TENDER ID; MLR/AO-6/ELE/124

TENDER DOCUMENT

INTERNAL ELECTRICAL WORKS – FOR ELECTRICAL WORKS OF MANGALORE MAIN BRANCH, RBO-1, MANGALURU

STATE BANK OF INDIA, LHO BENGALURU.

PART A

INSTRUCTIONS TO TENDERERS AND GENERAL CONDITIONS.

EMPLOYER:	**State Bank of India** **Premises & Estate Department, New Annex Building,** **Local Head Office, St. Marks Road, Bangalore.**
Issued to:	**M/s……** **……** **……** **……**

Notice inviting E- Tenders
(Ref No. TENDER ID: MLR/AO6/ELE/124)

State Bank of India, P&E Department, LHO Bangalore, invites E-Tenders from the Empanelled contractors in Group - A of Bengaluru Circle, under Category E3. [From 25L Upto Rs. 50 LAKH]
Details of the tenders are as under; Engineer in-charge ; 9619885179

1	Name of the work	**INTERNAL ELECTRICAL WORKS – FOR RENNOVATION OF MANGALORE MAIN BRANCH,RBO-1 MANGALURU.**
2	Time allowed for completion.	120 days from the date of issue of work order
3	Quantum of Work	Complete work of Internal Electrical Work of Parashuram Apartments
4	Earnest Money Deposit.	Rs.39000/-(Rupees Thirty Nine Thousand Only), To be submitted in the form of Demand Draft drawn in favour of Deputy General Manager (B&O), AO-6 Mangaluru and to be submitted physically at **State Bank of India Administrative Office, Manjush Building, First Floor, Bejai, Mangalore - 575004.**
5	Initial Security Deposit.	2% of contract value including EMD
6	Last date and time of receipt of E-Tender. https://etender.sbi	3.00 PM On 15.01.2026.
7	Mode of tender submission	Tenders will be accepted only in e-tender portal **https://etender.sbi**
8	Date and time of opening of tenders. (Technical & Price Bid)	3.30 PM On 15.01.2026.
9	Defect liability period.	12 months from the date of commissioning
10	Validity of tenders.	Rates quoted should remain valid for a period of 3 months from the date of opening of price bid.
11	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.
12	**Submission of Technical Bid**	Contractors shall Download the entire Technical Bid to get acquainted with the 3 terms and conditions However, L1 Tenderer should

		submit the Technical bid containing pages 1 to 59 duly signed with company seal and date physically to the Administrative Office within 3days of receipt of confirmation.
13	Place of opening tenders	SBI Administrative Office -6, 1st Floor, Manjusha Building, Bejai, Mangaluru - 575004
14	Value of interim Certificate.	Rs. 15.00 Lakhs.
15	Any additional Information	The Given rates 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.
16	Pre-Bid Meeting	Will be held on 12.01.2026 @ 15.00 at Mangalore Main Branch, Port Road, State Bank Circle, Mangaluru – 575 001
13	SBI reserves the right to accept or reject any or all bids without assigning any reasons thereof, even after opening of the bids	

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).

Bank will not pay interest on, any of the deposits mentioned in the tender.

For and behalf of State Bank of India

Assistant General Manager
State Bank of India
Administrative Office-6, Mangaluru

INSTRUCTIONS TO CONTRACTORS.

Scope of Work Sealed Tenders are invited by State Bank of India for the work of **"FOR RENOVATION OF MANGALORE MAIN BRANCH,RBO-1 MANGALURU."**

1.1 Site and its location

The proposed work is to be carried out at 1st to 5th Floors of Parashuram Apartments, 1st Cross, Ladyhill, Mangaluru - 575004.

2.0 Tender Documents

2.1 The work has to be carried out strictly according to the conditions stipulated in tender consisting of the following documents and the most workman like manner,

- Instructions to tenderers.
- General Conditions of Contract
- Special Conditions of Contract
- Technical Specifications
- Drawings
- Price Bid

2.2 The above documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order given below:

- Price Bid
- Technical Specifications
- Special Conditions of Contract
- General Conditions of Contract
- Instructions to Tenderers

2.3 Complete set of tender documents including relative drawings can be downloaded from https://e-tender.sbi .

2.4 The tender documents are not transferable.

3.0 Site Visit

3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and data which may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The Tenderer is requested satisfy himself regarding the availability of water, power, transport and communi-

cation facilities, the character quality and quantity of the materials, labour, the law & order situation, climatic conditions local authorities' requirement, traffic regulations etc;

The tenderer will be fully responsible for considering the financial effect of any or all the factors while submitting his tender.

4.0 Earnest Money

4.1 The tenderers are requested to submit the Earnest Money in the form of Demand Draft or Banker's Cheque in favour of State Bank of India drawn on any Bank in India.

4.2 EMD in any other form other than as specified above will not be accepted. Tender not accompanied by the EMD in accordance with clause 4.1 above shall be rejected.

4.3 No interest will be paid on the EMD.

4.4 EMD of unsuccessful tenderers will be refunded within 30 days of award of Contract.

4.5 EMD of successful tenderer will be retained as a part of security deposit.

5.0 Initial Security Deposit

The successful tenderer will have to submit a sum equivalent to 2% of contract value less EMD by means of D/D drawn in favour of State Bank of India within a period of 15 days of acceptance of tender.

6.0 Security Deposit

6.1 Total security deposit shall be 5% of contract value. Out of this 2% of contract value is in the form of initial security deposit which includes the EMD. Balance 3% shall be deducted from the running account bill of the work at the rate of 10% of the respective running account bill i.e. deduction from each running bill account will be 10% till total 3% of contract value is reached. 50% of the total security shall be paid to the contractors on the basis of architect's certifying the virtual completion. The balance 50% would be paid to the contractors after the defects liability period as specified in the contract.

6.2 No interest shall be paid to the amount retained by the Bank as Security Deposit.

6.3 Additional Security deposit (ASD)/Additional performance Guarantee (APG) shall be applicable if the bid price is below 10% of the estimated cost put to tender. The amount of such ASD/ APG shall be the difference between 90% of estimated cost put to tender and the quoted price. ASD in the format of DD / Banker's Cheque / Bank Guarantee shall be submitted within 15 days of intimation of award of work / work order, without which the contractor will not be allowed to start the work and failure of submission of ASD will result in forfeiture of EMD and cancellation of tender.

For e.g., if a contractor is quoting 15% below the estimated cost put to tender (i.e. 85% of the estimate), then ASD of 5% of estimated cost is required to be obtained from the contractor (90%-85%).

7.0 Signing of Contract Documents

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 15 days from the receipt of intimation of acceptance of his tender by the Bank. However, the written acceptance of the tender by the Bank will constitute a binding agreement between the Bank and successful tenderer whether such formal agreement is subsequently entered into or not.

8.0 Completion Period: The time period allowed for completion of the project shall be 4 (Four) months from the date of commencement of work or 15 days from the date of issuance of work order, whichever is earlier.

9.0 Validity of Tender

Tenders shall remain valid and open for acceptance for a period of 3 (Three) months from the date of opening price bid. If the tenderer withdraws his/her offer during the validity period or makes modifications in his/her original offer which are not acceptance to the Bank without prejudice to any other right or remedy the Bank shall be at liberty to forfeit the EMD.

10.0 Liquidated Damages

The liquidated damages shall be 0.5% per week subject to a maximum of 5% of contract value.

11.0 Rates and Prices

11.1 In case of item rate tender

11.1.1 The tenderers shall quote their rates for individual items both in words and figures in case of discrepancy between the rates quoted in words and figures the unit rate quoted in words will prevail. If no rate is quoted for a particular item the contractor shall not be paid for that item when it is executed.

The amount of each item shall be calculated, and the requisite total is given. In case of discrepancy between the unit rate and the total amount calculated from multiplication of unit rate and the quantity the unit rate quoted will govern and the amount will be corrected.

11.1.2 The tenderers need not quote their rates for which no quantities have been given. In case the tenderers quote their rates for such items those rates will be ignored and will not be considered during execution.

11.1.3 The tenderers should not change the units as specified in the tender. If any unit is changed the tenders would be evaluated as per the original unit and the contractor would be paid accordingly.

The tenderer should not change or modify or delete the description of the item. If any discrepancy is observed, he should immediately bring to the knowledge of the Architect/ Bank.

11.1.4 Each page of the BOQ shall be signed by the authorized person and cutting or overwriting shall be duly attested by him.

11.1.5 Each page shall be totaled, and the grand total shall be given.

11.1.6 The rate quoted shall be firm and shall include all costs, allowances, taxes, VAT, levies, etc. However, excluding GST, which shall be paid separately as applicable.

11.1.7 Scanned copy of EMD must be uploaded and the same needs to be submitted at given address within due date of tender.

11.1.8 Firm should be visit the website (https://etender.sbi) till last date of submission for changes. corrigendum if any will be published only in https://etender.sbi.

11.1.9 L-1 Tenderer signed copy of entire tender document should be submit within 3 days from date of tender opening.

LETTER OF TRANSMITTAL
(To be typed in the letter head of the Applicant)

The Assistant General Manager,
State Bank of India
Administrative Office 6
1st Floor, Manjusha Building,
Bejai, Mangaluru.

Sub: Submission of Tender for Electrical Renovation Works of Mangalore Main Branch, RBO-1 Mangaluru

Dear Sirs,

I/We the undersigned have carefully gone through and clearly understood after visiting the site and the Tender drawings and tender documents comprising of the tender form, notice to contractors, and conditions for building contract, Special Conditions, Specifications and Schedule of Probable quantities and Draft Agreement prepared by SBI.

I/We do hereby undertake to execute and complete the whole or part of the work (as desired by you) at the respective rates which/I/We have quoted for the respective items of the Probable Bill of Quantities.

I/We are depositing as Earnest Money a sum of Rs. 39,000/- (Rupees Thirty Nine Thousand Only) in favor of SBI, payable at Mangaluru along with this tender for due execution of the work at my/our tendered rates together with any variations in quantity which shall be adjusted by the Bank at prices based on our tendered rates. I/We shall deposit further sum equivalent to 2% of tender amount, less EMD paid in the event of my/our tender being accepted, towards initial security deposit.

In the event of this Tender being accepted I/We agree to enter into an agreement as and when required and execute the contract according to your form of Agreement, within 15 days of receipt of work order, in default thereof, I/We do hereby bind my-self/ourselves to forfeit the aforesaid initial security deposit.

I/We further agree to complete the work covered in the said schedule of quantities within 4 months from the 15th day reckoned from the date of issue of the work order to commence the work or on which contractor is instructed to take possession of the site, whichever is later.

I/We agree not to employ Sub-contractors other than those that may be specifically approved by the Bank for this contract work.

I/We agree to and to get the work, workers, employees (of Employer) engaged on the work at site and all materials at site for execution of the work shall be insured comprehensive insurance including fire/accidents/ rain/ floods/riots/CAR policy (contractor's all risk insurance policy) and the insurance shall cover the period from date of start of work to date of actual completion of work plus 3 months. In case part work is taken over by the Employer before final completion of the whole work, such parts may not be covered by the insurance from the date of taking over that part of work by the Employer. All the rates quoted by me/ us are inclusive of the same in full and nothing extra shall be claimed anytime on account of any of these.

I/We agree to pay Income tax, to be deducted at source, at the rate prevailing from time to time on the Gross value of the work done, and the rates quoted by me/us are inclusive of same.

