation thereto, whether during progress or after determination, foreclosure or breach of the contract (other than those in respect of which the decision expressed to be final and binding in cases listed out in condition 40 above), Architects shall, after written notice to either party to the contract and to the appointing Authority, who shall be appointed for this purpose by the

employer refer those disputes for adjudication to a sole arbitrator, to be appointed as hereinafter provided.

- e. For the purpose of appointing the sole arbitrator referred to above, the Appointing authority will send, within thirty days of receipt by him of the written notice aforesaid, to the contractor a panel of three names of persons, who shall be presently unconnected with the organization for which the work executed.
- f. The contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole arbitrator and communicate his name to be appointed as a sole arbitrator to the Appointing Authority, within thirty days of receipt of the names by him. The Appointing Authority shall thereupon without any delay appoint the said person as the sole arbitrator. If the contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the sole arbitrator.
- g. If the Appointing Authority fails to send to the contractor the panel of three names as aforesaid within the period specified, the contractor shall send to the appointing authority a panel of three names of persons, who shall be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as the sole arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole arbitrator within 30 days of receipt by him of the panel and inform the contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the sole arbitrator and communicate his name to the Appointing Authority.
- h. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reasons whatsoever, another sole arbitrator shall be appointed as aforesaid.
- i. The work under the contract, shall however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.
- j. The arbitrator shall be deemed to have entered on the reference, on the date he issues notice to both the parties, fixing the date of first hearing.
- k. The arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.
- l. The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such a place, as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator, if required to be paid before the award is

made and published, shall be paid half and half by each of the parties. The costs of the reference and of the award including the fees, if any, 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 may fix or settle the amount of costs to be so paid.

m. The award of the Arbitrator shall be final and binding on both the parties.

n. Subject to aforesaid, the provisions of the Arbitration and Conciliation Act, 1996, or any statutory modifications or re-enactments thereof, and the rules made thereunder, and for time being in force, shall apply to the arbitration proceedings under this clause.

### *SPECIAL CONDITIONS OF CONTRACT*

#### **1. DRAWINGS AND SPECIFICATIONS**

The works shall be carried out to the entire satisfaction of the EMPLOYER and the Architect, in accordance with the signed drawings and specifications and such further drawings and details as may be provided by the Architect/Employer, and in accordance with such written instructions, directions and explanations as may from time to time be given by the Employer/Architect, whose decision as to the sufficiency and quality of the work and materials shall be final and binding upon all parties. If the work shown on any such further drawings or work that may be necessary to comply with any such instructions directions or explanations, be in the opinion of the contractor extraction that comprised in or reasonably to be inferred from the contract he shall before proceedings with such work, give notice in writing to this effect to employer/Architect, and in the event of the employer/Architects agree to the same in writing the contractor shall be entitled to an allowance in respect of such extra work as on authorized extra. If the Architect and the contractor fail to agree as to whether or to there is an extra, then, if the Architect decided that the contractor is to carry out the said work, the contractor shall do so, and the question whether or not there is any extra, and it so the amount thereof, shall failing agreement, be settled by Arbitration as hereinafter provided, but such references shall in no way delay the fulfilment of this contract.

No drawings shall be taken as in itself on order for variation unless, in addition to the employer/Architect's signature, it bears express words stating that is intended to be such an order or bears a remark '**VALID FOR EXECUTION**'. No claim for payment for extra work shall be allowed unless the said work shall have been executed under the provisions of clause 6 (Authorities notices, patent right and royalties) or by the Authorities of directions in drawing of the Architect as herein mentioned.

One complete set of the signed drawings and specification and scheduled of quantities shall be furnished by the Architect to the Contractor. The Architect shall furnish within such time, as he may consider reasonable, one copy of any additional drawing, which is his opinion, may be necessary for the execution of any part of work. Such copies shall be kept at the works, and the architect or his representatives shall, at all reasonable time have access to the same and shall be return to the

Architect by the contractor before the issue of the Final certificate. The contract shall remain in the custody of the Architect, and shall be produced by him at his office as and when required by the Employer or by the contractor.

## **2. INSPECTION OF DRAWINGS**

Before filling in the tender, the contractor will have to check up all drawings/specification and schedule of quantities, and will have to get an immediate clarification from the employer/Architect on any point that he feels is vague or uncertain. No claim of damages or compensation will be entertained on this account.

## **3. EXECUTION OF WORK (PRICES TO INCLUDE)**

The whole of the work is described in the contract a (including the schedule of Quantities, the specifications and all drawing pertaining there to) and as advised by Employer / Architect from time to time is to be carried out and completed in all its parts to the entire satisfaction of the Employer /Architect. Any minor details of the work which may not have been definitely referred to in this contract, but which are usual in practice and essential to the work, are deemed to be include in this contract. Rates quoted in the Schedule shall be inclusive of all frights, Royalties, duties, etc., as well as transportation, so as to execute the contractor as per the rules and regulations of Local Bodies, State Government and Government of India.

The rates quoted in the tender should include all charges for:

- a) Labour, maintenance fixing, carrying, cleaning, making good, hauling, watering etc
- b) Plant, machinery, scaffolding, framework, English ladders, ropes, nails, spikes, tools, materials and workmanship protection from weather, shuttering, temporary supports, platform and maintenance of the same.
- c) Covering for the walling and other works during inclement weather or striking or whenever directed as necessary.
- a) The rates quoted by contractor shall include removal of all the existing furniture and other material & dispose them off where ever required including the furniture and material for which the contract has given the pay back offer.

## **4. SITE SUPERVISION**

The contractor shall appoint at his own cost competent and adequate number of qualified Engineers at site, for (1) joint measurements and preparations of bills, (2) for testing materials at site and outside laboratory, (3) for other general supervision. Their appointment shall be approved by the Employer / Architect. The site Engineers shall not be removed from the site without the written consent of the Employer / Architect.

## **5. DIMENSIONS**

Figures, dimensions, are in all case to be accepted preferences to scaled sizes. Large-scale details take precedence over small scale drawings. In case of discrepancy, the contractor is to ask for a clarification before proceeding with the work. Accordingly if

any work is executed without prior clarification it is liable to be rejected and shall not be paid for.

#### **6. PROGRAMME OF WORKS**

Contractor shall have to prepare and submit the CPM/PERT charges for employer approval immediately after issue of the work order and display the approved charts in the site office. He shall also make bar charts indicating individual items and during the progress of work he shall update the bar charts showing the proportionate progress of work every week.

He shall strictly adhere to the program of works as per CPM/PERT charts showing the proportionate progress of work.

#### **7. PROCUREMENT OF MATERIALS**

Contractor shall procure all the materials for the work from the open market. Time is the essence of the contract. Acceptance of the completion date by the contractor shall mean that he has taken into consideration the availability of all material of approved make and quality in sufficient quantities at site to enable him to complete the entire work in the stipulated period. Contractor will get sample of all materials approved by the Employer before placing order / purchase / procurement. They shall conform to I.S. codes and or tender specification as applicable.

For all materials the contractor shall quote for the best quality of the materials of best make / source or supply and it will be got approved by Employer before procurement. In case sufficient quantities of approved quality materials from approved source are not available in time, contractor may have to procure the same from neighbouring area with longer leads as required and directed at no extra cost. The material will be, however as per relevant I.S code as and wherever applicable.

#### **8. UNFIXED MATERIALS**

When any materials intended for the works shall have been placed at site by the Contractor, such material shall not be removed there from (except for the purposes of being used on the works) without the written authority of the Employer / Architect and when the contractor shall have received payment in respect of any certificate in which the architect shall have stated that he has taken in to account to value of such unfixed materials on the works such material shall become the property of the Employer and the contractor shall be liable for any loss or damage to any such materials.

#### **9. CUSTODY AND SECURITY OF MATERIALS**

The contractors shall be responsible for the custody and security of all materials and equipment at site and he will provide full time watchman / watchmen to look after his materials, stores equipments etc.

#### **10. RATES**

Rates quoted by the contractor shall hold good for all the work carried out to any height and depth as shown in detailed drawings and as required and directed by the Architect.

Rates quoted by the contractor shall also hold good for any small work at any place at site.

#### **11. PRICES FOR EXTRAS ETC., ASCERTAINMENT**

The rates of extra items will be ascertained as below

- a) The rates will be derived from the rates of items already quoted in the original tender for the extra work.
- b) Where extra work cannot be properly measured or valued, the contractor shall be allowed any 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 local day work, rates and wages for the district, provided that in either case vouchers specifying the daily time (and if required by the Architect, the workmen's name) and materials employed at or before the end of the week following that in which the work has been executed.
- c) The measurements and valuations in respect of the extra items of contract shall be completed within the 'period of final measurement' or within three months of the completion of the contract works as defined under clause (Certificate of Virtual Completion)

#### **12. EXTRA ITEMS RATES**

The work or extra items shall be started only after the approval of extra items rates by client / Architect. Rates for additional or extra items work which cannot be derived from the contract item rates shall be calculated on the basis of actual cost plus 15 % for profit.

#### **13. DRAWINGS AND INSTRUCTIONS**

A set of major drawings along with the contract documents shall be provided to the contractor. For any clarifications or further drawings are required by the contract, during or before the start of construction work, the Contractor shall inform the employer/Architects in writing to provide the same. Working details will be given to the contractor from time to time during the progress of work as and when required. In case of other drawing is required by the contractor he will give a minimum ten days' notice to the Employer / Architect.

#### **14. FAILURE BY CONTRACTOR COMPLY WITH ARCHITECT EMPLOYER'S INSTRUCTIONS**

If the contractor after receipt of written notice from the employer/architect requiring compliance with such further drawings and / or instruction, fails within seven days to comply with the same, the Employer / Architect may employ and pay other persons to execute any such work whatsoever as may be necessary to give effect thereto and all cost incurred in connection there with shall be recoverable from the contractors by the Employer as a debit or may be deducted from any money due or which become due to the Contractors.

#### **15. INFORMATION TO BE SUPPLIED BY THE CONTRACTOR**

The contractor shall furnish the Employer / Architect the following:

- a) Detailed industrial statistics regarding the labour employed by him etc.

- b) The Power of Attorney, name and signature of his authorized representative who will be in charges for the execution of work
- c) The list of technically qualified persons employed by him for the execution of this work.
- d) The total quantity and quality of materials used for the works.
- e) The list of plant and machinery employed for this work.

#### **16. ARCHITECT'S DELAY IN PROGRESS**

The Architect may delay the progress of the works in case of rains or otherwise, without vitiating the contract and grant such extension of time with the approval of the employer for the completion of the contract as he may think proper and sufficient in consequences of such delay, and the contractor, shall not make any claim for compensation or damage in relation thereto.

#### **17. CERTIFICATE AND PAYMENTS**

The contractor shall be paid by the Employer from time to time, by instalments under interim Certificates to be issued by the Architect and Bank's Engineer to the contractor on account of the works executed by the contractor when in the opinion of the Architect, work to the approximate value, named in the Appendix as 'Value of work for interim Certificates' (or less at the reasonable discretion of the Employer / Architect) has been executed in accordance with this contract, subject however, to a retention of the percentage of such value need in the Appendix hereto mentioned as 'retention percentage for interim Certificates' until the total amount retained shall reach the sum named in the appendix as Total Retention money after which time the instalments shall be up to the full value of the work subsequently so executed in the interim Certificate, such amount as he may consider proper on account materials delivered upon the site by the Contractor for use in the work.

And when the works have been virtually completed and the Architect shall have certified in writing that they have been completed, the contractor shall be paid in accordance with the Certificate issued by the Architect the sum of money named in the Appendix after satisfying themselves as 'Instalment after Virtual Completion' being a part of the said 'Total Retention Money'.

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 Architect at the expiration of the period refer to as 'The Defect Liability Period' in the Appendix hereto, from the date of Virtual Completion or as soon as after the expiration of such period as the work shall have been finally completed and all defect made good according to the true intent and meaning hereof, whichever shall happen, provided always that the issue by the Architect of any certificate during the progress of the works or after the completion shall not relieve the Contract from his liabilities in cases of fraud, dishonesty or fraudulent concealment relating to the works of materials or any matter dealt within the certificate, and in case of all defects and insufficiency in the works or materials which reasonable examination would have disclosed. No certificate

of the Architect shall of itself be conclusive evidence that any works and materials to which it relates are in accordance with the contract.