Yours faithfully,

Contractor's Signature along with stamp

Address: Date:

_____

_____

_____

_____

NOTICE TO CONTRACTOR

ADDRESS:

_____
_____
_____

PROJECT : **FOR RENNOVATION OF MANGALORE MAIN BRANCH,RBO-1 MANGALURU.**

Madam/ Dear Sir,

State Bank of India, Mangaluru have pleasure in inviting you to tender for the aforesaid work.

The scope of work broadly as given below is for **FOR RENNOVATION OF MANGALORE MAIN BRANCH,RBO-1 MANGALURU**

1. **Tender Documents should be filled and uploaded on the site of https://etender.sbi.**

2. The tenderer must obtain for himself, on his own responsibility and at his own expenses, all the information which may be necessary for the purpose of filling this tender and for entering into a contract for the execution of the same and must examine the drawings and inspect the site of the work and acquaint himself with all local conditions and matters pertaining thereto.

3. Each of the tender documents page is required to be signed by the person or persons submitting the tender in token of his/their having acquainted himself/themselves with the General conditions etc., as laid down. Any tender with any of the documents not so signed will be rejected.

4. The tender documents must be filled in English and all the entries (wherever required to submit hardcopy) must be made by hand and written in ink. If any of the documents are missing or un-signed, the tender shall be considered invalid.

5. After submission date of the tender no advice or any change in rate or conditions will be entertained.

6. The tender shall be valid for a period of 90 days from the date of opening.

7. TOTAL SECURITY DEPOSIT: shall comprise of:
   a. Earnest Money deposit
   b. Initial Security deposit
   c. Retention money
   d. Additional Security deposit if any

8 The intending tenderer shall deposit with SBI, by Demand Draft a sum of Rs. 39,000/- as the Earnest Money, as a guarantee of good faith, which amount shall be forfeited as liquidated damages, in the event of any evasive/direct refusal or delay in starting the work and or signing the contract. The deposit of the unsuccessful tenderers will be returned, with-

out interest, immediately after a decision is taken regarding the award of the contract. The Earnest money of the successful tenderer will be adjusted towards Security Deposit. A tender not accompanied by Earnest money deposit will not be considered.

9 **The successful tenderer will have to pay further sum equivalent to 2% of his contract value, less EMD already paid, as initial Security Deposit (ISD) by means of a D.D./Banker's cheque within 15 days from the date of issue of work order to commence work. The EMD and Security deposit thus paid shall be held by the State Bank of India as Security deposit, for due execution and fulfillment of the contract, till the completion of the work and defect liability period in all respects and shall not bear any interest.**

9.1 Together with the money paid under clause 8 & 9 above, further retention of 10% of the value of the work done will be deducted from every running bill, till total retention, including EMD and initial SD paid earlier, comes to 5% of the contract value, and same shall be held by the Bank as Total Security Deposit. On Bank's Engineer's certifying the completion of work, 50% of the total security deposit shall be released to the contractor along with the final certificate of payment, and the balance amount will be retained in the manner stated elsewhere for a further period of Twelve months after the completion date recorded in completion certificate, issued by the Bank.

10. Within 15(Fifteen) days of the receipt of intimation from the Employer of the acceptance of his/their tender, the successful tenderer shall be bound to sign an agreement, on a stamp paper in accordance with the Draft Agreement and conditions of contract attached herewith, but the work order or the written acceptance of a tender by the Employer will constitute a binding agreement between the Employer and the person tendering whether such formal contract is or not signed by the contractor.

11. All compensation or other sums of money payable by the contractors to the Employers, 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 15 days of being asked to do so make good in cash or cheque, any sum which have been deducted from his security deposit.

12. The rates quoted by the Contractor shall include all eventualities, such as heavy rain, sudden floods, accidents, fire, riots etc., which may cause damage to the executed work or which may totally wash out the work. Until the completion certificate is issued to the Contractors, the Employers will not be responsible for such damage or wash out of the construction work.

13. Time is the essence of the contract. The work should be completed **within 4 months** from the date of commencement. The date of commencement shall be within ONE day after confirmation.

a) 7th day from the date of issue of work order.

Or

b) The day on which the contractor receives the possession of the site whichever is later.

Or

c) The contractor is asked in writing to take over the possession of the site.

The successful contractor will have to give a CPM/PERT chart of various activities of work to be done so that the work gets completed within the stipulated time. The chart shall be submitted within 15 days from the date of acceptance of the tender.

14. 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 the rate of half percent of contract amount for each week of delay the work remains incomplete beyond the completion (Original/extended date), subject to maximum of 5% of the contract value (without extra items).

15. The quantities contained in the Schedule are only indicative. The work as actually carried out and done will be measured up from time to time, for which payment will be made subject to the terms and conditions of contract.

16. The unit prices shall be deemed to be fixed prices. In case of extra items, a record of labour charges paid shall be maintained and shall be presented every month for extra/substituted items regularly to the Bank for checking. The settlement will be made based on figures arrived at jointly and taking into account unit prices of items of work mentioned 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 invariably be based on those tender rates to the extent reasonable. **The rates quoted shall be excluding GST.**

17. Employer, do not bind themselves to accept the lowest or any tender and reserve to themselves the right to accept or reject any or all tenders, either in whole or in part, without assigning any reason whatsoever for doing so.

18. No employee of the bank is allowed to work as a contractor for a period of two years of his retirement from Bank service, without the previous permission of the Bank. This contract is liable to be cancelled, if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of the Bank as aforesaid before submission of the tender or engagement in the contractor's service.

19. The tenderer, apart from being a competent contractor must associate himself with agencies of the appropriate class who are eligible to tender for (1) Electrical (2) Air-conditioning works (3) Firefighting systems & (4) Interiors (fixed furniture), as the case maybe.

20. Release of security deposit:

i. 50% of the total security deposit will be released along with the final certificate of payments.

ii. Balance 50% of Retention money will also be released as noted under(i) above, subject to submission of a Bank Guarantee drawn on Bank other than SBI, to the satisfaction of Employer for an equivalent amount. This Bank Guarantee shall be valid up to completion of defects liability period.

ARTICLES OF AGREEMENT

This agreement made the ……day of …… between the State Bank of India, a Bank constituted under the State Bank of India Act, 1955 having its Corporate Office at State Bank Bhavan, Madame Cama Road, Mumbai, a Local Head Office at Bengaluru and Administrative office at Mangaluru represented by AGM,State Bank of India, ---------- (hereinafter called the Bank or SBI) which expression shall include the successors and assigns) of the one part and M/s. …….... company / partnership for registered under the Indian Companies Act/ Partnership Act having its registered office…….. (hereinafter called 'the Contractors' which expression shall include the present directors / partners and also the directors / partners from time to time as also their respective heirs, legal representatives, administrators and assigns) of the other part.

WHEREAS the employer is desirous of execution of **FOR RENNOVATION OF MANGALORE MAIN BRANCH,RBO-1 MANGALURU** and has caused drawings and specifications describing the works to be done prepared by Project **Architects M/s _____** having their offices at _____ (hereinafter called "the Architect")

AND WHEREAS THE SAID Drawings numbered as mentioned in the tender documents hereinafter mentioned and to be issued from time to time, the specifications and the Schedule of items and quantities have been signed by or on behalf of the parties hereto.

AND whereas the contractors have agreed to execute upon and subject to the condition set forth herein and Schedule of items and quantities, General & special Conditions of Contract, specification etc. contained in the tendered documents including all correspondences exchanged by or between the parties from the submission of tender till the award of work, both letters inclusive, (all of which are collectively hereinafter referred to as "the said conditions"). The works shown upon the said drawing and /or described in the said specification and included in the schedule of Items and Quantities at the respective rates therein set forth amounting to the sum of **Rs_____** (Rupees _____in words_____) as there in arrived at or such other sum as shall become payable there under (hereinafter referred to as " the said Contract Amount".

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said Contract amount to be paid at the times and the manner set forth in the said Conditions, the Contractors shall upon and subject to the said conditions execute and complete the work shown upon the said drawings and described in the said specifications and the schedule of items and quantities.

2. The employer shall pay the Contractors the amount or such other sum as shall become payable, at the times and in the manner specified in the said conditions.

3. The term "the Architect" in the said condition shall mean the said "M/s _____" or in the event of their ceasing to be the Architect for the purpose of this contract for whatever reason, such other person or persons as shall be nominated for that purpose by the Bank, not being a person to whom the Contractor shall object for reasons considered to be sufficient by the Employer provided always that no person or persons subsequently appointed to be Architect under this contract

shall be entitled to disregard or over rule any previous decisions or approval or direction given or expressed in writing by the architect for the time being.

4. The said conditions and appendix thereto shall be read and construed as forming part of this agreement, and the parties hereto shall respectively abide by / submit themselves to the said conditions and perform the agreements on their part respectively in the said conditions contained.

5. The plans, agreement and documents mentioned herein shall form the basis of this contract.

6. This contract is neither a fixed Lump sum contract nor a piece work contract but is a contract to carry out the work in respect of the entire project on item rate basis to be paid for according to actual measured quantities at the rates contained in the schedule of quantities and rates or as provided in the said conditions.

7. The Bank reserves to itself the rights of altering the specifications and nature of work by adding to or omitting any item of work or having portions of the same carried out without prejudice to the contract.

8. Time shall be considered as the essence of this contract and the contractor hereby agrees to commence the work soon after the site is handed over to him or from the 14th day after date of issue of formal work order as provided for in the said conditions of contractor whichever is later and to complete the entire work within ____(period of contract) months subject never the less to the provisions for extension of time.

9. All payments by the Employer under this contract will be made only at _____.

10. Any dispute arising under this Agreement shall be referred to arbitration in accordance with the stipulations laid down in the tender.

11. That all the parts of this contract have been read by the contractor and fully understood by the contractor. They further agree to complete the said work to fullest satisfaction of architect / Employer.

12. IN WITNESS WHEREOF the Employer and the contractors have set their respective hands to these presents through their duly authorized official and the said two duplicates hereof to be executed on its behalf of the day and year first herein above written.

Signed on behalf of the Signed-on behalf of the

STATE BANK OF INDIA	**CONTRACTORS**
In the presence of:	In the presence of:
1. Signature:	1. Signature:
Name:	Name:
Address:	Address:
In the presence of:	In the presence of:
2. Signature:	2. Signature:
Name:	Name:
Address:	Address:

APENDIX TO GENERAL CONDITIONS OF CONTRACT

1.	Earnest Money Deposit (EMD)	:	Rs. 39,000/-
2.	Initial Security Deposit (ISD)	:	2% of contract value including EMD.
3.	Additional Security deposit(ASD)	:	Bank reserves the right to obtain additional Security deposit if: o The price Bid is below 10% of the estimated cost put to tender. The amount of such ASD/APG shall be the difference between 90% of the estimated cost put to tender and the quoted price.
4.	Period of completion	:	4 months
5.	Defects Liability period	:	12 months after completion as Recorded in the completion certificate.
6.	Agreed Liquidated Damages	:	0.5 % of contract amount per week of delay subjected to a maximum of 5% of contract value.
7.	Period of final measurement	:	Within One month after completion as recorded in the completion certificate.
8.	Minimum value of work to be Executed for issue of interim Certificates for making payment	:	Minimum Rs. 15.00 Lakhs
9.a)	Retention money from each bill	:	10% of gross value of each interim bill, subject to 9(b) below.
b)	Total retention money including Earnest money and initial security Deposit	:	5% of the contract value.
10.	Release of Security deposit		50% of the total security to be released on Virtual completion along with final certificate of payment, but only after removing all his materials, equipment, labour, huts/force, temporary sheds/stores, all his installations, machinery etc., from the site. Balance payment to be released on submission of Bank Guarantee on any Scheduled Bank, Other than SBI in the prescribed manner and valid till the completion of defects liability period of 12 months.