The Architect shall have power to withhold any certificate if the works or any part thereof is not being carried out to his / employer satisfaction.

The Architect may by any Certificate make any correction in any previous Certificate, which shall have been issued by him.

#### **18. DELAYED PAYMENTS**

Any amounts payable by the Employer to the contractor in pursuance of any Certificate given by the Architect hereunder shall, if not paid within the 'Period of honouring of Certificate' no interest will be paid by the Employer.

#### **19. FORCE MAJEURE**

Neither party shall be held responsible by the other for breach of any condition of this agreement attributable to any 'Act of God' Act of state, lockout of control or any other reason, beyond the control of the parties and any breach of clauses arising from much force majeure conditions as aforesaid shall not be regarded as a breach of the provision of this Agreement.

#### **20. INCOME-TAX**

Income Tax shall be deducted at source by the client from the contractor interim and final bill payments as per Statutory Regulations.

#### **21. SITE MEETINGS**

A senior representative of the contractor shall attend weekly meetings at works site and in addition meetings as and when arranged by employer / Architect to discuss the progress of the work and sort out problems, if any and ensure that the work is completed in the stipulated time.

#### **22. SCHEDULE OF APPROXIMATE QUANTITIES AND RATE**

1. The quantities given herein are approximate and they are subjected to alterations omissions, deductions or additions as provided for in the conditions of this contract and do not necessarily show the actual quantities of the work to be done.

2. It is to be expressly understood that the measured work is to be taken net (notwithstanding) any custom or practice to the contrary according to the actual quantities when in place and finished according to the drawings or as may be directed from time to time by the employer and the cost calculated by measurements or weight, at the respective prices, without any additional charge for any necessary or contingent works connected there with. The rates quoted are for work in site and complete in every respects.

3. If any operation of work, which is specified in the respective items mentioned in the schedule of quantities, is not executed by the contractor then proportionately the rate quoted in the schedule shall be re-fixed.

#### **23. ACTION WHERE THERE IS NO SPECIFICATION**

In case of any class of work for which is there is no specification mentioned the same will be carried out in accordance with the Indian Standards Specifications subject to



the approval of the Employer / Architect.

#### **24. ACCIDENT AT SITE**

The contractor shall be responsible for the safety of persons employed by him on the works. This shall be without prejudice to the responsibility of the contractor under the Insurance Clause of the general conditions. Contractor shall take all precaution detailed in the safety code attached separately.

#### **25. TYPOGRAPHICAL CLERICAL ERRORS**

The Employer / Architect clarification regarding partially omitted particulars of typographical or Clericals errors shall be final and binding on the contractors.

#### **26. WORK PERFORMED AT CONTRACTOR'S RISK**

The contractor shall take all precautions necessary and shall be responsible for the safety of the work and shall maintain all lights, goods, signs, temporary passages or other protection necessary for the purpose. All works shall be done by the contractor's risk and if any loss or damage shall result from fire or from others cause, the contractor shall promptly repay or replace such loss or damage free from all expenses to the employer.

The contractor shall be responsible for any loss or damage to materials, tools or other articles used held for use in connection with the work. The work shall be carried on to completion without interference's with the operations of existing machinery or equipment, if any.

#### **27. SPECIAL CONDITIONS OF CONTRACT**

In the event of any discrepancy with clauses mentioned anywhere else in the tender with the clauses mentioned within special conditions of contract, the clauses mentioned within the special conditions of contract shall supersede those mentioned elsewhere.

#### **28. CONTRACTOR'S LABOUR REGULATIONS**

Short title:

These regulations may be called the "contractor labour regulations."

1. **Definitions :-** in these regulations, unless otherwise expressed or indicated, the works and expressions shall have the meaning hereby assigned to them respectively, that is to say :

- (i) "Labour" means worker employed by the bank's contractor directly or indirectly through a sub-contractor or other persons or by an agent on his behalf of a payment not exceeding Rs. \_\_\_\_/- per month and will not include supervisory staff like overseers etc.
- (ii) "fair wages" means wages whether for time or piece work notified at the time of inviting tenders for the work and where such wages prescribed by the government of India in the ministry of labour and employment vide Sl.No. 1917 published in the gazette of India, extraordinary part - ii section (3) sub-section (ii) dated 19-5-1969.
- (iii) "Contractors' shall include every person whether a sub-contractor or

headman or agent employing labour on the work taken on contract.

(iv) "Wages" shall have the same meaning as defined in the payment of wages act and includes time and piece rate wages.

2. Normally working hours if an adult employee should not exceed 9 hours a day and in case of a child 4 1/2 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.
3. When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week. He shall be paid overtime for the extra hours put in by him at double the ordinary rate of wages. Children shall not be made to work extra.
4. Every worker shall be given a paid weekly holiday normally on Sunday in accordance with the provisions of minimum wages (central) rules, 1960 as amended from time to time irrespective of whether such worker is governed by the minimum wages act 1948 or not.
5. **Display of notice regarding wage etc. the contractor shall:**
  - (i) Before the commences his work on contract, display and correctly maintain and continue to display correctly maintain in a clean legible condition in conspicuous places on the work, notice in English and in the local Indian language spoken by the majority of workers, giving the rate of wages which have been certified by the executive engineer, ZONAL labour commissioner fair as wages and the hours of work for which such wages are earned, and
  - (ii) Send a copy of such notices to the certifying officer.
6. **Payment of wages under central govt. wages act:-**
  - (i) Wages due to every worker shall be paid to him direct.
  - (ii) All wages shall be paid in current coin or currency or in both.
  - (iii) Arrears claimed after 3 months after the completion of the work shall not be entertained.
7. **Fixation of wage periods:-**
  - (i) The contractor shall fix the wage periods in respect of which the wages shall be payable.
  - (ii) The minimum daily rates of wages fixed under notification of the government of India in the ministry of labour and employment no. 1972 dated 10-5-78 are inclusive of wages for weekly day of rest and the question of extra payment for week holiday would not arise.
  - (iii) No wage period shall exceed one month.
  - (iv) wages of every employed on the contract shall be paid (a) in case of establishments in which wage period is one week within 3 days from the end of the wage period and (b) in the case of other establishments before the expiry of the 7th day or 10th day from the end of the wages period according to the number of workers employed in such establishment does not exceed

1000 or exceeds 1000.

(v) When the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry the day exceeding the one on which his employment is terminated.

(vi) All payment of wages shall be made on a working day except when the work is completed before the expiry of the wage period in which case final payment shall be made within 48 hours of the last working day at work site and during the working time.

**Note:** The term "working day" means a day on which work on which the labour employed is in progress.

8. **wage book and wage slips etc.** : the contractor shall maintain a wage book of each worker in such form as may be convenient at the place of work, but the same shall include the following particulars :-

(a) Name of the worker.

(b) Rate of daily or monthly wages.

(c) Nature of work on which employed.

(d) Total number of days worked during each wage period.

(e) Dates and periods for which worked overtime.

(f) Gross wages payable for the work during each wage period.

(g) All deductions made from the wage with an indication in each case of the ground for which the deduction is made.

(h) Wages actually paid for each wage period.

(i) Signature or thumb impression of the worker.

(j) The contractor shall also issue a wage slip containing the aforesaid particulars to each worker employed by him on the work at least a day prior to the day of disbursement of wages.

(k) The contractor shall issue the employment card in the prescribed form iii to each worker on the day of work or entry in to his employment. If the worker has already any such card with him from the previous employer, the contractor shall merely endorse that employment card with relevant entries. On termination of employment the employment card shall again be endorsed by the contractor and returned to the worker.

(l) The contractor shall issue an attendance-cum-wages card as perform:

Attached to each worker on the day of each worker on entry into his employment.

9. **Register of unpaid wages:** – the contractor shall maintain a register of unpaid wages in such form as may be convenient at the place of work but the same shall include the following particulars:

(a) Full particulars of the labourers where wages have not been paid.

(b) Reference number of the muster roll and wage register.

(c) Rate of wages.

- (d) Wage period
- (e) Total amount not paid
- (f) Reasons for not making payment
- (g) How the amount of unpaid wages was utilized.
- (h) Acquaintance with dates.

10. **Register of accidents:** the contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:

- (a) Full particulars of the labourers who met with accident.
- (b) Rate of wages.
- (c) Sex
- (d) Age
- (e) Nature of accident and cause of accident.
- (f) Time and date of accident
- (g) Date and time when admitted in hospital
- (h) Date of discharge from the hospital
- (i) Period of treatment and result of treatment.
- (j) Percentage of loss of earning capacity and disability as assessed by the medical officer.
- (k) Claim required to be paid under worker's compensation act.
- (l) Date of payment of compensation.
- (m) Amount paid with details of persons to whom the same was paid.
- (n) Authority by which the compensation was assessed.
- (o) Remarks.

11. **Fines and deductions which may be made from wages:**

- (a) The wages of a worker shall be paid to him without any deduction of any kind except the following:
  - I. Fines.
  - II. Deduction for absence from duty i.e. from the place or the places whereby terms of his employment he required to work. The amount of deduction shall be in proportion to the period for which he was absent.
  - III. Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to this neglect or default.
  - IV. Deduction for recovery of advances or for adjustment of over-payment of wages, advance granted shall be entered in a register.
  - V. Any other deduction which the central government may from time to time allow.
- (b) No fine should be imposed on any worker save in respect of such acts and omission on his part as have been approved by the chief labour

commissioner.

- (c) No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.
- (d) The total amount of fine which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in a rupee of wages, payable to him in respect of that wage period.
- (e) No fine imposed on any worker shall be recovered from him by instalment, or after the expiry of sixty days from the date on which it was imposed.
- (f) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

**12. Register of fines, etc.:**

- (a) The contractor shall maintain a register of fines and a register of deduction for damage or loss in form nos. 1 & 2 respectively which should be kept at the place of work.
- (b) The contractor shall maintain both in English and the local Indian language, a list approved by the chief labour commissioner clearly stating the acts and omissions for which penalty or fine may be imposed on a workman and display it in a good condition in a conspicuous place of the work.

**13. Preservation of registers:** – the wage book the wage slips, the register of unpaid wages, the register of accidents, the register of fines, deductions required to be maintained under these regulations shall be preserved for 30 days after the date of last entry made in them and shall be made available for inspection by the engineer-in-charge labour welfare officer or any other officer authorized by the chief labour commissioner in this behalf.

**14. Powers of labour welfare officer to make investigation or enquiry**

The labour welfare officer or any other person authorized by the central government on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clauses and provisions of these regulations. He shall investigate into any complaint regarding the default made by the contractor or sub-contractor in regard to such provision.

**15. Report of labour welfare officer**

- (a) The labour welfare officer or other persons authorized as aforesaid shall submit a report of result of his investigation or enquiry to the executive engineer concerned indicating the extent, if any, to which the default has been committed, with a note that necessary deduction from the contractor's bill be made and the wages and other dues be paid to the labourers concerned. In case an appeal is made by the contractor under clause 14 of these regulations actual payment to the labourers will be made by the executive engineer after the Zonal labour commissioner has given his

decision on such appeal.

- (b) The executive engineer shall arrange payments to the labours concerned within 30 days from the receipt of the report from the labour welfare officer or the zonal labour commissioner as the case may be.

**16. Appeal against the decision of labour welfare officer:**

Any person aggrieved by the decision and recommendations of the labour welfare officer or other person so authorized may appeal against such decision to the zonal labour commissioner concern within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the executive engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

**17. Prohibition regarding representation through lawyer:**

- (a) A workman shall be entitled to be represented in any investigation or enquiry under this regulation by:
  - (b) An officer of a registered trade union of which he is a member.
  - (c) An officer of a federation of trade unions to which the trade union referred to in clause (a) is affiliated.
- (d) Where the employee is not a member of any registered trade union, by any officer, of a registered union, connected with, or by any other workman, employed in the industry in which the worker employed.
- (e) An employer shall be entitled to be represented in any investigation or enquiry under this regulation by;
  - (f) An officer of any association of employers of which he is a member.
  - (g) An officer of a federation of association of employers to which the
  - (h) Association referred to in clause (a) is affiliated.
- (i) Where the employer is not a member of any association of employers' by an officer of association of employers connected with or by any other employer, engaged in the industry in which the employer is engaged.
- (j) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these regulations.

**18. Inspection of books and slips:**

The contractor shall allow inspection of the wage books and the wage slips the register of unpaid wages, the register of a accident, and the register of fines and deduction to any of his workers or to his agent at a convenient time and place after due notice is received or to the labour welfare officer or any other person authorized by the central government on his behalf

**19. Submission of returns:**

The contractor shall submit periodical returns as may be specified from time to time.

- 20. **Amendment:** the central government may from time to time add to or amend the regulation and on any question as to the application, interpretation or effect

of these regulations the decision of the chief labour commission or deputy chief labour commission to the government of India, or any other person authorized by the central government in that behalf shall be final.

## 29. Safety code

### Scaffolds:

- (i) Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying material as well, suitable footholds and hand holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1/4 to 1 (1/4 horizontal and 1 vertical)
- (ii) Scaffolding or staging more than 4m. above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached bolted, braced and otherwise secured at least 3 feet high above the floor or platform of such scaffoldings or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
- (iii) Working platform, gangways, and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 12 feet above the ground level on the floor level. They should be closely boarded, should have adequate width and should be suitably fastened, as described in (ii) above.
- (iv) Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 3'0". Wherever there are open excavations in ground, they shall be fenced off by suitable railing and danger signals installed at night so as to prevent persons slipping into the excavations.
- (v) Safe means of access shall be provided to all working platforms and the working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. in length while the width between sides rail in rung ladder width shall in no case be less than 290mm. For ladder up to and including 3m, in length. For longer ladders this width should be increased at least 20mm. for each additional meter or length.
- (vi) A sketch of the ladders and scaffolds proposed to be used shall be prepared and approval of the engineer obtained prior to construction.

### *Other safety measures*

- (vii) All personnel of the contractor working within the plant site shall be provided

with safety helmets. All welders shall wear welding goggles while doing welding work and all metal workers shall be provided with safety gloves. Persons employed on metal cutting and grinding shall wear safety glasses.

1. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public.

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## FORM OF AGREEMENT

ARTICLES of AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ year 202\_ between the **Assistant General Manager, State Bank of India, Bangalore** (Hereinafter referred to as the "Employer/Owner/client" which expression shall, unless excluded by or repugnant to the context, includes its successors and assigns) of the ONE PART and \_\_\_\_\_ of \_\_\_\_\_ (Hereinafter referred to as "Contractor" unless excluded by or repugnant to the context, includes its successors and assigns) of the OTHER PART.

WHEREAS the Employer intends to carry out (**Electrical work for \_\_\_\_\_**) and shall herein after referred to as "Project".

AND WHEREAS for the purpose of the above said project, the Employer invited sealed tenders from experienced, resourceful and bonafied contractors vide his Notice Inviting Tender (NO. \_\_\_\_\_ dated. \_\_\_\_\_).

WHEREAS the contractor submitted his Tender Documents containing Notice Inviting Tender, General notes, General Conditions of Contract, Special conditions, Schedule of approximate quantities and rates , Form of Agreement, General Specification, Approved manufacturers/ natural source of materials, Declaration, Technical Specifications as in Schedule of Quantities etc. for the above said project, (Hereinafter collectively referred to as the "said conditions"), duly signed on each page as a token of his acceptance of the same, along with requisite Earnest Money Deposit of **Rs10,800/-**

AND WHEREAS out of the Tenders received, the Tender of the contractor was found to be most suitable for the project.

AND WHEREAS the Employer has accordingly issued the work order (NO. \_\_\_\_\_ dt. \_\_\_\_\_) to the contractor subject to his furnishing the requisite Security Deposit.

AND WHEREAS the Contractor has accepted the aforesaid Work Order vide his letter of acceptance NO. \_\_\_\_\_ dt. \_\_\_\_\_ and has also deposited with the Employer a sum of Rs. \_\_\_\_\_ which with the Earnest Money of RS. \_\_\_\_\_ forms the requisite Security Deposit @ 2 % of the accepted Tender Value of Rs. \_\_\_\_\_.

NOW, therefore, it is hereby agreed to and between the parties as follows:

1) Contract documents

The following documents shall constitute the Contract Documents.

I. This Article of Agreement.

II. Tender Document submitted by the Contractor including the "said conditions", N.I.T and Schedule of quantity.

III. All correspondence between the Employer and the Contractor from the date of issue of N.I.T and the date of issue of work order.

IV. Work order No. \_\_\_\_\_ dt. \_\_\_\_\_

2) In consideration of the payments to be made to the Contractor as hereinafter

provided the Contractor shall upon and subject to the said conditions, execute and complete the contracted project works shown upon the said drawings etc. and such further detailed drawings as may be furnished to the contractor by the said Employer and described in the said Specifications and the said Schedule of Quantities.

3) Notwithstanding what are stated in the N.I.T conditions of Tendering, Conditions of Contract of herein stated before, the Employer reserves itself the right of altering the drawings and the nature of the work and addition to or omitting any items of work or of having portions of same carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this contract.

4) As mentioned in Article 1 above, the "said conditions" shall be read and be treated as forming part of this agreement and parties hereto will respectively be bound thereby and to abide by and submit themselves to the conditions and stipulations and perform the same on their parts to be respectively observed and preferred.

5) Any dispute arising under this agreement shall be referred to the Arbitration in a manner specified in the General Conditions of the Contract and all legal disputes shall be limited within the territorial jurisdiction of the **Bengaluru** thereto. The decision of the arbitration shall be final and binding on both the parties.

IN WITNESS WHEREOF THE PARTIES to their present have here under set and subscribed their hands, the     day, month and year first above written.

Signed and delivered for and on behalf of

State Bank of India, Shri.\_\_\_\_\_ its duly authorized official, In the presence of –

1. (Name and Address)

2. (Name and Address)

Signed and delivered for and on behalf of

The Contractor \_\_\_\_\_ by Shri \_\_\_\_\_ his duly authorized official, in the presence of –

1. (Name and Address)

2. (Name and Address)

### **TECHNICAL SPECIFICATIONS**

#### **LT PANEL INSTALLATION:**

#### **TECHNICAL SPECIFICATION FOR LOW TENSION PANELS**

GENERAL: This specification covers design, manufacture, testing and supply at site of the following 415 V, 50 Hz, switchboards.

The panels shall be dust, vermin and corrosion proof construction, sheet steel, clad totally enclosed, compartmentalised cubicle design with front access and rear access.

#### PANEL DESIGN REQUIREMENTS:

The switchgear shall be formed using distinct vertical sections each comprising following compartments:

A completely metal enclosed horizontal busbar compartment running horizontally at top / bottom.

Individual feeder modules organised in multitier mode.

Completely enclosed vertical busbars serving all feeder modules in the vertical panel.

Cable termination compartment.

Perforated sheet/insulating material enclosed horizontal auxiliary bus way for control, interlock, indication and metering wiring running horizontally.

Metal sheets shall be provided between two adjacent vertical panels running to the full width of the wider panel and upto full useful height of the switchgear.

The front of the board shall comprise of individually enclosed Air Break Circuit Breakers, Starters, Fuse switch and Switch Fuse modules.

All auxiliary devices for control, indication, measurement and protection such as control and selector switches, indicating lamps, ammeters, voltmeters, energy meter, protective relays shall be mounted on the front side of the respective compartment only.

The design shall be such that unless required for maintenance/inspection purpose, all power on / off or start / stop and relay reset operations shall be performed without opening the panel door.

**CONSTRUCTION:** The complete board shall be of co-ordinated design so that shipping groups of the board are easily assembled together at site into a continuous lineup. Necessary standard connecting materials shall be supplied.

Name plates of elegant and durable design and quality shall be fixed to the individual compartments, feeder modules, bus risers, busbars, cable alleys etc.,

The boards covered by this enquiry shall be designed, manufactured and tested in accordance with the latest revisions of the related applicable Indian Standards.

The framework of the boards shall be constructed of preformed steel channels, angles and side sheets bolted together and suitably reinforced to form a rigid, self supporting, compact assembly to function properly under both normal and short circuit conditions.

The bus compartments shall comprise of one main horizontal TPN bus unit with vertical risers for connection to the individual modules.

The board shall be of totally metal-enclosed ventilated multiple unit construction.

End units shall include provisions for future main bus extensions and installation of additional units on either side with the framework suitably drilled to receive the additional modules and the busbars fitted with fishplates and associated hardware enabling future extension without involving major fabrication works on the panel in service.

Metallic barriers shall be provided between vertical sections and also between adjacent modules to ensure prevention of accidental contact with live parts during routine inspection / maintenance of functional units or cable terminations of one or more functional units when working on those of adjacent units. These barriers shall have insulating inserts as necessary for taking the interconnections etc.,

Doors and covers shall be of sheet steel of thickness not less than 1.6 mm cold rolled and the edges shall be reinforced against distortion by rolling / bending / or by addition of welded reinforcement members. The doors shall have concealed type of hinges.

Cut outs shall be true in shape and free from sharp edges.

The panel shall be provided with integral metal base channel 75 mm in height for facilitating grouting on the floor.

The hardware shall be cadmium plated & passivated; these shall be of the captive type to obviate loss of these bolts / screws etc., when the doors / covers are opened for servicing / inspection.

Cold Rolled Sheet Steel of 2 mm thickness shall be used for all members except for doors, covers and partitions where it may be of 1.6mm.

All components including the busbars shall be capable of being removed from front. The cable alleys shall also be at the front of the board.

All the doors for the feeder modules in the front shall have individual sheet steel hinged doors with concealed hinges; these doors shall be capable of being physically lifted off the main base shell and fixed back in position while the panel is in service without necessitating removal of any screws or welding etc., and with the adjacent modules in service with their doors closed.

The bus bar chamber shall have screwed covers at the front, on the sides and for the top.

The covers for the cable chambers and other compartments shall have covers screwed on with captive screws so that these do not fall off when the panel is in use while the operating / maintenance personnel have occasion to open & replace these covers.

The panels shall be suitable for cable entry at top or bottom as specified in drawings / data sheet. Drilled gland plates with glands shall be provided for the switchboards to suit entry of the cables as furnished in the drawings. Cable clamping arrangements shall be provided in the cable alley.

The switchboards shall have uniform height. The height of the operating handle for the feeder module, indicating lamps, instrument fuses etc., in the topmost tier which may need adjustment shall all be not more than 1800mm from the finished operating level on the floor so that these are easily accessible for the operating / maintenance personnel without having to take recourse to ladders / steps etc.,

The minimum operating height of the switch handles shall not be less than 400mm from the finished floor level including the safety rubber mat.

All live parts shall be suitably shrouded with non-deteriorating Insulating barriers so as to prevent any accidental contact with these by the operating / maintenance personnel while the panel is in service and the modules are opened for inspection / servicing etc.,

The switchgear panel shall be provided with space heaters if specified in drawingsto prevent moisture condensation and maintain cubicle temperature 5 Deg. C above the ambient temperature. The space heater shall be located at the bottom of the switchboard and shall be supplied from 110 V AC control supply. The space heater shall be provided with a manually operated rotary switch shall be controlled through a thermostat. A separate space heater shall be provided for each vertical panel.

**BUSBARS:** The bus bars shall be of Hard drawn high conductivity electrolytic grade (63401 WP) Aluminium confirming to IS:5082. The bus bars shall be of uniform cross section along its entire length. No tapering of the bus bar cross section is allowed. Current density shall not exceed 0.8 A/Sq.mm. In case of copper bus bars current density shall not exceed 1.2 A/sq.mm. The copper bus bar shall be tin plated.

Horizontal and vertical bus bars shall be provided with PVC sleeves of high quality.

The joints in the bus bars shall be of the bolted type and it shall be ensured that the following precautions are observed:

The contact pressure must be ample and this shall be maintained during the time the panel is in service.

The surfaces of the conductors must be clean.

With flat conductors, the overlap should be equal to or greater than the width of the bars or ten times the bar thickness whichever is greater.

The joints shall be treated by the application of joint compound to render the joint moisture-proof.

For the joints use of bolts of cadmium plated high tension MS bolts and nuts.

The efficiency of the joints shall be preserved by smearing the surfaces with oxide inhibiting grease just prior to making the joint.