11.	Period for honoring certificate	:15 working days from date of certificate of payment for interim bills and 30 working days for final certificate.

WITNESS :

DATE : SIGNATURE OF THE CONTRACTOR WITH DATE

INDEX TO GENERAL CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

1.0 Definitions

"Contract" means the documents forming the tender and the acceptance thereof and the formal agreement executed between State Bank of India (Client) and the contractor, together with the documents referred therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Architects/Bank and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

1.1 In the contract the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.

1.1.1 'SBI' shall mean State Bank of India (client) a body Corporate created under State Bank of India Act 1955, having its Corporate Centre at State Bank Bhavan, Madame Cama Road, Mumbai 400 021 and a LHO at Bengaluru and includes the client's representatives, successors and assigns.

1.1.2 'Site Engineer' shall mean an Engineer appointed by the Bank as their representative to give instructions to the contractors.

1.1.3 'The Contractor' shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include legal personal representative of such individual or the composing the firm or company and the permitted assignees of such individual or firms of company.

The expression 'works' or 'work' shall mean the permanent or temporary work described in the 'Scope of Work" and/or to be executed in accordance with the contract and includes materials, apparatus, equipment, temporary supports, fittings and things of all kinds to be provided, the obligations of the contractor hereunder and work to be done by the contractor under the contract.

1.1.4 'Engineer' shall mean the representative of the Architect/consultant.

1.1.5 'Drawings' shall mean the drawings prepared by the Architects and issued by the Engineer and referred to in the specifications and any modifications of such drawings as may be issued by the Engineer from time to time 'Contract value shall mean the value of the entire work as stipulated in the letter of acceptance of tender subject to such additions thereto or deductions there from as may be made under the provision herein after contained.

1.1.6 'Specifications' shall mean the specifications referred to in the tender and any modifications thereof as may time to time be furnished or approved by the architect/ consultant "Month" means calendar month.

1.1.7 "Week" means seven consecutive days.

1.1.8 "Day" means a calendar day beginning and ending at 00 Hrs and 24 hrs respectively.

CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of:

a. Earnest Money Deposit
b. Initial Security Deposit
c. Retention Money
d. Additional Security Deposit

a) Earnest Money Deposit:

The tenderer shall furnish EMD in the form of Demand draft or bankers cheque drawn in favour of State Bank of India, on any Scheduled Bank. No tender shall be considered unless the EMD is so deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time during the period when he is required to keep his tender open acceptance by the SBI or after it is accepted by the SBI the contractor falls to enter into a formal agreement or fails to pay the initial security deposit as stipulated or fails to commence the work within the stipulated time.

a) Initial Security Deposit (ISD)

The amount of ISD shall be 2% of accepted value of tender including the EMD. Balance of ISD (i.e. excluding EMD) is to be submitted in the form of D/D drawn on any scheduled Bank and shall be deposited within 15 days from the date of letter of acceptance of tender.

b) Retention Money

Besides the ISD as deposited by the contractor in the above said manner the retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total security deposit i.e. the ISD plus Retention Money shall both together not exceed 5% of the contract value. 50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

c) Additional Security Deposit:

Additional Security deposit (ASD)/Additional performance Guarantee (APG) shall be applicable if the bid price is below 10% of the estimated cost put to tender. The amount of such ASD/ APG shall be the difference between 90% of estimated cost put to tender and the quoted price. ASD in the format of DD / Banker's Cheque / Bank Guarantee shall be submitted within

15 days of intimation of award of work / work order, without which the contractor will not be allowed to start the work and failure of submission of ASD will result in forfeiture of EMD and cancellation of tender.

For eg, if a contractor is quoting 15% below the estimated cost put to tender (i.e. 85% of the estimate), then ASD of 5% of estimated cost is required to be obtained from the contractor (90%-85%).

2.0 Language Errors, Omissions and Discrepancies

In case of errors, omissions and/or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications etc, the following order shall apply.

i) Between scaled and written dimension (or description) on a drawing, the latter shall be adopted.
ii) Between the written or shown description or dimensions in the drawings and the corresponding one in the specification the former shall be taken as correct.
iii) Between written description of the item in the specifications and descriptions in bills of quantities of the same item, the latter shall be adopted.
iv) In case of difference between rates written in figures and words, the rate in words shall prevail.
v) Between the duplicate/subsequent copies of the tender, the original tender shall be taken as correct.

3.0 Scope of Work

The contractor shall carry out, complete and maintain the said work in every respect strictly in accordance with this contract and with the directions of and to the satisfaction of the Bank to be communicated through the architect/consultant. The architect/consultant at the directions of the Bank from time to time issue further drawings and/or written instructions, details directions and explanations which are hereafter collectively referred to as Architect's/Consultant's instructions in regard to : the variation or modification of the design, quality or quantity of work or the addition or omission or substitution of any work, any discrepancy in the drawings or between the BOQ and/or drawings and/or specifications, the removal from the site of any material brought thereon by the contractor and the substitution of any other materials thereof, the demolition, removal and/or re-execution of any work executed by him, the dismissal from the work of any person employed/engaged thereupon.

4.0 Letter of Acceptance

Within the validity period of the tender the Bank shall issue a letter of acceptance either directly or through the architect by registered post or otherwise depositing at the address of the contractor as given in the tender to enter into a Contract for the execution of the work as per the terms of the tender. The letter of acceptance shall constitute a binding contract between the SBI and the contractor.

5.0 Contract Agreement

On receipt of intimation of the acceptance of tender from the SBI/Architect the successful tenderer shall be bound to implement the contract and within fifteen days thereof he shall sign an agreement in a non-judicial stamp paper of appropriate value.

6.0 Ownership of drawings

All drawings, specifications and copies thereof furnished by the SBI through its architect/ consultants are the properties of the SBI. They are not to be used on other work.

7.0 Detailed drawings and instructions

The SBI through its architects/consultants shall furnish with reasonable promptness additional instructions by means of drawings or otherwise necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof and reasonably inferable there from.

The work shall be executed in conformity therewith and the contractor prepare a detailed programme schedule indicating therein the date of start and completion of various activities on receipt of the work order and submit the same to the SBI through the Architect/Consultant.

Copies of Agreement

Two copies of agreement/tender document duly signed by both the parties in a non-judicial stamp paper of Rs 500/- with the drawings shall be handed over to the contractors.

8.0 Liquidated Damages

If the contractor fails to maintain the required progress in terms of clause 30 of GCC or to complete the work and clear the site including vacating their office on or before the contracted or extended date or completion without justification in support of the cause of delay, he may be called upon without prejudice to any other right of remedy available under the law to the SBI on account of such breach to pay a liquidated damages at the rate of 0.5% of the contract value per week subject to a maximum of 5% of the contract value.

9.0 Materials, Appliances and Employees

Unless or otherwise specified the contractor shall provide and pay for all materials, labour, water, power, tools, equipment transportation and any other facilities that are required for the satisfactory execution and completion of the work. Unless or otherwise specified all materials shall be new and both workmanship and materials shall be best quality. The contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him. Workman whose work or behaviour is found to be unsatisfactory by the SBI/Architect/Consultant he shall be removed from the site immediately.

10.0 Permits, Laws and Regulations

Permits and licences required for the execution of the work shall be obtained by the contractor at his own expenses.

The contractor shall give notices and comply with the regulations, laws, and ordinances rules, applicable to the contractor. If the contractor observes any discrepancy between the drawings and specifications, he shall promptly notify the SBI in writing under intimation of the Architect/Consultant. If the contractor performs any act which is against the law, rules and regulations he shall meet all the costs arising there from and shall indemnify the SBI any legal actions arising there from.

11.0 Setting out Work

The contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof and get it approved by the architect/consultant before proceeding with the work. If at any time any error in this respect shall appear during the progress of the works, irrespective of the fact that the layout had been approved by the architect/consultant the contractor shall be responsible for the same and shall at his own expenses rectify such error, if so, required to satisfaction of the SBI.

12.0 Protection of works and property

The contractor shall continuously maintain adequate protection, of all his work from damage and shall protect the SBI's properties from injury or loss arising in connection with contract. He shall make good any such damage, injury, loss due to his fault or negligence except which are due to causes beyond his control.

He shall take adequate care and steps for protection of the adjacent properties. The contractor shall take all precautions for safety and protection of his employees on the works and shall comply with all applicable provisions of Government and local bodies' safety laws and building codes to prevent accidents, or injuries to persons or property of about or adjacent to his place of work. The contractor shall take insurance covers as per clause 24.0 at his own cost. The policy may be taken in joint names of the contractors and the SBI and the original policy may be lodged with the SBI.

13.0 Inspection of Work

The SBI/Architect/Consultant or their representatives shall at all reasonable time have free access to the work site and/or to the workshop, factories or other places where materials are lying or from where they are obtained and the contractor shall give every facility to the SBI, Architect/Consultant and their representatives necessary for inspection and examination and test of the materials and workmanship. No person unless authorized by the SBI/Architect/Consultant except the representative of Public authorities shall be allowed on the work at any time. The proposed work either during its construction stage or its completion can also be inspected by the Chief Technical Examiner's organization a wing of Central Vigilance Commission.

14.0 Assignment and subletting

The whole of work included in the contract shall be executed by the contractor and he shall not directly entrust and engage or indirectly transfer assign or underlet the contract or any part or share thereof or interest therein without the written consent of the SBI through the architect and no undertaken shall relieve the contractor from the responsibility of the contractor from active superintendence of the work during its progress.

15.0 Quality of Materials, Workmanship & Test

i) All materials and workmanship shall be best of the respective kinds described in the contract and in accordance with Architect/Consultant instructions and shall be subject from time to time to such tests as the architect/consultant may direct at the place of manufacture or fabrication or on the site or an approved testing laboratory. The contractor shall provide such assistance, instruments, machinery, labour and materials.

ii) Samples

All samples of adequate numbers, size, shades & pattern as per specifications shall be supplied by the contractor without any extra charges. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site detailed literature/test certificate of the same shall be provided to the satisfaction of the Architect/ consultant. Before submitting the sample/literature the contractor shall satisfy himself that the material/equipment for which he is submitting the samples/literature meet with the requirement of tender specification. Only when the samples are approved in writing by the architect/consultant the contractor shall proceed with the procurement and installation of the particular material/equipment. The approved samples shall be signed by the Architect/Consultant for identification and shall be kept on record at site office until the completion of the work for inspection/comparison at any time. The Architect/Consultant shall take reasonable time to approve the sample. Any delay that might occur in approving the samples for reasons of its not meeting the specifications or other discrepancies inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment etc shall be to the account of the contractor.

iii) Cost of tests

The cost of carrying out any test shall be borne by the contractor if such test is intended by or provided for in the specifications or BOQ.

iv) **Cost of test not provided for**

If any test is ordered by the Architect/ Consultant which is either:

If so intended by or provided for or (in the cases above mentioned) is not so particularized or through so intended or provided for but ordered by the Architect/Consultant which is either to be carried out by an independent person at any place other than the site or the place of manufacture or fabrication of the materials tested or any Government/approved laboratory, then the cost of such test shall be borne by the contractor.