The switchboard shall be provided with power bus bars for the 3 phases and neutral. The Bus bars fed by the incomer shall run continuously throughout the length of the switchboard.

The power bus bars shall have a short circuit rating as specified in drawings/ data sheet.

The bus bars shall be phase identified by colour, at regular intervals. Colour code shall be RED, YELLOW and BLUE for phase buses and BLACK for the neutral. Bus bars shall be rated for 40 Deg. C temperature rise over an ambient of 45 Deg. C as measured by thermometer. The cross section of the bus bars shall be uniform throughout.

Bus bars shall be supported on tough, non-hygroscopic, resin bonded self extinguishing fire retardant insulators of SMC/DMC with ribbed construction to prevent tracking due to dust accumulation and to have larger creepage paths. All the

phases are individually supported. If a common support is provided for all the three phases, anti tracking barriers shall be incorporated. Bus bars and supports shall withstand the maximum stresses that are likely to be induced by the short circuit currents specified.

The clearance between the individual bare phase power bus bars and between the phase and earth bus bars in air shall be not less than 25 mm and 16 mm respectively. All bus bars joints shall be of the bolted type. Ring washers shall be used for joints to prevent loosening of the nuts and over heating. Lock nuts shall be incorporated for the bolts besides the main nuts. The bolts and nuts used in the current carrying paths shall all be of steel cadmium plated and the hardware shall have adequate coverage of the protective cadmium coating to obviate corrosion while the boards are in service.

The bus bars chambers at the top shall be totally segregated from the rest of compartments and rendered totally inaccessible under normal circumstances. No equipment /instrument shall be mounted on the bus bar chamber.

Power shall be distributed to each module or compartment by a set of vertical bus bars. The vertical bus bars shall run behind/by the side of the modules.

All bus bars, links, etc., shall be PVC sleeved and adequately shrouded to prevent accidental contact. The sleeve used shall be of the heat shrinks type.

The bus bars shall run horizontally in a separate enclosure but may run in an enclosure located within the power bus bar compartment.

Necessary tee off connectors shall be used for distributing auxiliary supply to each vertical panel. Rubber grommets shall be used for all wire entries to make the entries dust and vermin proof.

**EARTHING CONNECTIONS:** The panel shall be connected to an earth busbar running throughout the length of the switchboard. The minimum earth bus size shall be 50 x 6mm Aluminium. All doors and movable parts shall be connected to the earth bus with flexible copper connections. Provision shall be made to connect the earthing busbar to the plant earthing grid at two ends. All non-current carrying metallic parts of the mounted equipment shall be earthed. Earthing bolts shall be provided to ground cable armours.

**PAINTING:** All sheet steel surfaces shall be chemically cleaned, degreased and pickled in acid to produce a smooth, clean surface free of scale, grease and rust. After cleaning the surface shall be given a phosphate coating followed by a coat of high quality primer and backing in the oven.

The assembly shall be finished with two coats of enamel powder coated paint as specified in drawings in light Grey as per IS:5 shade 631.

**MARKING OF WIRES, CABLES AND MODULES:** All wirings & cables at the terminations at the switchboard shall have distinct marking by means of ferrules with letters/ numerals printed corresponding to the wiring diagram to be furnished by the successful tenderer.

All labels shall comprise white letters on a black back-ground; the size of the lettering shall be 6 mm.

The switchboard shall carry the following district markings / name plates.

The manufacturer's name/brand name.

The module nos. with the load designation and rating of the module in kW/Amps.

Danger boards as per the IE Rules and the statutory regulations of the Range Electrical Inspector.

NAME PLATE: A nameplate with the switchgear designation shall be fixed at the top of the central panel.

A separate nameplate giving feeder details shall be provided for each compartment.

A separate nameplate giving details of bus section shall be provided for switch-gears having more than one bus section.

Nameplate shall be provided for each equipment (amps, push buttons, switches, relays, auxiliary contactors, etc.,) mounted on the switchboard. Special warning plates one each front of a shipping section shall be provided on removable covers of doors giving access to cable terminals and busbars. Special warning labels shall be provided inside the switchboard also, wherever considered necessary. Identification tags shall be provided inside the panels matching with those shown on the circuits diagram.

Engraved nameplates shall preferably be of 3-ply (Black-white black) lamicoid sheets or anodised aluminium. Engraving shall be done with square/V groove cutters. Nameplates shall be fastened by screws and not by adhesives.

The nameplates for feeder compartments shall be in two parts. One part shall have necessary details pertaining to the switchboard. The other parts shall be removable and shall contain all details regarding the drives/equipment's controlled by the particular module.

The following documents shall be submitted within four (4) weeks from the date of order:

Connection diagram for all units (like in-comer, outgoing feeders, breaker wiring diagrams, etc).

Schematic diagram for the complete switchboard.

Terminal connection diagram of the main terminal boards.

Catalogues, Operation & Maintenance / Instruction manuals for major components.

Sketches of the overall dimensions of the board - Plan, elevation and section views clearly showing the bus size.

Brand names of all components incorporated like, relays, contractors, pilot device, pilot lamps, current transformers, HRC fuse fittings / links, terminal blocks, wiring, cable sockets, meters, selector switches for instrument's, instrument fuse fittings / links etc.,

Certificates of tests giving the results of tests conducted as per the appropriate Standards on similar switchboard and interior components.

Shipping dimensions of the board and its weight - gross & net (without packing).

TESTS: Switchgear assembly shall be subjected to the routine tests as per latest revision of IS: 8623.

1.4 INSTALLATION OF DBs: All DBs wall mounting and floor mounted arrangement shall be in accordance with BOQ and the approved material. Ensure that painting of the wall is completed prior to marking and mounting of DB. Confirm label/markings to ensure that is the correct DB and check the position according to the approved layout and mark the fixing position of the DB's support. After marking, drill according to the selected sizes of anchor bolts to appropriate depth. Permanently fix the DB to the wall/slab with anchor bolts. If there is more than one DB to be installed at the same location, they shall be installed side by side and clearance shall be maintained for easy maintenance and trouble shooting. The height of Distribution Board shall be maintained so that easy access for termination of cables and other maintenance work can be carried out. Cut-out shall be made for inserting the wire in DB and same cut out shall be provided with a rubber gasket so that there will be no sharp edges and secure the wire insulation from damage. Wire inserted in the DB shall be cross-checked for existing circuit number and final ferruling shall be done. Wire in DB shall be used cable tie and dress with bunching of the phase-neutral and earth and suitably lugged to the respective MCBs and Bus bar. Bunching shall be done as per phase separation respectively R, Y and B. After Crimping insulation sleeves shall be provided in the Wire/ Cable to avoid accidental short circuit between the adjacent 32 terminals. DBs shall be provided with body earthing connections as per provisions available in the DB. Identification labels of approved engraved type nameplate/Radium stickers of suitable font size shall be fixed on DB. After complete termination of wire/cable same DB compartment shall be cleaned before fixing the door. When the DB is fixed on the partition care should be taken to ensure the holding capacity of the partition, to avoid the DB from falling and getting damaged or causing injury. The installation of DB shall be done in such a way to add to the ambience of the Branch. It shall be firmly fixed on the wall / partition.

#### **SPECIFICATION FOR ERECTION, TESTING & COMMISSIONING OF LT PANEL**

Scope: Receiving, Inspection, Unloading, Storage, Installation, Testing and commissioning of the LT panels shall be in accordance with the specified code of practice manufacturer's instructions. The panels shall be aligned properly and bolted to the flooring by at-least four bolts for each division of transport. The cable shall be terminated into the panel through glands fixed to bottom / top plate. The panels shall be bonded to the earth by connecting leads to the panel earth bus.

Handling / Unloading: Panels and all its accessories shall be handled / unloaded carefully in its upright position as indicated in the packing case. Lifting lugs and jacking pads shall be used for lifting of panels. While using jacking pads utmost care



shall be taken in proper application of jacks. Where panels is dragged or pulled on sleeper or rollers of the traction eyes provided at the bottom frame shall be used with suitable wire ropes and shackles. Unloading from the lorry shall be carried out using a mobile crane or tripod with chain pulley block for rolling over to platform.

Storage: Equipments shall be stored under shelter in a well-ventilated, dry place and covered by suitable polythene or tarpaulin covers for protection against moisture.

Erection: Panels shall be installed over a trench. The panels shall be aligned properly and bolted to the flooring by at least four bolts. The cables shall be terminated into the panel through bottom plate. The panel shall be bounded to the earth by connecting earthing leads to the panel earth bus.

Tests: The following preliminary checks and pre-commissioning tests shall be carried out before commissioning the panels in the presence of Buyer/Architects/Consultants representatives.

Preliminary checks:

- Check nameplate details according to specifications.

- Check for physical damage.

- Check tightness of all bolts, clamps and connecting terminals.

- Check oil level air pressure and leakage (wherever applicable).

- Check earth connections.

- Check the cleanliness of insulators and bushings, arc chambers.

- Check that all moving parts are properly cleaned and lubricated.

- Check it spare heaters provided.

Pre-commissioning checks:

- Check alignment of breaker trucks for free movement. Check correct operation of shutters.

- Slow-closing / opening operation.

- Check control wiring for correctness of connections, continuity and IR values.

- Manual operation of breakers.

- Power closing/opening operation manually and electrically.

- Breakers closing and tripping time.

- Trip free and anti-pumping operation.

- I.R. values, resistance and minimum pick up voltage of coils.

- Contact resistance.

- Simultaneous closing of all three phases.

- Pole discrepancy tests.

- Single and three-phase auto-reclose operation.

- Check electrical and mechanical interlocks provided.

- Check on spring charging motor correct operation of limit switches and time of charging.

Check on CT's:

All functional checks with the relays, meters, alarm scheme, interlocks as per scheme with the primary injection kits.

High voltage tests on control and power circuits (2.5 kV).

#### LAYING OF LT CABLE

IN CABLE TRAY: Wherever the cable trays are provided, the cables shall be laid in the cable tray. The cable shall be laid from one end of the route or any other suitable point as per site conditions. Wherever the cable needs to be bended, the cables bending radius shall conform to the cable manufacturer's recommendation. Prior to cable cutting, check both ends to make sure there is sufficient length for proper dressing and end termination. After cable laying is finished, all cables shall be tested for insulation resistance. Install the cable tags, dress the cables and clamp it as per the standards. Whenever, single core cables are used, Trefoil (three-foil formation) laying shall be used with single-core cables.

#### LAYING THE LT CABLE UNDERGROUND:

A trench of about 1.5 meters deep and 45 cm wide is dug. Then the trench is covered with a 10 cm thick layer of fine sand. The cable is laid over the sand bed. The sand bed protects the cable from the moisture from the ground. Then the laid cable is again covered with a layer of sand of about 10 cm thick. When multiple cables are to be laid in the same trench, a horizontal or vertical spacing of about 30 cm is provided to reduce the effect of mutual heating. Spacing between the cables also ensures a fault occurring on one cable does not damage the adjacent cable. The trench is then covered with bricks and soil to protect the cable from mechanical injury. The LT Cable route markers shall be provided as per standards.

The end termination shall be provided as per the cable size. Unless specified, the termination shall be single compression type glands of proper size and lugs shall be suitable for termination as per the point of termination like switchgear terminals, Bus bar, terminal connectors etc. Only the respective metal lugs shall be used for termination. Aluminium lugs shall not be used to terminate in the copper bus bars or vice versa.

The cables from the Panel to DB or from Main DB to Sub DBs should be duly fixed with suitable size clamps if laid in the wall. If more number of cables are to be laid, then they shall be laid in cable trays of suitable size firmly fixed to the ceiling with threaded rods.

To avoid rodent menace, the contractor shall close all openings made by him in the wall, the unused knockout holes in the DB, Panels, Junction Boxes with suitable dummies, Blanking plates etc and also provide sufficient protection to the panels, DB. No claim for additional amount towards rectifying the work on account of damages caused by rodents will be entertained during the defects liability period.

#### **SPECIFICATION FOR LOW TENSION CABLES**

**SCOPE:** This specification covers the technical requirements of supply, laying testing and commissioning of Heavy duty medium voltage cables up to 1100 Volts for power control and lighting application for efficient and trouble free operation.

The cable shall be properly packed for transportation, supply and delivery at site.

**CODE AND STANDARDS:** The materials covered by this specification shall unless otherwise stated as designed. Constructed, manufactured and tested in accordance with latest revisions of the relevant Indian Standards.

Sl.	Code	Standards for
1	IS -1554 (Part – I) – 1998	PVC insulated cables for working voltages upto and including 1000 volts.
2	IS – 5831 – 1984	PVC insulation and sheath of electric cables.
3	IS – 8130 – 1984	Conductors for insulated electrical cables.
4	IS – 3961 – (Part - II)	Recommended current ratings for PVC insulated and PVC sheathed heavy-duty cables.
5	IS – 7098 – (part – 2) 1985	XLPE insulation and sheath of electric cables.

**RATING :** The cable shall be rated for a voltage rating of 650/1100 Volts.

**SELECTION OF CABLES:** Cables should be selected considering the conditions of maximum connected load, ambient temperature, grouping factor, and allowance for voltage drops. However it is the responsibility of the contractor to recheck the sizes before cables are procured. He should submit the cable de-rating, voltage drop and length calculation to Architects for approval before procuring cables.

**INSULATION:** The conductor is insulated with suitably compounded PVC/XLPE (CROSSLINKED POLYETHYLENE) applied to the conductor by the extrusion.

The PVC/XLPE compound used for insulation shall have reduced flame propagation properly. This shall also have reduces emission of hydrogen-chloride gas fumes etc., when severely overheated.

**CORE IDENTIFICATION:** The cores of the cables shall be provided with the colour scheme of PVC insulation as per IS for any easy identification.

**ARMOURING:** The armouring of multicore cable consists of either GI round steel wires or GI flat strips and in case of single core cable armouring shall be of non-magnetic material such as hard drawn aluminum or aluminum alloy wires or strips.

**OUTER SHEATH:** The PVC compound used for outer sheath shall be resistant to termites, fungus and rodent attacks and shall also have reduced flame propagation properly as specified above.

**IDENTIFICATION:** The manufacturer's name, voltage grade of cable, year of manufacture, nominal cross-sectional area of conductor shall be embossed on the outer sheath of the cables throughout the length of the cable at regular intervals.

**PACKING, MARKING AND TRANSPORT:** The cables shall be supplied in strong, non-returnable wooden drums of heavy construction.

Each cable drum is marked with particulars of cable size, voltage class, length, direction of rolling, position of outer gross weight, ISI certification marking etc.,

**STORING, LAYING, JOINTING AND TERMINATIONS**

**STORING:** All the cables shall be supplied in drums, on receipt of cables at site; the cables shall be inspected and stored in drums with flanges of the cable drum in vertical position.

Employer/Architects will inspect the cables before storing. Contractor shall take out samples from the drums as per their instructions and send them to the manufacturers to conduct the approval tests. After the receipt of the test analysis, the cable will be accepted by the Employer.

**LAYING:** Cables shall be laid as per the specification given below:

**Cables in Outdoor Trenches:** Cables shall be laid in outdoor trenches wherever called for. The depth of the trenches shall not be less than 75 cms. From the Formed Ground level (FGL) which has to be ascertained from the Architects. The width of the trenches shall be allowed between the cables. The trenches shall not be less than 45 cms. A spacing of not less than 15 cms. shall be allowed between the cables. The trenches shall be cut square with vertical side walls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed level. Cable unreeling from drums shall be done only with the help of cable drum rolling supports. The cables shall be laid in trenches over the rollers placed inside the trench. The cable drum shall be rolled in the direction of the arrow for rolling. Wherever cables are bent, the minimum bending radius shall not be less than 12 times the diameter of the cable. After the cable is laid and straightened, it shall be covered with 8 cms. thick layer of sand. Cable shall be taken lifted and placed over this and cushion. The cable shall then be covered with an 8 cms. thick cushions, where cable is laid in rocky situation.

Extra thick cushioning of sand as may be required/decided by the Project Manager/Architects shall be done without extra charge. Over this, a course of cable protection tiles or brick shall be provided to cover the cables by 5 cms. on either side. Unless otherwise specified, the cable shall be protected by concrete tiles/stone slabs of minimum 25mm thick placed on top of the trench breadth wise for the full length of the cable. Trench shall be back filled with earth and consolidated. Cables shall be laid in hume pipes/stoneware pipes at all road crossings and in GI pipes at the wall entries. Approved cable markers made of concrete blocks indicating blocks indicating the voltage grade and the direction of run of the cables shall be installed at regular intervals of 25 Mtrs. the depth of concrete blocks shall be at least 300 mm below ground and 50mm above ground.

**Cables in Indoor Trenches:** Cables shall be laid in indoor trenches whichever specified. Suitable painted MS base plate clamps, saddles, GI nuts/bolts shall be used

for securing the cables in position at an interval not more than 450 mm. Spacing between the cables shall not be less than 15 mm centre. Wherever specified trenches shall be filled with fine sand and covered with steel chequered trench covers or RCC slabs.

All chases and passages if necessary for the laying of service cables at the entry or of premises shall have to be cut and made good to the satisfaction of the project manager/Consultants.

All cables entries into the buildings/cable trenches ducts, etc., shall be suitably sealed as required by the project manager/ consultants without extra cost.

**JOINTING AND END TERMINATION:** Cable jointing shall be done as per the recommendations of the cable manufacturer jointing shall be done by qualified cable jointer under strict supervision. Sample crimping of different size cables shall be subjected to contact resistance and heating tests in the presence of the Architects.

Each termination shall be carried out using Electroplated Brass single compression glands and copper cable sockets and approved jointing materials are to be used Hydraulic crimping tool shall be used for making the end terminations. Cable gland shall be bonded to the earth by using suitable copper /G.I wire. The cable armouring is to be earthed properly so that the earth continuity is maintained.

**TESTING:** Cables shall be tested at factory as per the regulations of IS: 1554 Part-I. The tests shall incorporate routine tests, type tests and acceptance tests. Copy of such test certificates shall be furnished to the Owner.

Cables shall be tested at site after installation and results shall be submitted to Consultants/Engineers.

Pressure test for 15 minutes.:Insulation resistance between conductors and neutral and conductors and earth.

## **SPECIFICATIONS FOR DISTRIBUTION SYSTEM, CONDUITS, WIRING & ACCESSORIES**

### **GENERAL:**

This specification of medium voltage distribution system shall be applicable for wiring 3 phase, 4 wire 415 volts, and 50 Hz. AC and single phase, 2wire 230 volts, 50 Hz, AC supply.

### **RIGID STEEL/PVC CONDUITS & ACCESSORIES:**

MS conduits shall be of welded and screwed sheet steel construction. Conduits shall be welded and screwed sheet steel construction. Conduits shall be black stove enamelled inside and outside. The conduits shall conform to the requirements of relevant IS (latest edition) in all respects. The conduits shall have uniform wall thickness/cross section throughout. Conduits shall bear the name, trademark of the manufacturer and size of conduit on each length. The conduits shall be delivered to the site in original bundles. Conduits of less than 19-mm dia shall not be used. The minimum wall thickness of conduits shall be as follows:

- Rigid MS conduits:
- a) 20, 25 & 32 mm – 16 gauge
  - b) 38 mm & above –14 gauge

Rigid PVC conduits

– 2 mm

Conduit Accessories:

Conduit accessories such as bends, inspection bends, inspection tees, elbows, reducers, draw boxes, junction boxes, etc. shall be of approved makes. Boxes shall have internally tapped spouts, junction boxes/inspection boxes shall be internally tapped covers. Necessary pull boxes of adequate sizes shall be provided wherever required at no extra cost.

All conduits shall be ample size for easy 'draw in' and 'draw out' of all the wires in the conduits. In no case the total cross section of wires measured over all be more than forty percent of the area of the conduit.

All the conduits shall be adequately protected while stored on site prior to erection and no damaged conduit shall be used.

All conduit accessories shall be made out of 16 gauge thick MS enclosures.

**PREPARATION OF CONDUIT:** The inside surface and ends of conduits and threads and fittings used shall be clean, smooth, cut square and free from burrs and other defects. Powdered soap stone, talc or prepared compounds shall be used as lubricants to facilitate the smooth pulling in of conductors.

**ERECTION OF CONDUIT:** The conduit shall be properly and tightly screwed between the various lengths and to the boxes to which it runs and terminates. No part of the conduit shall be under mechanical stress and the whole conduit system shall be electrically and mechanically continuous throughout.

Conduits shall be installed with provision for ventilation self-drainage in the event of ingress of moisture due to condensation or any other reason and prevent sweating.

**INSTALLATION OF RECESSED CONDUIT SYSTEM:**

The conduits shall be installed in such a manner that running can be carried out from the fittings boxes and switch boxes only.

Conduits which are to be taken in the ceiling slab shall be laid on the prepared shuttering work of the ceiling slab before concrete is poured, and tied to bars at every 500 mm. The conduit shall be watertight by using bituminous compound at the screwed ends. The conduits in ceiling slab shall be straight as far as possible.

Conduit recess in walls shall be secured rigidly by means of steel hooks/staples at 0.8 mtrs. intervals. Before conduit is concealed in the walls, all chases, grooves shall be neatly made to proper dimensions to accommodate the required number of conduits.

The outlet boxes, point control boxes, inspection and draw boxes shall be securely fixed by means of counter sunk steel screws and rawl plugs. They shall be firmly grouted in position prior to plastering fixed as and when conduit is being laid. The recessing of conduits in wall shall be so arranged as to allow atleast 12-mm plaster cover on the same. All grooves, chases, etc. shall be refilled with cement mortar and finished upto the wall surface before plastering of walls is taken up by the general contractor. The top edge of the conduit shall be atleast 25 mm below the finished

surface of wall. Wherever conduits terminate into point control boxes, distribution boards, etc. conduits shall be rigidly connected to the boxes, boards, etc. with checknuts on either side of the entry to ensure electrical continuity.

After conduits, junction boxes, outlet boxes, etc. fixed in position their outlets shall be properly plugged with PVC stoppers or with any other suitable materials so that water, mortar, vermins or any other foreign material do not enter into the conduit system.

To facilitate easy drawing of wires in circuit necessary GI pull wires of 16 SWG shall be inserted into the conduit immediately after shuttering is removed.

The Electrical Contractor shall be present during the pouring of concrete to ensure that the conduits and accessories are not displaced or blocked.

The conduits shall be swabbed out by drawing dry swabs of rag through the conduit to remove all moisture prior to drawing of wires.

Where vertical concealed conduits pass through floors or beams and horizontal concealed conduits required to pass through columns or beams, these shall be taken through rigid PVC/GI pipes to be inserted in the floors/columns/beams, etc. during casting for which no extra payment shall be entertained.

Extension collars of suitable depth shall be used as necessary to leave all boxes absolutely flush with the finished wall or ceiling surface.

Conduits shall not be buried or plastered etc. unless and until the work has been inspected by the Owner/Architects.

#### INSTALLATION OF SURFACE CONDUIT SYSTEM:

Conduits shall run in square and symmetrical lines. Before the conduits are installed, the extra routes shall be marked at site and approval of the Architect shall be obtained. Conduits shall be fixed by heavy gauge GI base plates, saddles, secured to suitable rawl plugs, at an interval of not more than 1 Mtr. conduits shall be joined by means of screwed couplers and screwed accessories only. In long distance straight runs of conduit, inspection type couplers or running type couplers or pull boxes shall be provided.

Bends in conduit runs shall be done by bending conduits by pipe bending machine. Bends which cannot be negotiated by pipe bends shall be accompanied by introducing inspection boxes or inspection bends. Not more than three equivalent 90° C bends shall be used in a conduit run from outlet to outlet.

All the conduit openings shall be properly plugged with PVC stoppers/bushes. The conduits shall be adequately protected against rust by applying two coats of approved synthetic enamel paint after the installation is completed.

Wherever conduits terminate conduits shall be rigidly connected to the box/board with brass hexagonal checknuts with compression washers on either side of the entry to ensure proper electrical and mechanical continuity.

The crossing of surface conduits shall not be generally permitted and to avoid such crossings, adopter boxes shall be used at junctions/crossings.

All unused conduit entries shall be blanked off in an approved and where conduits terminate in adopter boxes. All removable box covers shall be firmly secured to provide complete enclosure.