16.0 Obtaining Information related to execution of work

No claim by the contractor for additional payment shall be entertained which is consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the work nor any misunderstanding or the obtaining incorrect information or the failure to obtain correct information relieve him from any risks or from the entire responsibility for the fulfilment of contract.

17.0 Contractor's superintendence

The contractor shall give necessary personal superintendence during the execution of the works and as long, thereafter, as the Architect/consultant may consider necessary until the expiry of the defect's liability period, stated hereto.

18.0 Quantities

i) The bill of quantities (BOQ) unless or otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurements.

   The rate quoted shall remain valid for variation of quantity against individual item to any extent subject to maximum variation of the contract value by 25%. The entire amount paid under Clause 20 hereof as well as amounts of prime cost and provisional sums, if any, shall be excluded.

ii) Variation exceeding 25%: The items of work executed in relation to variation exceeding 25% shall be paid on the basis of provisions of clause 21(e) hereof

19.0 Works to be measured

The Architect/Consultant may from time to time intimate to the contractor that he required the work to be measured, and the contractor shall forthwith attend or send a qualified representative to assist the Architect in taking such measurements and calculation and to furnish all particulars or to give all assistance required by any of them. Such measurements shall be taken in accordance with the Mode of measurements detailed in the specifications. The representative of the Architect/Consultant shall take joint measurements with the contractor's representative and the measurements shall be entered in the measurement book. The contractor or his authorized representative shall sign all the pages of the measurement book in which the measurements have been recorded in token of his acceptance. All the corrections shall be duly attested by both representatives. No over writings shall be made in the Measurement book. Should the contractor not attend or neglect or omit to depute his representative to take measurements then the measurements recorded by the representative of the Architect/consultant shall be final. All authorized extra work, omissions and all variations made shall be included in such measurements.

20.0 Variations

No alteration, omission or variation ordered in writing by the Architect/Consultant shall vitiate the contract.

In case the SBI/Architect/Consultant thinks proper at any time during the progress of works to make any alteration in, or additions to or omission from the works or any alteration in the kind or

quality of the materials to be used therein, the Architect/Consultant shall give notice thereof in writing to the contractor or shall confirm in writing within seven days of giving such oral instructions the contractor shall alter to, add to, or omit from as the case may be in accordance with such notice but the contractor shall not do any work extra to or make any alteration or additions to or omissions from the works or any deviation from any of the provisions of the contract, stipulations, specifications or contract drawings without previous consent in writing of the Architect/Consultant and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Architect/Consultant and the same shall be added to or deducted from the contract value, as the case may be.

21.0 Valuation of Variations

No claim for an extra shall be allowed unless it shall have been executed under the authority of the Architect/Consultant with the concurrence of the SBI as herein mentioned. Any such extra is herein referred to as authorized extra and shall be made in accordance with the following provisions.

The net rates or prices

a) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein. Rates for all items, wherever possible should be derived out of the rates given in the priced BOQ.

b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of works are carried out, otherwise the prices for the same shall be valued under sub clause (c) hereunder.

c) Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the receipt of the letter of acceptance inform the Architect/Consultant of the rate which he intends to charge for such items of work, duly supported by analysis of the rate or rates claimed and the Architect/Consultant shall fix such rate or prices as in the circumstances in his opinion are reasonable and proper, based on the market rate.

d) Where extra work cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender of the BOQ 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/Consultant) the workman's name and materials employed be delivered for verifications to the Architect/Consultant at or before the end of the week following that in which the work has been executed.

e) It is further clarified that for all such authorized extra items where rates cannot be derived from the tender, the contractor shall submit rates duly supported by rate analysis worked on the "market rate basis" for material, labour, hire/running charges of equipment and wastages etc plus 15% towards establishment charges, contractor's overheads and profit. Such items shall not be eligible for escalation.

22.0 Final Measurement

The measurement and valuation in respect of the contract shall be completed within six months of the virtual completion of the work.

23.0 Virtual Completion Certificate (VCC)

On successful completion of entire works covered by the contract to the full satisfaction of the SBI, the contractor shall ensure that the following works have been completed to the satisfaction of the SBI.

a) Clear the site of all scaffolding, wiring, pipes, surplus materials, contractor's labour, equipment and machinery.

b) Demolish, dismantle and remove the contractor's site office, temporary works, structures including labour sheds/camps and constructions and other items and things whatsoever brought upon or erected at the site, or any land allotted to the contractor by the SBI and not incorporated in the permanent works.

c) Remove all rubbish, debris etc. from the site and the land allotted to the contractor by the SBI and shall clear, level and dress, compact the site as required by the SBI.

d) Shall put the SBI in undisputed custody and possession of the site and all land allotted by the SBI.

e) Shall hand over the work in a peaceful manner to the SBI.

f) All defects/imperfections have been attended and rectified as pointed out by the SBI to the full satisfaction of SBI.

Upon the satisfactory fulfilment by the contractor as stated above, the contractor shall be entitled to apply to the Architect/Consultant for the certificate. If the Architect/Consultant is satisfied of the completion of the work, relative to which the completion certificate has been sought, the Architect/Consultant shall within fourteen (14) days of the receipt of the application for virtual completion certificate, issue a VCC in respect of the work for which the VCC has been applied.

This issuance of a VCC shall be without prejudice to the SBI's rights and contractor's liabilities under the contract including the contractor's liability for defects liability period nor shall the issuance of VCC in respect of the works or work at any site be construed as a waiver of any right or claim of the SBI against the contractor in respect of works or work at the site and in respect of which the VCC has been issued.

24.0 Work by other agencies

The SBI/Architect/Consultant reserves the rights to use premises and any portion of the site for execution of any work not included in the scope of this contract which it may desire to have carried out by other persons simultaneously and the contractor shall not only allow but also extend

reasonable facilities for the execution of such work. The contractor however shall not be required to provide any plant or material for the execution of such work except by special arrangement with the SBI. Such work shall be carried out in such manners not to impede the progress of the works included in the contract.

25.0 Insurance of Works

25.1 Without limiting his obligations and responsibilities under the contract the contractor shall insure in the joint names of the SBI and the contractor against all loss or damages from whatever cause arising other than the excepted risks, for which he is responsible under the terms of contract and in such a manner that the SBI and contractor are covered for the period stipulated in clause 28 of GCC and are also covered during the period of maintenance for loss or damage arising from a cause, occurring prior to the commencement of the period of maintenance and for any loss or damage occasioned by the contractor in the course of any operations carried out by him for the purpose of complying with his obligations under clause.

A) The works for the time being executed to the estimated current Contract value thereof, or such additional sum as may be specified together with the materials for incorporation in the works at their replacement value.

B) The constructional plant and other things brought on to the site by the contractor to the replacement value of such constructional plant and other things.

C) Such insurance shall be effected with an insurer and in terms approved by the SBI which approval shall not be unreasonably withheld and the contractor shall whenever required produce to the Architect/Consultant the policy of insurance and the receipts for payment of the current premiums.

25.2 Damage to persons and property

The contractor shall, except if and so far as the contract provides otherwise indemnify the SBI against all losses and claims in respect of injuries or damages to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and maintenance of the works and against all claims proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation of damages for or with respect to :

A) The permanent use or occupation of land by or any part thereof.
B) The right of SBI to execute the works or any part thereof, on, over, under, in or through any lands.
C) Injuries or damages to persons or properties which are unavoidable result of the execution or maintenance of the works in accordance with the contract.
D) Injuries or damage to persons or property resulting from any act or neglect of the SBI, their agents, employees or other contractors not being employed by the contractor or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extant of responsibility of the SBI, their employees, or agents or other contractors for the damage or injury.

25.3 Contractor to indemnify SBI

The contractor shall indemnify the SBI against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the provision sub-clause 25.7.2 of this clause.

25.4 Contractor's superintendence

The contractor shall fully indemnify and keep indemnified the SBI against any action, claim, or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claim made under or action brought against SBI in respect of such matters as aforesaid the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expenses to settle any dispute or to conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the SBI if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Architect/Consultant in this behalf.

25.5 Third Party Insurance

25.5.1 Before commencing the execution of the work the contractor but without limiting his obligations and responsibilities under clause 26.0 of GCC shall insure against his liability for any material or physical damage, loss, or injury which may occur to any property including that of SBI, or to any person, including any employee of the SBI, by or arising out of the execution of the works or in the carrying out of the contract, otherwise than due to the matters referred to in the provision to clause 26.0 thereof.

25.5.2 Minimum Amount of Third-Party Insurance

Such insurance shall be affected with an insurer and in terms approved by the SBI which approval shall not be reasonably withheld and for at least the amount stated below. The contractor shall, whenever required, produce to the Architect/Consultant the policy or policies of insurance cover and receipts for payment of the current premiums.

25.6 The minimum insurance cover for physical property, injury, and death is Rs.5.00 lacs per occurrence with the number of occurrences limited to four. After each occurrence contractor will pay additional premium necessary to make insurance valid for four occurrences always.

25.7 Accident or Injury to Workmen

25.7.1 The SBI shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the contractor or any sub-contractor, save and except an accident or injury resulting from any act or default of the SBI or their agents, or employees. The contractor shall indemnify and keep indemnified SBI against all such damages and compensation, save and except as aforesaid and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

25.7.2 Insurance against accidents etc to workmen

The contractor shall insure against such liability with an insurer approved by the SBI during the whole of the time any person employed by him on the works and shall, when required, produce to the architect/consultant such policy of insurance and receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-contractor the contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that SBI is indemnified under the policy but the contractor shall require such sub-contractor to produce to the Architect/Consultant when required such policy of insurance and the receipt for the payment of the current premium.

25.7.3 Remedy on Contractor's failure to insure

If the contractor fails to effect and keep in force the insurance referred to above or any other insurance which he may be required to effect under the terms of contract, then and in any such case the SBI may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the SBI as aforesaid and also deduct 15% of contract value from any amount due or which may become due to the contractor, or recover the same as debt from the contractor.

25.7.4 Without prejudice to the other rights of the SBI against contractors, in respect of such default, the Bank shall be entitled to deduct from any sums payable to the contractor the amount of any damages costs, charges, and other expenses paid by the SBI and which are payable by the contractors under this clause. The contractor shall upon settlement by the insurer of any claim made against the insurer pursuant to a policy taken under this clause, proceed with due diligence to rebuild or repair the works destroyed or damaged. In this event all the monies received from the insurer in respect of such damage shall be paid to the contractor and the contractor shall not be entitled to any further payment in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.

26.0 Commencement of Works

The date of commencement of the work will be reckoned as the recorded date of handing over site by the SBI or 15 days from the date of issue of Letter of Acceptance of Bank, whichever is later.

27.0 Time for completion

Time is the essence of the contract and shall be strictly observed by the contractor. The entire work shall be completed within a period of 4 (Four) calendar months from the date of commencement. If required in the contract or as directed by the Architect/Consultant, the contractor shall complete certain portions of work before completion of the entire work. However, the completion date shall be reckoned as the date by which the whole work is completed as per the terms of the contract.