#### CONDUITS ABOVE FALSE CEILING:

In the false ceiling area, the conduits shall be run above the false ceiling frame work supported by means of M.S. straps secured and fixed to both conduits and structural ceiling, keeping the outlet box as near as possible to the fittings/fans for connections. The conduit boxes for fittings/fans are independently supported by means of separate fixing arrangements to the box and structural ceiling so that the box is held rigidly.

#### ENCLOSURE FOR ELECTRICAL ACCESSORIES:

Enclosure for electrical accessories shall conform to IS: 5133 – Part I. The wall thickness of MS enclosures shall be not less than 1.6 mm. The enclosure boxes shall be provided with a minimum of four fixing lugs located at the corners for fixing the covers. All fixing lugs shall have tapped holes to take machined brass screws.

Sufficient number of knockouts shall be provided for conduit entries. The enclosures shall be adequately protected against rust or corrosion both inside and outside. The enclosures shall be provided with 5 mm thick overlapped white PVC or Perspex sheet cover with rounded corners and beveled edges for mounting switches, sockets etc. Wherever different phase conductors are brought into the same enclosure, phase barriers shall be provided.

Minimum size of the box shall be 75 x 75 x 75 mm.

Draw boxes of ample dimension shall be provided at convenient points on walls/ceilings to facilitate pulling of long runs of wire. These boxes will be as few as possible and located where found necessary and approved by Architects at no extra cost.

Where flush conduits are required to terminate at surface mounted equipment, the conduit shall terminate at a flush box and the back of the equipment should fully cover the flush box and brass screws shall be used between the equipment and the box in addition to any other means of fixing and earthing arrangement.

The alternative arrangement to the above shall be by means of fixing a terminal extension box to the flush conduit box in which case a break joint ring shall be fitted between boxes.

#### WIRING CONDUCTORS:

All wiring conductors shall be PVC insulated, copper conductors of 1100 V grade, and shall conform to IS: 694 Part II (Latest Edition).

Wiring conductors shall be supplied in Red, Blue, Yellow, Black and Green colors for easy identification of wires. The wires shall be supplied in sealed coils of 100 Mtrs. lengths and shall bear manufacturer's trademark, name, Voltage grade etc.

#### INSTALLATION OF WIRING CONDUCTORS/CABLES:



The wiring conductors shall not be drawn into the conduits until all the works of any nature that may cause damage to the wires are completed. The installation and termination of wires shall be carried out with due regard to the followings:

While drawing the wiring conductors, care shall be taken to avoid scratches and kinks, which cause breakage of conductors. There shall be no sharp bends in the conduit system.

Stands of the wires shall not be cut for connecting to the terminals or lugs. The terminals shall have adequate cross section to take all the strands.

Oxide inhibition grease shall be applied at all terminals and connections.

Brass flat washers of large area shall be used for bolted terminals.

Bimetallic connectors should be used wherever aluminum conductors are tapped from copper mains or vice-versa.

Wiring for power and lighting circuits shall be carried out in separate and distinct wiring systems.

The wiring system envisaged is generally shown on the layout drawings and line diagrams. However, a brief account of the general wiring system is given below:

**Sub-mains wiring;** Wiring from meterboards / switch boards to the individual distribution boards, and shall consist of wires, conduits, and all conduit and fixing accessories as required and specified. The sizes of conduits and number of wires shall be as specified in Schedule of Quantities. Wires shall be drawn in conduits as required without being damaged, with necessary draw boxes if required. The wire lengths must be adequate for terminating at either end and identifying ferrules shall be provided at termination. The wiring shall be color coded. The rate shall include all materials, connections, labour etc. as specified above.

**Circuit wiring;** Wiring from DB's to the first point control boxes for lighting, fans 5 Amps sockets, call bells, etc. The scope of work shall be same as in sub main wiring.

**Power wiring;** The wiring from DB's to heating supplies, 16/6 Amps 5 Pin socket outlets, etc. The scope of work shall be same as in sub-main wiring.

The wiring from DB's to 63A / 32A, 3 phase/1phase Industrial Socket with control MCB, etc. The scope of work shall be same as in sub-main wiring.

Each sub-main/circuit main/power wiring circuit shall also have its own earth continuity wire as specified.

All the wiring shall be carried out in loop-in-loop system only and phase or line conductors shall be looped at switch box and neutral conductor can be looped from light, fan or sockets.

The maximum number of various size conductors that could be drawn into various sizes of conduits shall be as per table II of IS: 732 (Latest Edition). The wiring shall be color coded for easy identification of phases and neutral. The following color codes shall be adopted.

**Phases – Red, Yellow and Blue**

**Neutral – Black**

**Earth – Green or Bare wire as specified**

All sub mains and circuit wiring shall be provided with printed PVC identification ferrules at either end bearing circuit number and designation.

All the wiring shall be carried out without any jointing of wires

**SWITCHES, SOCKETS AND ACCESSORIES:**

General requirements: General control switches shall be of a 6 Amps rating and shall be of approved make/type suitable for flush mounting. Switches shall have integral mounting plates or white PVC/Perspex of minimum 4.5 mm thick.

All sockets, 6 Amps and 16/6 Amps ratings shall be of flush mounting type with combined control switches of the same rating as that of the sockets. All sockets outlet shall be of 6 pin type.

The switch, plug socket or regulator boxes shall be made of GI/sheet steel of minimum 16 SWG on all sides except in the front. Depth of boxes shall not be less than 75 mm and suitably increased where fan regulators are mounted in flush pattern. The boxes shall be provided with suitable earthing studs. Wherever required switches/fittings shall be fixed on metal strip which in turn are welded to the box.

Fan regulators shall be flush type and earthed with earth continuity conductor. The fan regulators shall be of electronic type.

LAMP HOLDERS, CEILING ROSES, ETC.: Accessories for light outlets such as lamp holders, ceiling roses, etc. shall be in conformity with requirements of relevant IS specification. Only approved make of accessories shall be supplied.

Screwed holder shall be used in brackets and pendants, light fittings shall have brass holders on T.W. round blocks.

Ceiling roses for recessed system of wiring shall be porcelain make and flush type. For surface type of wiring this shall be Bakelite.

**INSTALLATION OF SWITCHES, SOCKETS AND ACCESSORIES:**

All the switches shall be wired on phases. Connections shall be made only after testing the wires for continuity, cross, phase etc. with the help of megger. Regulators shall be fixed on adjustable M.S. flat straps inside the enclosure. The arrangement of switches and sockets shall be neat and systematic. Covers for enclosures accommodating switches, sockets etc. (point control boxes) shall be of 4.5 mm thick, fine finished PVC/Perspex material or laminated hylam sheet and fixed to the enclosure in plumb with counter sunk head, chromium plated M.S. screws and washers. Outlets shall be terminated into a flush type fan box for fan points. For wall plug sockets, the conductors may be terminated directly into the switches and sockets. The outlets point control boxes etc. shall be set out as shown on the drawings. Before fixing these, the contractors shall obtain clearance from the Owner/Architect with regard to their proper locations. The enclosure the enclosures of sockets and 3rd pin of the sockets shall be connected to the ground through an earth continuity wires, as specified.

**CAPACITY OF CIRCUITS:** Light points, 5 Amps socket points, fans, and call bell points may be wired on a common circuit. Such of those circuits shall not have more than 10 nos. of Light/fan/socket points or a load of 800 W whichever is less. Not more than two numbers of 15 amps socket outlets shall be wired on the same circuit.

**POINT WIRING:** Point wiring shall commence from the first point control box/local control box for the points connected to the same circuit. Point wiring for lights, ceiling and exhaust fans, 5 Amps sockets, call bells etc. shall be carried out with 1100 V grade PVC insulated wires. The point wiring shall be inclusive of conduits of not less than 19 mm size, switches, wiring along with conduit accessories such as bends, inspection bends, reducers, pull boxes, junction boxes, switch boxes, fan boxes, covers etc. together with wiring accessories such as ceiling roses, brass lamp holders, TW blocks, loose wires up to 1 Mtr. long at outlet end connectors point control boxes (enclosure for electrical accessories) switches, etc. Point wiring shall be provided with earth continuity wire as specified for earthing 3rd pin of sockets, luminaries and fan fixtures. Light control shall be either single, twin or multiple points controlled by a switch, as specified.

The point wiring for Light/Fans/5 Amps sockets etc. shall include the supply and installation of all materials specified above. Any item not specified above. Any item not specifically included but required for satisfactory completion of the point wiring shall also be included. No separate extra price will be allowed for any item under point wiring.

A dependant socket point shall mean the combination 5 Amps switch socket outlet/point mounted on the same switchboard as any other point/points and shall include the 5 Amps switch and socket.

The fan point shall be complete with fan hook box flush mounted in slab, control switch mounted in switch box and electronic regulator, complete with cover. The measurement will be numbers of each kind of point and as specified in Schedule of Quantities.

#### **FIXTURES/FANS:**

**LIGHT FITTINGS:** Unless otherwise specified, light fittings shall be generally fixed as directed by Owner/Architects.

Fittings such as wall brackets shall be fixed at 2200 mm from FFL.

Bulk head fittings shall be flush with ceiling/wall as required and shall be at a height as specified or directed.

Pendant fittings shall be suspended to a height of 2400 mm from FFL.

The fluorescent fittings shall be fixed in such a manner that the wiring conductors shall not terminate in a ceiling rose but in a junction box 300 mm away from the centre of the fittings along the length of the fitting so that no exposed wiring is seen from outside.

#### **FANS:**

CEILING FANS: Ceiling fans shall be suspended from the special fan hook boxes. The fan wiring shall be terminated in porcelain/PVC multiway connector.

Each fan shall have a separate switch and speed regulator. The canopy at the top of the suspension rod shall effectively hide the suspension hook.

The control switch and the electronic regulator for the fan shall be included in the point wiring.

EXHAUST FANS: shall have separate control switch, connection to device shall be through 5A socket or ceiling rose arrangement.

The fans shall be fixed on proper frames or cuttings( core cutting on wall) with suitable fasteners. The core cutting size shall match the size of the fan.

TESTING OF ELECTRICAL INSTALLATION:

TESTING OF INSTALLATION SHALL BE AS PER IS: 732-1982.

The insulation resistance shall be measured by applying between earth and whole system of conductors of any selection thereof with all fuses in place and all switches closed and except in earthed concentric wiring all lamps in position or both poles of the installation otherwise electrically connected together, where a direct current pressure of not less than twice the working pressure provided that it need not exceed 500 Volts for medium voltage circuits. Where the supply is derived from the three wires (AC or DC) or a poly phase system, the neutral pole of which is connected to earth either direct or through added resistance, the working pressure shall be deemed to be that which is maintained between the outer or phase conductor and neutral.

The insulation resistance measured as above shall not be less than 50 mega ohms divided by the number or points on the circuits provided that the whole installation shall be required to have an insulation resistance greater than one mega ohm.

Control rheostats, heating and power appliances and electric signs may, if required be disconnected from the circuit during the test but in the event of the insulation resistance between the case or frame work and all live parts of each rheostat appliances and all live parts or each rheostat and sign shall be less than specified in the relevant Indian Standard Specification or where there is no such specification shall not be less than half a mega ohm.

The insulation resistance shall also be measured between all conductors connected to one pole or phase conductor of the supply and all the conductors connected to the middle wire or the neutral or to the other pole or phase conductors of the supply and its value shall not be less than specified in sub-clauses 17.1.2.

TESTING OF EARTH CONTINUITY PATH: The earth continuity conductor including metal conduits and metallic envelopes in all cases shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit breaker measured from the connection with the earth electrodes to any point in each continuity conductor in the completed installation shall not exceed one ohm. For checking the efficiency of

earthing, the earth resistance of each earth electrode shall also be measured. This test shall preferably be done during summer months.

#### TESTING OF POLARITY OF NON-LINKED SINGLE POLE SWITCHES:

In a two wire installation, a test shall be made to verify that all non-linked, single pole switches have been fitted in the same conductor throughout and that such conductor has been connected to an outer or phase conductor or to the non-earthed conductor of the supply.

The contractors shall be responsible for providing the necessary instruments and subsidiary earth for carrying out the tests. The earth coordinating tests shall comply with the IS specifications as may be applicable. Should the above tests not complete with the limits laid down, the contractors shall do the necessary rectification of the fault till the required results are obtained.

CONDUITS: Unless otherwise specified all wiring shall be in rigid PVC conduit embedded in wall, or ceiling or concealed in the false ceiling. The size of conduits shall be selected in accordance with the IS regulations and the minimum size of the conduit shall be 20 mm dia unless otherwise indicated or approved. Conduits shall be kept at minimum of 100 mm from the pipes of other non-electrical services. Separate conduits and runways shall be used for: 1. Lighting system. 2. Power outlets. 3. Emergency light. 4. Telephone system. 5. Fire alarm system. 6. Sound / public address system. 7. Television system. 8. Computer system.

Wiring for short extensions to outlets in hung ceiling or to equipment, motors etc. shall be installed in flexible MS conduits. Otherwise rigid conduits shall be used. Conduits shall be free from sharp edges and burrs and grease or oil shall not be used for the purpose of pulling the wire. The entire system of conduits must be completely installed and rendered electrically continuous before the conductors are pulled in.

All PVC conduits shall be jointed with plain PVC couples using approved PVC jointing materials as recommended by the manufacturer. All joints shall be water tight. Junction between conduit and adaptable boxes, back outlet boxes, switch outlet boxes and the like must be provided with entry spouts and smooth PVC bushes.

LAYING OF CONDUITS IN SURFACE: Conduits run on surfaces shall be supported on galvanized / PVC saddles which in turn are properly screwed to the wall or ceiling. Saddles shall be at intervals of not more than 60 cm. Fixing screws shall be with round cheese head or and rustproof materials. Exposed conduits shall be neatly run parallel or at right angles to the wall of the building. Pull boxes must be provided at the right angles and at a distance of not exceeding 20 meter

CONCEALING THE CONDUITS IN THE WALL: Conduits embedded into the walls shall be fixed by means of staples at not more than 60 cm intervals. Chase in the wall shall be neatly made and refilled after laying the conduit and brought to the finish of the wall. Chasing shall be done with the wall cutting machine. Hammer and chisel shall be used on chased portion to get uniform depth of 50 mm. Uniform depth of 50 mm shall be maintained on chased portion. Conceal Back box shall be installed by using

cement mortar. Alignment of the back box shall be done by using a calibrated spirit level. PVC adaptor shall be used for connection between JB and conduit. PVC solvent shall be used. PVC solvent cement shall be applied on conduit before interconnection. Embedded JB shall be protected by covering with brown tape filled with jute/gunny bag. Cement mortar 1:5 ratio (1 portion of the cement+5 portion of sand) shall be used for patchwork in chased area. Chicken (wire) mesh and GI nails shall be used for all chasing width of the embedded conduit. Curing shall be carried out for a minimum of three days.

**CONCEALING IN THE CONCRETE:** Conduits buried in concrete structure shall be put in position and securely fastened to the reinforcement and got approved by the consultant/Engineer before the concrete is poured. Proper care shall be taken to ensure that the conduits and boxes are neither dislocated nor choked at the time of pouring the concrete. Suitable fish wires shall be drawn in all conduits before they are embedded. Inspection boxes shall be provided for periodical inspection to facilitate draw and removal of cables. Such inspection boxes shall be flush with the wall in the case of recessed conduits. Inspection boxes shall be spaced at not more than 12 meters apart or two 90 degree solid bends or equal.

#### **WIRING AND ACCESSORIES:**

**LAYING OF WIRES:** Unless otherwise specified all wires shall be FRLS PVC insulated single core, stranded copper conductor. All wires shall be coloured as follows: Phase R: Red Colour of wire, Phase Y: Yellow Colour of wire, Phase B: Blue Colour of wire, Neutral: Black Ground: Yellow Green or Green (One colour only to be used for the complete Installation).

The size of wires shall be as indicated in the drawings or in the BOQ. When more than one wires are installed in the same raceway, they should be pulled in the raceway at the same time. Use guide wires and similar equipment when wire pulling, to support the tension and avoid possible damage. Conductor splices must be enclosed in junction boxes. Use a minimum of 300mm of slack conductors inside DB and at each outlet as needed. Ensure proper wire installation in all boxes. After installation, the Wires Insulation Test should be conducted.

**SWITCH BOARDS AND POWER OUTLET SOCKETS:** Switch Boards for light points, socket outlets, power outlets, pull / junction boxes shall be of galvanized steel, and shall be of shapes and size to suit their respective locations and installations and shall be provided with covers to suit their function and installation. All outlet boxes shall be provided with brass ground terminals. All junction boxes/pull boxes shall have suitable covers. Surface mounted outlet and junction boxes in the outdoor locations shall be of weatherproof. The surface mounted indoor boxes shall be of sheet steel painted or PVC for surface installation. For internal use Switches shall be of the grid assembly pattern with rocker operated switch units suitable for operation with inductive loads. Switches shall be either one way or two way as specified in the BOQ. Switch plates shall be of suitable shade and size as specified in BOQ or

approved by SBI. Surface installation switches shall be provided with matching steel box.

**CIRCUIT WIRING** unless and otherwise specified in the BOQ, all sub main circuit conductor sizes for lighting and appliances, shall be as shown in the schedule of quantities. Each circuit phase wire from the distribution boards should be followed with a separate neutral wire of the same size as the circuit wire or as specified in the BOQ. For the light/fan point wiring individual phase, Neutral and Earth wires shall be run from the switch board to the respective ceiling rose. Looping of neutral and Earth wires for adjacent light points are not allowed except for the secondary points. For the secondary points Neutral and Earth looping should be done only from the respective primary points. This will avoid nuisance tripping of ELCB/RCCB in case of leakage and identifying the faulty circuit and rectifying will be easy. Each light point and outlet shall be identified with their circuit number and DB number with a label pasted on them. Flexible cords for connection to appliances, fans and pendants shall be 250/440V grade, three or four cores, with tinned stranded copper wires, insulated, twisted and sheathed with strengthening cord. If demanded by SBI, the contractor shall supply a certificate issued by the manufacturer of wires and switches stating origin, date of manufacture, batch number and standard to which it complies and the test certificates. Looping system of wiring shall be used. Wires shall not be jointed. Where joints are unavoidable, these shall be made through approved mechanical connector. 230 V power supply wiring shall be distinctly separate from any other different voltage system and lighting wiring.

**CONTROL SWITCHES** Control switches shall be connected in the phase conductors only and shall be 'ON' when knob is down. Switches shall be fixed in galvanized steel boxes. Chromium plated screws shall be used. The rating of the Switches shall as per the BOQ. For the UPS power sockets provided in the workstations and counters, the control switches shall be provided separately above the counter and the sockets below the counter. Similarly, for the wall mounting fan points, the control switches shall be provided separately in the Switch board and the socket outlet provided near the wall mounted fans.

**TESTING OF ELECTRICAL WIRING SYSTEM** The entire installation shall be tested in accordance with IS regulations for: 1. Insulation resistance. 2. Earth continuity. 3. Polarity of single pole switches.

#### **LIGHT FIXTURE INSTALLATION:**

Inspect the site to install light fixtures as per approved lighting layout. If any mismatch is observed between the approved layout and the actual layout, please consult the SBI Engineer and re-plan the lighting layout to suit the actual site conditions.

If there is no false ceiling, chalk lines (removable type) shall be used to mark the spacing of light fixtures as per approved drawing. After marking, the light fitting support and accessories shall be fixed. Wires shall be connected to the connector of

light fitting as per standard. Light fitting shall be mounted on the support fitted. Line level and final alignment shall be checked.

**INSTALLATION OF LIGHT FIXTURES IN THE FALSE CEILING:** While installing light fixtures in the false ceiling, the contractor has to check the distance between the roof and the false ceiling and ensure that the sufficient height is available for fixing the light fixtures and if requires any change in the lighting layout. Any hindrance like beams, sewerage pipe lines, electrical cables etc. has to be informed to the SBI Engineer and necessary guidance obtained before installation. Support to hang the fixture to be provided in the roof with suitable length of chain links or GI wires of suitable size, as per recommendation of the light manufacturer. The supports shall be of sufficient length to enable change of location of fixtures to the adjacent grid/cutout, if required by Bank. The supports should not be fixed to the pipes or cables or electrical conduits running above the false ceiling. The Light fixtures should not be loosely laid on the false ceiling grid without any support.

In case of the Gypsum false ceiling, the marking shall be made in the false ceiling first as per the lighting layout and the cutout shall be made in coordination with the interior contractor. Wherever required, the suitable frame required have to provide by the contractor for the 2'x2' fixtures.

The cutouts for the light fixtures and down lighters shall be properly marked in the false ceiling to make the cutout neatly and as per the desired lighting layout. Nylon line dori shall be used to ensure that all light fixtures are in a straight line

If the works involves, some architectural features in the false ceiling, the contractor shall consult the interior contractor and SBI Engineers before installation of light fixtures, ceiling fans, laying of cables above false ceiling to avoid any damage or any hindrance to the proposed architectural features.

#### **EARTH STRIPS / CABLE TRAYS:**

**GI/COPPER STRIP LAYING:** Before installation of GI and copper earth strip, the inspection shall be carried out to confirm size, quantity and galvanizing of GI strip. Arrangement shall be made for proper scaffold for strip laying on the tray. Check wall and beam finishing before strip clamping on the wall and beam. Ensure that all Earth strip installation are straight. The earth strip route and size shall be confirmed/verified with approved earthing drawing.

Ensure that there is no overlapping in strips at joints. Where required for Joint area, use "C" type holding clamp for avoiding gap between two strips. GI strip fixing inside cable tray with using of GI nut bolt at every 5 mtr. interval. Clamps shall be fixed at an interval of 1000mm. Copper to GI earth strip connection shall be done by using the bimetallic washer

**EARTH STRIP LAYING BY WELDING ON WALL/SLAB.** Whenever longer length of Earth strips are to be installed on wall/ slab, the overlapping in strips at joints shall be minimum. Overlapping area to be properly welded and ensure no gap in the joint area. Approved PVC sleeve shall be provided to 50x6mm and 75x10mm GI earth strip



36 wherever accessible areas such as inside substation, all embedded portion etc. Welding joints are cleaned with wire brush and then coated with Galva brite. All paint, scale and enamel shall be removed from the contact before the earthing connections are made. All sizes of GI strips shall be fixed by using GI clamp, GI spacer, and 35x8mm GI screw with PVC nylon fasteners (PVC Grip). Clamps shall be fixed at an interval of 1000mm (in case of wall/slab). The earthing for Equipment shall be tapped from the main earth conductor/strip. Equipment earthing shall be done by GI nut bolting. Ensure GI nut bolt shall be fully tightened at equipment earthing. GI strip laid underground shall be at depth of 500mm below finished grade level. All joint below ground level shall be welded by two coats of bitumen paint. All connections to the grounding grid shall be made with earthing strip welded to the grid and bolted at equipment ends. All joints and cut ends shall be properly painted.

**CABLE TRAY INSTALLATION:** Cable tray supports and cable tray material shall confirm the size, quantity and quality as per technical specification. Cable tray routes shall be cleared of any debris. Necessary cable tray route and supports shall be checked as per approved drawings. If required, make suitable size opening in the wall for cable tray entry into the building. All accessories used such as joint plate, nut, bolts with washer, bends, reducers, etc. used in cable trays shall be of the same manufacturer as that of the cable trays. Necessary Scaffolding shall be arranged wherever applicable. Throughout the work execution, safety standards shall be followed. Chalk lines (geru powder cement colour removable type) are used to mark the cable tray route at the deck slab. After marking of supports location, drill the hole & install anchor fastener. Ceiling bracket and top hat section shall be fixed on anchor fastener. Install the threaded rod supports using with ceiling bracket as per approved drawing. Check the vertical and horizontal alignment of threaded rod support by spirit level. Supports shall be installed at spacing not exceeding 1.5 meters and all branches, bends, Endpoints supports shall be installed as shown on the approved drawings. Nylon line dori will be used to ensure that all supports are in a straight line. After the installation of supports install the proper size cable tray and check the alignment using of line dori & Sprit level. Two lengths of cable tray shall be connected with the joint plate. Minimum clearance shall be maintained between bottom of the tray and the ceiling. End cap to be provided at end cut portion of tray.