28.0 Extension of Time

If, in the opinion of the Architect/Consultant, the work be delayed for reasons beyond the control of the contractor, the Architect/Consultant may submit a recommendation to the SBI to grant a fair and reasonable extension of time for completion of work as per the terms of contract. If the contractor needs an extension of time for the completion of work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion as stipulated in the contract, the contractor shall apply to the SBI through the Architect/Consultant in writing at least 30 days before the expiry of the scheduled time and while applying for extension of time he shall furnish the reasons in detail and his justification if any, for the delays. The architect/consultant shall submit their recommendations to the SBI in the prescribed format for granting extension of time. While granting extension of time the contractor shall be informed the period extended time which will qualify for levy of liquidated damages. For the balance period in excess of original stipulated period and duly sanctioned extension of time by the SBI the provision of liquidated damages as stated under clause 9 of GCC shall become applicable. Further contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

29.0 Rate of progress

Whole of the materials, plant and labour to be provided by the contractor and the mode, manner and speed of execution and maintenance of the works are to be of a kind and conducted in a manner to the satisfaction of the Architect/Consultant. Should the rate of progress of the work or any part thereof be at any time be in the opinion of the Architect/ Consultant too slow to ensure the completion of the whole of the work by the prescribed time or extended time for completion the Architect/Consultant shall thereupon take such steps as considered necessary by the Architect/Consultant to expedite progress so as to complete the woks by the prescribed time or extended time. Such communications from the Architect/Consultant neither shall relieve the contractor from fulfilling obligations under the contract nor he shall be entitled to raise any claims arising out of such directions.

30.0 Work during nights and holidays

Subject to any provision to the contrary contained in the contract no permanent work shall save as herein provided be carried on during the night or on holidays without the permission in writing of the Architect/Consultant, save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the work in which case the contractor shall immediately advise the Architect/Consultant. However, the provision of the clause shall not be applicable in the case of any work which becomes essential to carry by rotary or double shifts in order to achieve the progress and quality of the part of the works being technically required and continued with the prior approval of the Architect/consultant at no extra cost to the SBI.

All work at night after obtaining approval from competent authorities shall be carried out without unreasonable noise and disturbance.

31.0 No compensation for restrictions of work

If at any time after acceptance of the tender SBI shall decide to abandon or reduce the scope of work for any reason whatsoever and hence not require the whole or any part of the work to be carried out, the Architect / Consultant shall give notice in writing to that effect to the contractor

and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work fully but which he did not derive in consequence of the foreclosure of the whole or part of the work.
Provided that the contractor shall be paid the charges on the cartage only of materials actually and bona fide brought to the site of the work by the contractor and rendered surplus as a result of the abandonment, curtailment of the work or any portion thereof and then taken back by the contractor, provided however that the Architect/Consultant shall have in such cases the option of taking over all or any such materials at their purchase price or a local current rate whichever is less.

In case of such stores having been issued from SBI stores and returned by the contractor to stores, credit shall be given to him at the rates not exceeding those at which were originally issued to the contractor after taking into consideration and deduction for claims on account of any deterioration or damage while in the custody of the contractor and in this respect the decision of Architect/Consultant shall be final.

32.0 Suspension of work

The contractor shall, on receipt of the order in writing of the Architect/Consultant (whose decision shall be final and binding on the contractor) suspend the progress of works or any part thereof for such time and in such manner as Architect/ Consultant may consider necessary so as not cause any damage or injury to the work already done or endanger the safety thereof for any of following reasons.

A) On account any default on the part of the contractor, or
B) For proper execution of the works or part thereof for reasons other than the default of the contractor, or
C) For safety of the works or part thereof.

The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Architect/Consultant.

If the suspension is ordered for reasons (b) and (c) in sub-Para (i) above:

The contractor shall be entitled to an extension of time equal to the period of every such suspension. No compensation whatsoever shall be paid on this account.

33.0 Action when the whole security deposit is forfeited

In any case in which under any clause or clauses of this contract, the Contractor shall have rendered himself liable to pay compensation amounting to the whole of his security deposit the Architect/Consultant shall have the power to adopt any of the following course as they may deem best suited to the interest of the SBI.

A) To rescind the contract (of which rescission notice in writing to the contractor by the Architect/Consultant shall be conclusive evidence) and in which case the security deposit of the contractor shall be forfeited and be absolutely at the disposal of SBI.

B) To employ labour paid by the SBI and to supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and materials (the cost of such labour and materials as worked out by the Architect/ Consultant shall be final and conclusive against the contractor) and crediting him with the value of the work done, in all respects in the same manner and at the same manner and at the same rates as if it had been carried out by the contractor under the terms of this contract the certificate of Architect/Consultant as to the value of work done shall be final and conclusive against the contractor.

C) To measure up the work of the contractor, and to take such part thereof as shall be unexecuted, out of his hands, and to give it to another contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess the certificates in writing of the Architects/Consultants shall be final and conclusive) shall be borne by original contractor and may be deducted from any money due to him by SBI under the contract or otherwise, or from his security deposit or the proceeds of sale thereof, or sufficient part thereof.

In the event of any of above courses being adopted by the SBI the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any material or entered into any engagements or make any advances on account of, or with a view to the execution of the work or the performance of the contract and in case the contract shall be rescinded under the provision aforesaid, the contractor shall not be entitled to recover or to be paid any sum or any work thereto for actually performed under this contract, unless, and until the Architect/Consultant will have certified in writing the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

34.0 Owner's Right to Terminate the Contract

If the contractor being an individual or a firm commit any 'Act of Insolvency' or shall be adjusted an insolvent or being an incorporated company shall have an order for compulsory winding up voluntarily or subject to the supervision of Government and of the Official Assignee of the liquidator in such acts of insolvency or winding up shall be unable within seven days after notice to him to do so, to show to the reasonable satisfaction of the Architect/Consultant that he is able to carry out and fulfil the contract, and to give security therefore if so required by the Architect/Consultant.

Or if the contractor (whether an individual firm or incorporated Company) shall suffer execution to be issued or shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the contractor.

Or shall assign or sublet this contract without the consent in writing of the SBI through the Architect/Consultant or shall charge or encumber this contract or any payment due to which may become due to the contractor there under.

a. Has abandoned the contract; or

b. Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for 14 days after receiving from the SBI through the Architect/Consultant written notice to proceed, or

c. Has failed to proceed with the works with such diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or has failed to remove the materials from the site or to pull down and replace work within seven days after written notice from the SBI through the Architect/ Consultant that the said materials were condemned and rejected by the Architect/ Consultant under these conditions; or has neglected or failed persistently to observe and perform all or any of the acts, matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall have been given to the contractor to observe or perform the same or has to the detriment of good workmanship or in defiance of the SBI's or Architect's/Consultant's instructions to the contrary subject any part of the contract. Then and in any of said cases the SBI and or the Architect/Consultant, may not withstanding any previous waiver, after giving seven days' notice in writing to the contractor, determine the contract, but without thereby affecting the powers of the SBI or the Architect/Consultant or the obligation and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been so determined and as if the works subsequently had been executed by or on behalf of the contractor. And, further the SBI through the Architect/Consultant, their agents or employees may enter sheds, machineries lying upon the premises or on the adjoining lands or roads, use the same by means of their own employees or workmen in carrying on and completing the work or by engaging any other contractors or persons to complete the work and the contractor shall not in any was interrupt or do any act, matter or thing to prevent or hinder such other contractor or other persons employed for completing and finishing or using the materials and plant for the works.

When the works shall be completed or as soon thereafter as convenient the SBI or the Architect/Consultant shall give a notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within 14 days after receipt thereof by him the SBI sell the same by public auction after due publication and shall adjust the amount realized by such auction. The contractor shall have no right to question any of the act of the SBI incidental to the sale of the materials etc.

35.0 Certificate of Payment

The contractor shall be entitled under the certificates to be issued by the Architect/ Consultant to the contractor within 10 working days from the date of certificate to the payment from SBI from time to time. The SBI shall recover the statutory recoveries and other dues including the retention amount from the certificate of payment.

Provided always that the issue of any certificate by the Architect/Consultant during the progress of works or completion shall not have effect as certificate of satisfaction or relieve the contractor from his liability under clause.

The Architect/Consultant shall have power to withhold the certificate if the work or any part thereof is not carried out to their satisfaction.

The Architect/Consultant may by any certificate make any corrections required in previous certificate.

The SBI shall modify the certificate of payment as issued by the Architect/Consultant from time to time while making the payment.
The contractor shall submit interim bills only after taking actual measurements and properly recorded in the Measurement book (M.B).

The contractor shall not submit interim bills when the approximate value of work done by him is less than Rs. 30 Lakh and the minimum interval between two such bills shall be one month.

The final bill may be submitted by contractor within a period of one month from the date of virtual completion and Architect/Consultant shall issue the certificate of payment within a period of two months. The SBI shall pay the amount within a period of three months from the date of issue of certificate provided there is no dispute in respect of rates and quantities.

The contractor shall submit the interim bills in the prescribed format with all details.

36.0 Settlement of Disputes and Arbitration

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

i) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the Contractor shall forthwith give notice in writing of his claim, or dispute to the Assistant General Manager (Premises& Estate)/Dy. General Manager (Premises)and endorse a copy of the same to the Architect, within 30 days from the date of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the Bank be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the Assistant General Manager (Premises& Estate)/Dy. General Manager (premises) in the manner and within the time as aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the Assistant General Manager (Premises & Estate) / Dy. General Manager (Premises) in writing in the manner and within the time aforesaid.

ii) The Assistant General Manager (Premises & Estate) / Dy. General Manager (Premises) shall give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of the Assistant General Manager (Premises& Estate) / Dy. General Manager (Premises) submit his claims to the conciliating authority namely the Circle Development Officer/General Manager (Official Language & Corporate Services) for conciliation along with all details and copies of correspondence ex-

changed between him and the Assistant General Manager (Premises& Estate)/Dy. General Manager (Premises).

iii) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned Chief General Manager/Dy. Managing Director (HR) & Corporate Development Officer of the Bank for appointment of an arbitrator to adjudicate the notified claims failing which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.

iv) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the contractor as aforesaid and all claims of the Bank shall be referred for adjudication through arbitration by the Sole Arbitrator appointed by the Chief General Manager at LHO /Dy. Managing Director &Corporate Development Officer at CC/CCEs. It will also be no objection to any such appointment that the Arbitrator so appointed is a technically competent person not below the rank of Superintending Engineer or equivalent position in Public Sector Banks / CPSEs, CPWD, LIC, RBI etc. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another sole arbitrator shall be appointed in the manner aforesaid by the said Chief General Manager/ Dy. Managing Director (HR) & Corporate Development Officer. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

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

vi) It is also a term of this contract that no person other than a person appointed by such Chief General Manager aforesaid should act as arbitrator.

vii) The conciliation and arbitration shall be conducted in accordance with the provisions of the Arbitration & Conciliation Act 1996 or any statutory modification or re-enactment thereof and the rules made there under.

viii) It is also a term of the contract that if any fees are payable to the arbitrator these shall be paid equally by both the parties.

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

37.0 Power Supply

The contractor shall make his own arrangements for power and supply/distribution system for driving plant or machinery for the work and for lighting purpose at his own cost. The cost of running and maintenance of the plants are to be included in his tender prices. He shall pay all fees and charges required for the power supply and include the same in his tendered rates and hold the owner free from all such costs. He has to obtain necessary approval from the appropriate authorities, if required.

38.0 Water supply

The contractor shall make his own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions:

a. That the water used by the Contractor shall be fit for construction purpose to the satisfac tion of the Architect/Consultant.

b. The Contractor shall make alternative arrangements for the supply of water if the arrangements made by the Contractor for procurement of water in the opinion of the Architect/Consultant is unsatisfactory.

37.1 The Contractor shall construct temporary well/tube well in SBI land for taking water for construction purposes only after obtaining permission in writing from the SBI. The contractor has to make his own arrangements for drawing and distributing the water at his own cost. He has to make necessary arrangements. To avoid any accidents or damages caused due to construction and subsequent maintenance of the wells. He has to obtain necessary approvals from the local authorities, if required.at his own cost. He shall restore the ground to its original condition after wells are dismantled on completion of work or hand over the well to the SBI without any compensation as directed by the Architect/Consultant.

39.0 Treasure Trove etc.

Any treasure trove, coin or object antique which may be found on the site shall be the property of SBI and shall be handed over to the Bank immediately.

40.0 Method of Measurement

Unless otherwise mentioned in the schedule of quantities or in mode of measurement, the measurement will be on the net quantities or work produced in accordance with up to date. Rules laid down by the Bureau of Indian Standards. In the event any dispute/disagreement the decision of the Architect/Consultant shall be final and binding on the contractor.

41.0 Maintenance of Registers

The contractor shall maintain the following registers as per the enclosed format at site of work and should produce the same for inspection of SBI/Architect/Consultant whenever desired by them. The contractor shall also maintain the records/registers as required by the local authorities/Government from time to time.

i Register for secured advance
ii Register for hindrance to work
iii Register for running account bill
iv Register for labour

42.0 Force Majeure

42.1 Neither contractor not SBI shall be considered in default in performance of their obligations if such performance is prevented or delayed by events such as war, hostilities revolution, riots, civil commotion, strikes, lockout, conflagrations, epidemics, accidents, fire, storms, floods, droughts, earthquakes or ordinances or any act of god or for any other cause beyond the reasonable control of the party affected or prevented or delayed. However, a notice is required to be given within 30 days from the happening of the event with complete details, to the other party to the contract, if it is not possible to serve a notice, within the shortest possible period without delay.

42.2 As soon as the cause of force majeure has been removed the party whose ability to perform its obligations has been affected, shall notify the other of such cessation and the actual delay incurred in such affected activity adducing necessary evidence in support thereof.

42.3 From the date of occurrence of a case of force majeure obligations of the party affected shall be suspended during the continuance of any inability so caused. With the cause itself and inability resulting there from having been removed, the agreed time of completion of the respective obligations under this agreement shall stand extended by a period equal to the period of delay occasioned by such events.

42.4 Should one or both parties be prevented from fulfilling the contractual obligations by a state of force majeure lasting to a period of 6 months or more the two parties shall mutually decide regarding the future execution of this agreement.

43.0 Local Laws, Acts, Regulations

The contractor shall strictly adhere to all prevailing labour laws inclusive of contract labour (regulation and abolition act of 1970) and other safety regulations. The contractor 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 project.

1) Minimum Wages Act, 1948 (Amended)
2) Payment of Wages Act 1936 (Amended)
3) Workmen's Compensation Act 1923 (Amended)
4) Contract Labour Regulation and Abolition Act 1970 and Central Rules 1971 (Amended)
5) Apprentice Act 1961 (Amended)
6) Industrial Employment (Standing Order) Act 1946 (Amended)
7) Personal Injuries (Compensation Insurance) Act 1963 and any other modifications
8) Employees' Provident Fund and Miscellaneous Provisions Act 1952 and amendment thereof
9) Shop and Establishment Act
10) Any other Act or enactment relating thereto and rules framed there under from time to time.

44.0 SAFETY CODE:

Safety as per annexure 4.32 should be followed.

45.0 Accidents

The contractor shall immediately on occurrence of any accident at or about the site or in connection with the execution of the work report such accident to the Architect/Consultant. The contractor shall also report immediately to the competent authority whenever such report is required to be lodged by the law and take appropriate actions thereof.

46.0 BANK'S BUILDING PROJECT – MAINTENANCE OF RECORDS

A.	Register at the site office
1	Measurement Books
2	Cement Register (Daily Record)
3	Steel Register
4	Steel Consumption Register – Bill Wise
5	Drawing Register
6	Materials at site Register
7	Hindrance Register
8	Concrete cube Test Register
9	File and register for extra/ variation items.
10	Materials test Register and File
11	Site Order Book (in triplicate)
12	Lead caulking Register.
13	Labour Reports and progress Reports Register
14	Site Visit & Instructions Register
15	Certified true copies of the contract

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43. Maintaining Registers at site
44. Agreement
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46. Indebtedness and liens
47. Work performed at contractor’s risk
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51. BIS CODES
52. AS BUILT DRAWING
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SPECIAL CONDITIONS OF CONTRACT

1. INSPECTION OF DRAWINGS:

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

2. CONTRACTOR TO VISIT SITE:

Each tenderer must, before submitting his tender, visit the site of works, so as to ascertain the physical site conditions prices and availability and quality of materials according to specifications before submitting the quotations. No excuse regarding non-availability of any materials or changes in the price will be entertained or extra allowed on that account.

The existing adjacent buildings belonging to Govt/private which are in close proximity of the proposed Interiors, hence the contractor shall cater for all arrangements to carry out the work without causing any disturbance to the occupants by providing screens with bamboo matting or other suitable material approved by Architects/Engineer. The contractor shall ensure that no dust or construction material falls near/around the existing buildings.

3. EXECUTION OF WORK (PRICES TO INCLUDE):

i) The whole of the work as described in the Contract (including the Schedule of Quantities, the specifications and all drawings pertaining thereto) and as advised by the Architect & employer from time to time is to be carried out and completed in all its parts to the entire satisfaction of the Architect & Employer. Any minor details of construction, which may not have been definitely referred to in this contract, but which are usual in sound building, road and all construction practice and essential to the work, are deemed to be included in this contract. Rates quoted in the Tender is inclusive of transportation and other over heads.

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

a)
1. Carrying
2. Hauling
3. Labour
4. Fixing
5. Watering
6. Cleaning
7. Making good and
8. Maintenance etc.

b) The contractor should arrange timely at his cost for all required.

i) Plant, machinery, scaffolding, formwork, ladders, ropes, nails, spikes, shuttering, temporary supports, platforms, tools, all materials etc., required for

executing the work, and protecting them from weather and other normal/natural causes.

ii) Covering/protecting for the walling and other works, during inclement weather, strikes etc., as and when necessary and or as directed.

iii) All temporary canvas covers/covering, lights, tarpaulin, barricades, water shoots etc.

iv) All stairs and steps, thresholds and any other requisite protection for the works.

v) All required temporary weather-proof sheds at such places and in a manner approved by the Architect, for the storage and protection of materials, against the effects of sun and rain.

vi) All required temporary fences, lighting/signboards etc., guards, approaches and roads as may be necessary for execution of the contract works and for safeguarding the public.

c) The Architect & Employer will be the sole judge in deciding as to the suitability or otherwise of the tools/formwork/machinery or plant that may be brought to the work site by the contractor for the proper execution of the work.

d) The rates quoted by the tenderer in the Schedule of Probable items of work will be deemed to be for the finished work.

e) **The rates quoted shall be exclusive of GST.**

4. SCHEDULE OF QUANTITIES:

The Schedule of quantities forms part of the contract, but the Employer reserves the right to modify the same or any part thereof as per variation clause stated herein below. The contractor shall not be allowed any compensation or damages for the work which is so omitted or cancelled or added or substituted by the Architect & Employer.

5. QUANTITIES LIABLE TO VARY:

This clause applies for unlimited variations (+ or -) for items of foundations and those executed below plinth level. For all other items, only in case where + variations of any item exceed 100% of Quantities of respective items given in the schedule of quantities of the contract, such additional quantities of those items shall be treated as extra items and valued as per clause 45 of special conditions of contract, considering of that rates for these items cannot be derived from the contracted items of work.

The quantities indicated in the bill of quantities are only approximate, and hence may vary on either side (+ or -) for accomplishing the works enunciated under the scope of works, in accordance with designs, drawings and specifications and or instructions of the Architect & Employer. Variations may also occur, consequent upon addition or deletion or substitu-

tion of particular items, change of designs or specifications during the course of execution. The contractor, in either case, is bound to carry out the modified quantities up to +100% (plus one hundred percent) variation, without any enhancement in rates and at the same rates as per accepted original tendered rates.

Please refer clause 4, 5 & 6 of General conditions of contract.

6. FILLING OF TENDERS:

The rates and amounts for each tendered item should filled in separate columns provided for in the Schedule of quantities and all the amounts should be totaled up in order to show the aggregate value of the entire tender. All rates shall be filled in both words and figures. These figures and words shall be preceded by 'Rs' and 'Ps' as the case may be, and while filling in words, must end with "Only". Example:

i) Rs.15.25 (Rupees fifteen and paise twenty-five only)
ii) Rs.20.00 (Rupees twenty only)

The rates quoted in figures should be clearly show the rates in full. While filling rates in words, each line should end in '-', and if continued further, last line for the rate of each item shall end in "Only". All corrections, by the contractor in the tender schedule shall be duly attested by the initials of the tenderer. Corrections which are not attested or overwriting in rates may entail the rejection of the tender.

In case the rate written in figures/words/amount differs, the following procedure shall be followed:

a) When there is a difference between the rates in figures and in words, the rates which correspond to the amounts worked out by the contractor will be taken as correct.

b) When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figures or in words, then the rate quoted by the contractors in words shall be taken as correct.

c) When the rates quoted by the contractor in figures and in word tallies, but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.

7. ACCESS OF INSPECTION:

The contractor is to provide at all times, during the progress of the works and the maintenance period, means of access with ladders, gangways etc., and the necessary attendants to move and adopt the same as directed for the inspection or measurement of the work by the Architect and Employer or any other agency employed by the Employer.

8. DIMENSIONS:

In all cases figured dimensions are to be accepted in preference to scaled sizes. Large scale details shall take precedence over small scale details/drawings. In case of any dis-

crepancy, the contractor shall 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,

9. PROGRAMME OF WORKS:

The contractor on starting the work shall furnish to the Employer and Architect a PERT/CPM programme, for carrying out the work stage by stage in the stipulated time, for the approval of Architects and Employer, and follow strictly the approved time schedule by incorporating changes, if any, so authorized by the Architect and Employer, to ensure the completion of construction work ins stipulated time. A graph or chart on individual item/group of items/trades of work shall be maintained, showing the progress both in terms of quantities and value, week by week. The contractor shall submit to the Employer and Architect a weekly progress report stating the number of skilled and unskilled labourers employed on the work, working hours done, quantity of cement, steel and other major items of materials (quantity and value wise) used and corresponding place, type and quantity of work done during the period.

The contractor must inform the SBI/Architects, 3 days in advance of requirement of respective drawings and details by him, from time to time. The contractor shall strictly adhere to the approved programme and arrange for the materials and labour etc., accordingly.

Despite repeated instructions, if the contractor fails to show satisfactory progress of the work, the Employer/Architect may take suitable action as deemed fit, including levying of liquidated damages not exceeding ½% of contract price for delay of every week or part thereof, subject to a limit of total liquidated damages levied under this clause to 5% of contract price without prejudice to any terms and conditions of the contract.

10. OFFICES, STORES, SHEDS ETC., ON THE SITE:

a. The contractor shall provide for all necessary storage on the site, in a specified area for all materials, in such a manner that all such materials, tools etc., shall be duly protected from damages by weather or any other cause. Stores for storage of cement shall have all weatherproof floors, walls and roof and have proper locking arrangements and must be secure. All these must be maintained till the work is completed and so certified by the Architect. Necessary and adequate watch and ward for all such accommodations and stores shall be provided for by the contractor at his cost and same included in the rates/amounts quoted by him. All such stores shall be cleared away and the ground left in good and proper order on completion of this contract unless otherwise expressly mentioned herein.

b. All materials which are stored on the site such as plywood, false ceiling material etc., shall be stacked in such a manner as to facilitate rapid and easy checking of quantities of such materials and prevent deterioration in quality due to water etc.