#### **SPECIFICATION FOR CABLE TRAYS**

**SCOPE:** This specification covers the design, supply, fabrication, fixing, aligning, and painting of cable trays and other steel frame works at site as required.

The cable trays shall be designed and fabricated out of various sections such as MS angles, flats, and channels etc. and got approved by Consultants.

Before fabrication the MS sections shall be properly straightened, aligned, cleaned properly to remove rust if any.

All materials used for fabrication of cable of cable trays shall conform to IS 226 and fabrication shall be as per IS: 800.

After fabrication the cable trays, and accessories shall be free from sharp edges, corners, burrs and unevenness, and a coat of cold phosphating chemical shall be applied followed by a coat of red oxide primer.

The cable trays shall be welded to the mounting supports, which in turn are either welded to plate inserts or grouted to structural members.

Plate inserts for cable tray mounting supports shall be provided by Civil Contractor.

Cable trays shall be either run in cable trenches or run overhead and supported from available structure.

Minimum clearance between the top most tray tier and structural member shall be 300mm.

The type and size of tray to be used shall be as required.

Each continuous length of cable tray shall be earthed at minimum two places.

The cable trays, accessories, covers etc. shall be painted with two coats of red oxide primer followed by two finishing synthetic enamel paint of approved shade. Where any cuts or holes are made or welding is done on finished steel work, the same shall be sealed against oxidation by red oxide primer followed by finished paint.

**CORE CUTTING:** Core cut hole shall be carried out at the site as per the site requirement after consulting Civil Engineer. Ensure marking of core cut is in line of existing cut out at the floor above or below to have vertical alignment. If more than one Core cut is required, required spacing shall be provided. Centre of core cut to be drilled with drill machine to receive core bit of machine. This will avoid displacement of core machine bit. The Core cut Machine will be Fixed to Slab using Machine Clamp and anchor Fastener. Check that machine is firmed enough not to be displaced from its location. Check the electrical supply and run the machine with minimal force. Maintain proper gaps between adjacent core cuts to allow pipe jointing in future. Upon completion of the core cut, protect the Core cut hole using the ply piece.

**CONCEALING INSIDE WALL/PARTITIONS/GROUND/CEILING:**

The contractor shall give due notice to the Employer whenever any work like opening for the earth pits, underground laying of cables, concealing the conduit piping, cabling or any work is to be concealed in the wall/false ceiling/partitions or finished up or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before concealing.

The Contractor has concealed the items without informing SBI Engineer, the same shall be opened up for measurement and made good to the original finishing at the contractor's expenses. If the contractor refuses to do so, then the same will not be considered for measurement and no payment may be made for such materials.

The contractor shall not execute any extra work other than the Bank's or SBI's written instruction. No works, for which rates are not specifically mentioned in the price bid, shall be taken up without written permission of the Bank.

Should any dispute or differences arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or

checked, the decision of SBI shall be accepted as correct and binding on the contractor.

It is the responsibility of the Contractor to arrange/provide the tools, ladder, stands or any other gadgets or supports required for the execution of the work at site and Bank will not provide or entertain such requests.

**1. 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. Standards:**

The Electrical wiring installations and other accessories shall comply with latest IS: 732 - 1989 and National Electrical code – 1985 and to the latest amendments from time to time.

**3. Construction**

Wall mounted switch boards shall be installed such that the bottom is at a minimum height of **1.35m** 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 fuse 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 15 amperes 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/LED 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 the 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 23 cm 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 PVC 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.
- e) 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.
- f) 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. TESTING OF WIRING:**

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

- a) Insulation resistance test,
- b) Electrical continuity test,
- c) Earth continuity test,
- d) Earth electrode resistance test,
- e) Switch polarity test.
- f) Insulation Resistance test:

The insulation resistance shall be measured by using **500V** 'Insulation tester' 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 mega ohm.

The insulation resistance in mega ohm 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 mega ohm.

- Electrical continuity test:

Each and every circuit shall be tested for electrical continuity by using a multi-meter.

- 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.

- Earth electrode resistance test:

The earth electrode resistance shall be tested as specified in section

- 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.

## **7. 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 numbers 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.

## **8. MOUNTING HEIGHTS:**

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

9. **Flexible conduits are strictly not envisaged, only industrial type GI Bind flexible conduit shall be used in a spot where the conduits and bends cannot be possible to run.**

## **CHAPTER 2 EARTHING**

### **1.0 SCOPE:**

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

- a) Pipe earthing
- b) Plate earthing

c) Strip earthing

## **2.0 STANDARDS:**

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

### **3.0 Earth electrode arrangement:**

#### **3.1 Pipe electrode:**

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

3.1.2 Electrodes shall be embedded below permanent moisture level.

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

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

#### **3.2 Plate electrode:**

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

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

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

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

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

3.2.5 Plate electrodes shall have a galvanized iron water pipe, buried vertically and adjacent to the electrode. One end of pipe shall be at least 5 cm above the surface of the ground and need not be more than 10 cm. The internal diameter of the pipe shall be at least 19 mm. The length of pipe under the earth's surface shall be such that it shall be able to reach the centre 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 3sq.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 overlap 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 Tester and the value shall be as per IS/IE rules.



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

Distribution Transformer	: ABB/KIRLOSKAR/INDO-TECH/
HT AYFY / YWY Cables	: Finolex/RR
Kables/HAVELS/Polycab/KEI/GLOSTER	
LT AYFY / YWY Cables	: Finolex / RR Kables / HAVELS/ Polycab/ KEI
PVC insulated Copper Wires(FRLS only)	: L&T / RR cables / ANCHOR / HAVELS / KEI
PVC Pipe and accessories (FRLS only)	: Avon plast / Precision / Attul / Finolex / VIP,etc
uPVC Trunking	:Legrand / MK /Precision /
MCB and ELCB	: ABB / Legrand / Siemens/ Schnider-acti9
Vertical DB & MCB DBs ( <i>SPN/TPN/VTPM</i> )	: ABB-Elegance / Legrand / Schnider/
Switch Fuse Units	: C&S/ HPL / IndoAsian/ Siemens /
Selector Switches	: Kaycee/ Salzer / L&T
Change Over Switch	: <i>C&amp;S / Havels / HPL/INDO ASIAN / Sohomec</i>
MCCB / SFU /ISOLATOR	: ABB /C&S / Legrand / Schnider/ Siemens/
Timer Switches (Analog / Digital)	: ABB/ Schneider / Legrand /
Modular Switches/ plug sockets / electronic regulators	: Legrand Myrius / <b>Schnider Zencelo / <u>ABB</u> Millenium</b>
Telephone Cable ( <b>0.5 sq mm</b> )	: Delton / finolex / HAVELS/RR kable /
Light Fittings / Lamps	: Philips / Wipro / Havels/ Philips/ Crompton
Ceiling fan – (5 Star rated only)	: Automberg, Crompton , Havells, Orient
Wall fan / Pedestal fan (steel blades only)	: Automberg/ Crompton/ Kaithan / Havels
Exhaust Fan	: Almonard / Atomberg/ Crompton / Usha/
Data Cable – CAT 6 cable	: AMP/D-Link / Schnider /
Dual IOS	: D-link / Legrand / Schnider
Data Switches / patch panels	: D-Link / Legrand / Schnider
Data Rack	: Legrand / HCL / Schnider / D-Link
Resin cast CTs	: AE / Kappa/Kalpa/IMP/Voltapm
Measuring Instruments	: Elmeasure / HPL/ L&T / Socomec /
Schnider/ABB	
Panel Builders	: Pace Switchgear,Bglr / Maland Controls & Engineers Bglr/ ESSVE Electro Controls Bglr /Balaji Controls, Bglr/ Sharan Controls/

For items not mentioned here, Materials having ISI mark may be used with the prior approval from Bank.

**NB:** Panel and MCB installed shall be of same make

**DECLARATION**

I/We have inspected the site for **Electrical work for** \_\_\_\_\_, of State Bank of India and I/We have made me/ us fully acquainted with the local conditions in and around the sites of works and Lay out drawings of works, drawings of each items etc. complete.

I/We hereby declare that I/ We have carefully gone through the conditions laid down in the Notice Inviting Tender, General notes, General Conditions of Contract, Special conditions, Schedule of approximate quantities and rates , Form of Agreement, General Specification, Approved manufacturers/ natural source of materials (i.e. all parts of Technical bid), Technical Specifications of schedule of quantities (i.e. all parts of Price bid), and clearly understood all the same and on the basis of the same I/ We have quoted our rates in the Schedule of Quantities/BOQ attached with the tender documents.

We accept all the terms and conditions of tender documents. We will abide by the technical specification mentioned in the tender. We here by undertake to use only specified material/ make as per the tender schedule.

I/ We hereby declare that, in particular during execution of all works at site; it will be my/ our sole responsibility to strictly adhere to/ meticulously follow the General Specification, Approved manufacturers/ natural source of materials, Technical Specifications of schedule of quantities, all drawings of layout and items.

For any type of deviation (to any of above or subsequent instructions), it will be my/ our responsibility to obtain the written instruction of the Engineer-in-charge for the same failing which it shall be deemed that I have carried out any such deviations at my own and I shall be duty bound to replace the all deviated material/ works from the site at my/ our cost as well as I shall be liable to penalized by the employer as deemed fit and for all such loses made thereof, I/ we shall not have any right to arbitrate in any manner.

I/ We hereby declare that I/ We shall obtain necessary drawings of items from employer in time and also shall uniformly maintain such progress as may be directed by the employer to ensure completion of same within the target date/ time as mentioned in the tender document.

Date:

Signature and seal of Contractor/ Tenderer

**Witness:**

1.

2.

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**NOTE:- ANY CLARIFICATIONS SOUGHT AFTER OPENING OF THE TENDERS WILL NOT BE ENTERTAINED AT ANY COST.**

**PREAMBLE TO BILL OF QUANTITIES**

All items of works mentioned in the schedule of quantities shall be read and executed strictly in accordance with the description of the items in the schedule of quantities, equipment schedule, data sheet, drawings and standard specifications read in conjunction with the appropriate IS and Conditions of contract.

The rate of each item of work included in the bill of quantities shall unless expressly stated otherwise include cost of:

All materials, fixing materials, accessories, hardware's, operations, tools, equipment's, consumables, civil works wherever involved and incidentals required in preparations for in the full and entire execution and completion of the work called for in the item and as per specification and drawing completely.

Wastage on materials and labour.

All the quoted rates should include with respective GST component also transit, insurance, packaging and forwarding, loading, transportation, unloading, handling, hoisting, to all levels setting and fixing in position, disposal of the debris and all other labors necessary in accordance with contract document, good practice, recognized principles.

Liabilities, obligations and risks arising out of conditions of contract.

Liason service charges.

All requirements of system whether such of them are mentioned in the item or not the specification and drawings are to be read as complementary to and part of the schedule of quantities and any work called for in one shall be taken as required for all.

In the events conflict between the bills of quantities and other documents, the most stringent shall apply and interpretation of the Architect shall be final and binding.

The installation price of switch boards, metering panels, DB's or any other items shall include supply and fixing or supporting steel structures/MS channels, grouting of the same civil works etc. as required.

No change in unit rate shall be allowed for any change in quantity or for any other reason whatsoever.

Supply of materials shall mean supply of materials at site. The rate for supply shall include all taxes, octroi, insurance, packing and forwarding charges, and transportation, unloading at site.

The successful contractors shall submit the schematic diagrams, fabrication drawings with details of the equipment's wiring diagrams etc. to Architects for approval prior to supply/commencement of such works. The approval of these drawings will be general and will not absolve to contractor responsibility of the correctness of these drawings. At distribution to various agencies at site at no cost to owner.

The tenders must see the site conditions such as type of soil, locations etc. and take

all factors into considerations while quoting the rates as no extra cost will be allowed on any ground arising out of or relating to the site conditions.

Any error in description or in quantity or omission of items from the contract shall not vitiate this contract but shall be corrected and deemed to be a variation required by Architect / Owners.

**CHECKLIST OF DOCUMENTS TO BE UPLOADED**

1. The soft copy of PAGES 1 TO 7 of Technical Bid in \_\_\_\_\_
2. EMD's scanned copy.
3. Signed copy of Declaration

\* The hardcopy/original DD should be submitted to the office before closure of tender submission time.