11. WATER AND ELECTRICITY:

Contractor shall make his own and adequate arrangements for water required for drinking and construction purposes and also for required electric supply at site for satisfactory execution and completion of the work, at his own cost. The contractor shall get the water used for construction purpose tested periodically as per relevant BIS codes at his cost and shall get the same approved from Architect and Employers before using such water for the work.

12. 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 materials of approved make and quality in sufficient quantities at respective markets/sources, to enable him to complete the entire work in the stipulated period.

Contractor will get samples of all materials approved by the Architect and employer, before placing order/purchase/procurement. They shall conform to relevant B.I.S. codes and or tender specifications as applicable.

For all materials, the contractor shall quote for the best quality of the materials of best make/source or supply and they should be got approved by the architect and employer, before procurement.

In case sufficient quantities of approved quality materials from approved sources are not available in time, contractor may have to procure the same from neighboring areas even with longer leads, as required and directed, at no extra cost.

13. SANITARY ACCOMMODATION IN SITE:

The contractor shall provide and maintain at his own cost and expense adequate closet and sanitary accommodation for the use of his workmen and others in accordance with the rules and regulations of the relevant local authorities.

14. FACILITIES TO OTHER CONTRACTORS:

The contractor shall give full facilities and co-operation to all other contractors working at site doing plumbing, Electrical, civil works etc., as directed by the Architect & Employer and shall arrange his programme of work, so as not to hinder the progress of other works. The decision of the Bank, on any point of disputes between the various contractors, shall be final and binding on all parties concerned.

15. TESTING:

The contractor shall, as and when directed by the Bank, arrange to test materials and/or portions of the work at site in any approved laboratory at his own cost, in order to provide their soundness and efficiency. The contractor shall transport all the materials from site to the approved laboratory at his own cost. The contractor shall carryout all the mandatory tests as per list attached at the frequencies stated therein. Even after such tests, any ma-

terials brought to site or incorporated in the works are found to be defective or unsound or not as per approved samples, the contractor shall remove the same and re-erect at his own cost and without any additional time/period for the same, with reference to the date fixed for completing the work. In case these tests are not carried out at the frequencies stated, then proportionate costs of materials not so tested, including cost of testing and quantities of items of work executed with such materials, if otherwise accepted for retention in the work, will be deducted from the dues to the contractor. The deductions will be worked out by the Bank and shall be final and binding on him.

Tolerance on various material and items of work shall be allowed laid down in the documents below and the order of precedence shall be:

a) Relevant Indian Standards Specifications.
b) CPWD norms.
c) Manufacturer's Specifications.

In absence of above Bank's decision basing on the general practice being following shall be final.

16. SITE MEETINGS:

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

17. CUSTODY AND SECURITY OF MATERIALS:

The contractor 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, equipment's etc., including cement and steel at site and ensure that at no time unauthorized persons gains any access at works site.

18. NOTICES:

The contractor shall give all notices and pay all necessary and relevant fees and shall comply with all Acts and Regulations, for the successful completion of the contract work.

19. STATUTORY REGULATIONS:

The whole of the work including sanitation and electrical is to be complied with, as per the requirements and bylaws of the relevant statutory authorities, including Contract Labour (Regulation and Abolition) Act, 1970 of Central Government.

20. MEASUREMENT TO BE RECORDED BEFORE WORK IS COVERED UP:

The contractor shall take joint measurements with the Employer's representative (Project Management Consultant or any Engineer identified by the Bank) before covering up or otherwise placing beyond the reach of measurement any item of work. Should the contractor neglect to do so, the same shall be uncovered at the contractor's expense or in default thereof, no payment or allowance shall be made for such work or the materials with which the same was executed.

21. WORKING AT NIGHT OR ON HOLIDAYS:

The contractor can carry out major work at night, only with prior permission of the Site Engineer of Bank and with proper supervision. However, all concrete work will be carried out only during the day light.

WORKS AT NIGHT:

If the contractor is required to do preliminary works at night, in order to complete the work within the Time Schedule, the contractor shall provide and maintain at his own cost necessary and sufficient barricades/lights etc., to enable the work to proceed satisfactorily without danger. Approaches to the site also shall be sufficiently lighted by the contractor.

22. WORKING ON HOLIDAYS:

No work shall be done on Sunday or other Bank holidays that may be notified by the Bank, without the specific sanction in writing of the Bank or its representatives.

23. ACTION WHERE THERE IS NO SPECIFICATION:

In case of any item/class of work, for which there is no specification mentioned (either in part or full), the same will be carried out in accordance with the relevant CPWD specifications (only for the specifications missing in the contract) and if not available even there (either in part or full) in, relevant standards of BIS shall be followed (only for the portions of specifications missing in the contract specifications and CPWD specifications). Indian standard specifications, subject to the approval of the Architect & Employer.

24. REPORTING OF ACCIDENT TO:

The contractor shall be responsible for the safety of all persons employed by him on the works and shall report serious accidents to any of them, whenever and wherever occurring one the works, to Employer who shall make every arrangement to render all possible assistance. This shall be without prejudice to the responsibility of the Contractor, under the Insurance clause of the General Conditions. Contractor shall take all the precautions as detailed in the safety code attached separately.

25. CLEARING THE SITE ON COMPLETION/DETERMINATION OF WORKS:

The contractor shall clear the site of works as per the instructions of the Bank. The site of works shall be cleared of all men, materials, sheds, huts etc., belonging to the contractor. The site shall be delivered in a clean and neat condition, as required by Bank, within a period one week after the job is completed. In case of failure by the contractor, the Bank, has the right to get the site cleared to his satisfaction at the risk and cost of the contractor.

26. POSSESSION OF BUILDINGS/WORK COMPLETED:

The contractor shall hand over to the Employer possession of the completed works in stages, as and when required, and as directed by the Bank.

The Bank will take over the possession of completed works in stages as directed by the Bank, and defects liability period will commence only from the date of final handing over of all the work accordingly.

27. TYPOGRAPHIC, CLERICAL AND OTHER ERRORS:

The Bank's clarification regarding partially omitted particulars or typographical, clerical and other errors shall be final and binding on the contractors.

28. INFORMATION TO BE SUPPLIED BY THE CONTRACTOR:

The contractor shall furnish to the Bank the following from time to time:

a) Detailed industrial statistics regarding the labour employed by him, etc., every month (within 5th of succeeding month),

b) The Power of Attorney, name and signature of his authorized representative, who will be in charge for the execution of work.

c) The list of technically qualified persons (to be approved by the Bank) employed by him for the execution of the work within 3 days from date of start of work,

d) The total quantity and quality of materials used for the works, every month within 5th of succeeding month.

In all these matters the decision of the Bank shall be final and binding.

29. 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, Strike, lock-out or control or any other reason, beyond the control of the parties and any breach of clauses arising from such Force Majeure conditions as aforesaid shall not be regarded as breach of the provisions of this Agreement.

30. ARCHITECTURAL DRAWINGS AND INSTRUCTIONS:

A set of major drawings, along with the contract documents shall be provided to the contractor. If any clarification or further drawings are required by the Contractor during or before the start of construction work, the contractor shall inform the Bank sufficiently in advance 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, any other drawing/detail is required by the contractor, he will give a minimum of fifteen days' notice to the Bank.

31. COMPLETION OF WORK AND LIQUIDATED DAMAGES:

The work shall be completed within 4 months, and reckoned as under:

(a) 7 days from the date of issue of work order.

or

(b) The day on which the contractor receives the possession of the site whichever is later.

or

(c) The contractor is asked in writing to take over the possession of the site.

Time is the essence of the Contract. The Contractor shall strictly adhere to the programme/chart agreed to. In case the contractor fails to complete the work as mentioned above, the liquidated damages may be imposed at the rate of 0.5% per each week (or part thereof) of delay, subject to a maximum of 5% of contract amount.

32. BILLS OF PAYMENTS:

The minimum value of work for interim payments will be as stated in Appendix. The contractor shall submit interim bills, once a month on the basis of joint measurements recorded at site by the contractor's Employer's and the Banks representatives. The bill will be certified by the Bank within 15 working days from the date of submission of the bill by the contractor, and the make payment as stated in the Appendix to General Conditions of Contract. All such interim payments shall not be considered as an admission of the due performance of the contract or any part thereof in any respect and shall not preclude the requiring of bad unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected at contractor's cost, all as per Bank's instruction and directions.

33. WORKMANSHIP:

Quality of materials and workmanship shall conform strictly to specifications given/stipulated in the tender/contract, and contractor will ensure that the best quality of work will be done to the satisfaction of the Bank, with strict control on the materials, workmanship and supervision.

34. SCHEDULE OF QUANTITES:

Quantities mentioned in the Schedule of Quantities, included in the contract, are approximate and are subjected to variations as per actual site conditions & requirements and as directed by the Bank. The work shall be executed and completed accordingly.

35. SITE SUPERVISION:

The contractor shall appoint at his own cost competent and adequate number of qualified Engineers at site, for (1a) joint measurements and preparations of bills. (2b) for testing materials at site and outside laboratory. (c) for concreting and reinforcement work. (d) for other general supervision. Their appointment shall be approved by the Bank. The site engineers shall not be removed from the site without the written consent of the Bank.

36. ENGAGEMENT OF APPRENTICES:

The Contractor shall during the currency of the contract, when called upon by the Employers, engage and also ensure engagement by sub-contractors and others employed by the contractor in connection with the works such number of apprentices in the categories mentioned in the act and for such period as may be required by the Employers. The contractor shall train them as required under the Apprentice Act 1961 and the Rules made thereunder and shall be responsible for all obligations of the Employers under the said Act, including the liability to make payment of apprentices, as required under the said Act.

37. RATES:

Contractor shall quote all the rates both in figures and in words and any alterations shall have to be initialed by the contractor. Rates quoted by the contractor for the same item in different schedules shall be same, and incase different rates are quoted, the lowest will be taken as correct, and the schedule corrected accordingly. In case of discrepancy between rates given in words and figures or in the amount worked out, the following procedure will be followed:

In case of item rate tender:

The tenderers shall quote their rates for individual items both in words and figures in case of discrepancy between the rates quoted in words and figures the unit rate quoted in words will prevail. If no rate is quoted for a particular item, the contractor shall not be paid for that item when it is executed.

The amount of each item shall be calculated, and the requisite total is given. In case of discrepancy between the unit rate and the total amount calculated from multiplication of unit rate and the quantity the unit rate quoted will govern and the amount will be corrected.

The tenderers should not change the units as specified in the tender. If any unit is changed the tenders would be evaluated as per the original unit and the contractor would be paid accordingly.

The tenderer should not change or modify or delete the description of the item. If any discrepancy is observed, he should immediately bring to the knowledge of the Bank.

38. INCOME TAX:

Income tax shall be deducted at source by the Employer from the contractor's interim and final bill payments as required by law.

39. EXTRA/SUBSTITUTED ITEM RATES:

Such items shall be executed as per directions/instructions of the Architects/ engineers of the employer.

The work on extra/substituted items shall be started only after the receipt of written order from the Bank. Rates for additional/extra or substituted (altered) items of work, which are not covered in the contract cannot be derived from the contract item rates either in full or partly, shall be calculated on the basis of actual costs plus 15% for overhead and profit etc., only to the extent not derivable from the contract item rates.

40. SERVICES DRAWINGS/SHOP DRAWINGS/CATALOGUE:

After getting approval from the Bank, the contractor shall submit to the concerned local authorities' necessary services drawings showing layouts etc., for getting approval of the schemes. On completion, the contractor shall arrange to get Drainage Completion Certificate and other Certificate necessary for obtaining Building Completion certificate. The contractor shall furnish completion drawings of all services in triplicate, showing the work as actual executed, along with levels. Contractor shall submit for approval 4 copies of shop drawings/ catalogue/ equipment characteristics/ manufacturer's specifications, drawings etc., as and when required and directed by the Bank. Costs of all these are deemed to have been included in the respective item rates quoted by the contractor and nothing extra shall be paid on account of any of these requirement/acts.

41. PAYMENT:

No payment whatsoever shall be made by the Employer, if the Contractor abandons the work, due to any site difficulties etc.,

42. PERMISSION:

The contractor shall also obtain necessary permission approvals from the relevant authorities shall be obtained by the contractor at no extra cost.

43. MAINTAINING REGISTERS AT SITE:

The contractor shall maintain registers for consumption of various specials, testing of materials etc., in the proforma which shall be given by the Bank from time to time.

44. AGREEMENT:

The successful contractor shall be required to enter into an agreement in accordance with the Draft Agreement and Schedule of Conditions etc., within 15 days from the date the

contractor is advised by the Bank that his tender has been accepted. The contractor shall pay for all stamps and legal expenses incidental thereto. However, the written acceptance of the tender by the Employer, will constitute as a binding contract between the Employer and contractor, whose tender has been accepted, whether such formal agreement is or is not subsequently executed.

45. INSURANCE:

The contractor shall provide insurance in respect of damage to persons and property and firm insurance as per clause 27 and 28 of General conditions of contract. In addition, he will also insure against riots and civil commotion. The insurance shall also cover third party and all the persons working at site and visitors including contractor's, worker's, Architect's and Employers people, other contractor's workers etc. The contractor shall indemnify the Employer against any claim or compensation or mishaps of whatsoever nature at site during the progress of work.

The contractor shall prove to the Bank from time to time that he has taken out all the insurance policies as required and directed and has paid the necessary premium for keeping the policies valid as per clause 27 & 28 of the General Conditions of Contract.

In case of failure by the Contractor or sub-contractor to effect and keep in force the insurance policies, then the Employer, without being bound to, may pay such premiums as may be necessary and deduct the same from any money due or which may become due to the contractor or recover the same as a debt due from the contractor.

46. INDEBTEDNESS AND LIENS:

The contractor agrees to furnish the Employer from time to time, during the progress of the work as requested, verified statement showing the contractor's total outstanding indebtedness in connection with the work covered by the contract. Before final payment is made, the Employer may require the contractor to furnish the Employer with satisfactory proof that there are no outstanding debts or liens in connection with the contract. If during the progress of the work, the contractor shall allow any indebtedness to accrue to subcontractor or other and shall fail to pay or discharge same within five (5) days after demand, then the Employer may withhold any money due to the contractor until such indebtedness is paid or apply the same towards the discharge thereof.

47. 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, guards, signs, barricades, temporary passages or other protection necessary for the purpose. All work shall be done at the contractor's risk and if any loss or damage shall result from fire or from any other cause, the contractor shall promptly repair 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 or held for use in connection with the work. The work shall be carried on to Employer or of others and without interference with the operation of existing machinery or equipment, if any.

48. PHOTOGRAPHS:

The contractor at his own cost shall take photographs of site and individual buildings during the progress of the work as directed by the Bank and submit two copies of each photograph with minimum size 20 cm x 15 cm to the Bank.

49. INSPECTION BY THE CHIEF TECHNICAL EXAMINERS (VIGILANCE):

The proposed work covered under this tender, during the progress and/ or after completion, can also be inspected by the Chief Technical Examiner/ Technical Examiner or Officers of the Central Vigilance Commission, Government of India, on behalf of Bank to ascertain that the execution of the work has been done with materials and workmanship all as stipulated in the contract and as directed.

Contractor shall afford all reasonable facilities to the above vigilance staff and also provide them with ladders, tapes, plum bob, level etc., as required and directed and also necessary labourers skilled/unskilled to enable them to complete their inspection/study/technical scrutiny and no extra shall be admissible to the contractor on this account.

50. 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 there mentioned elsewhere.

51. BIS CODES

It is compulsory for the contractor to keep all the B.I.S. codes mentioned in this tender document at his cost at the site to ensure the proper supervision/quality of work and materials.

52. AS BUILT DRAWINGS

The contractor shall prepare and submit a set of as-built drawings, duly certified by the Bank's engineer. The set consists of 2 soft copies and 3 sets of hard copies.

53. ADDITIONAL SECURITY DEPOSIT

Contractor whoever becomes L1 by quoting below the permissible limit have to submit Bank Guarantee/ Additional Security Deposit as per Bank's instructions.

GENERAL AND TECHNICAL SPECIFICATIONS

1. These specifications are for the work to be done, items to be supplied and materials to be used in the works as shown and defined on the drawings and described herein all under the supervision and to the satisfaction of the Consultant/Bank.

2. The workmanship is to the best available and of a high standard, use must be made of 'specialist' tradesman in all aspects of the work and allowance must be made in the rates for doing so.

3. The materials and items to be provided by the contractor shall be the best of their respective kinds and as approved by the consultant/Bank in accordance with samples, which may be submitted for approval and generally in accordance with the specifications.

4. Samples of all materials including these specified by name of the manufacturer or the brands, trades name or the Consultant/Bank for their approval before the contractor either orders or delivers in bulk to the site. Samples together with their packings are to be provided by the contractor free of any charge and should any materials be rejected, the same will be removed from the site at the expenses of the contractor.

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

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

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

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

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

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

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

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

13. The contractor shall quote his rate including the cost of materials as specified, corresponding wastages, labour, transportation to worksite, loading, unloading, scaffolding etc but excluding GST.

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

14. Workmanship for Joinery:

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

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

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

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

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

17. The contact surface of dowels, tenons, wedges etc., shall be glued with proper adhesive. Wherever joinery and carpentry works is likely to come in contract with moisture the adhesive shall be water proof.

18. List of Indian Standards referred to:

IS : 1200 : Latest	Methods of Measurements of buildings & Civil Engineering works.
IS : 287 – 1973	Recommendation for maximum permissible moisture content of timber.

19. Inspection and Testing:

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

20. MODE OF MEASUREMENTS

Measurements shall be measured as per ISI.

21. SAFETY CODE

Suitable scaffolds should be provided for workman for all the works that cannot safely be done from the ground or from solid construction, except in cases of short duration works, which 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 materials as well, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450mm and a maximum rise of 300mm. Suitable foot and hand hold of good quality wood or steel shall be provided, and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal to 4 vertical).

Scaffolding or staging more than 300mm above the ground or floor, swung or suspended from an overhead support, shall be erected with stationery supports and shall have guard rails properly attached, bolted, braced and otherwise secured and at least 900mm high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may necessary for the access of persons and delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

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 3-6m above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened, as described in (ii) above.

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 900mm.

Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 M in length while the width between side rails in ring ladder shall be in no case be less than 300mm. For longer ladders, this width should be increased at least 6mm for each additional foot of length. Spacing of steps shall be uniform and shall not exceed 300mm.

Adequate precautions shall be taken to prevent danger from electrical equipment. At the work site, no materials shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall also provide all necessary fencing and lights to protect the public from accident, and shall be bound to bear the expenses of defense of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay damages and costs, which may be awarded in such suit, action or proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any such person.

II. **Demolition:**

Before any demolition work is commenced and also during the progress of the work.

a. All roads and open areas adjacent to the work site shall either be closed or suitably protected.

b. No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

c. All practical steps shall be taken to prevent danger to persons employed, from the risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so over- loaded with debris or materials, so as to render it unsafe.

III. All necessary personal safety equipment as considered adequate by the Bank's engineer should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipment by the concerned.

a. Workers employed in mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

b. Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eyes shall be provided with protective goggles.

c. Those engaged in welding works shall be provided with welder's protective (eye) shields.

d. Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e. When workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manhole and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accidents to the public.

f. The contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, all precautions should be taken.

No paint containing lead or lead products shall be used except in the form of paste or readymade paint.

Suitable face masks should be supplied for use to the workers when paint is ap plied in the formof spray or a surface having lead paint is rubbed and scrapped.

Overalls shall be supplied by the contractors to the workers and adequate facili ties for washing shall be provided to the working painters during and on cessation of work.

When the work is done near any place, where there is risk of drowning, all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions

should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

IV. Use of hoisting machine and shackle including their attachments, in charge and supports shall conform to the following standards or conditions.

a. These shall be of good mechanical construction, sound material and adequate strength and free from any patent defects and shall be kept in good working order.

b. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.

c. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding or give signals to the operator.

d. In case of every hoisting machine and of every chain, ring hook, shackle swivel and pul ley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load, each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

e. In case of departmental machines, the safe working load shall be notified by the Employers. As regards contractor's machines the contractor shall notify the safe working load of the machines to the consultants, whenever he brings any machinery to site of work and get it verified by the consultants.

f. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce and minimize the risk of accidental descent of loads. Adequate precautions should be taken to reduce to the minimum risks of any part of a suspended load becoming accidentally displaced. Sleeves and boots as may be necessary should be provided, whenever workers are employed on electrical installations. The workers should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.

g. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition. No scaffold, ladder, or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place of work.

h. To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the contractor shall be open to inspection by the Bank's engineer.

i. These safety provisions should be brought to the notice of all concerned by display of a notice board at a prominent place of the work spot. The person, responsible for compliance of the safety code, shall be named therein by the contractor.

j. Notwithstanding the above clauses for (a) to (i), there is nothing in these to exempt the contractor from the operation of any other Act or Rules in force in the Republic of India.

22. LABOUR LAWS AND RULES

The Site Engineer shall ensure that the contractor maintains relevant records and fulfils all conditions and requirements in accordance with

a. The payment of Wages Act

b. Employer's Liability Act

c. Workmen's Compensation Act

d. Contract Labour (Regulations & Abolition) Act 1970 and Central Rules 1971.

e. Apprentices Act 1961.

f. Any other Act or enactment relating thereto, and rules framed thereunder from time to time.

The Site Engineer shall refrain from involving himself and the supervisors under him by comments/advice/attempts at mediation in any kind of labour dispute at site. His job is only to report to his superiors any happenings of this sort in an objective manner.

23. EMPLOYER'S RESPONSIBILITY – CONTRACT LABOUR (REGULATIONS AND ABOLITION) ACT 1970 AND RULES 1971

With a view to ensuring that the provisions of the Act are not contravened, the Site Engineer should give particular attention to the following points and see that all the provisions of the Act are enforced:

1. Principal Employer (Banks) is registered as per the Act.

2. Contractor holds a license under the Act from the Local Labour Commissioner for the appointment of Contract labour.

3. Required notice boards, registers and records as provided in section 29 of the Act are maintained by the contractor.

4. Payment of proper wages as per the rules is effected within the prescribed time limits by the contractor.

5. Prescribed facilities and amenities are provided by the contractor.

6. Proper efforts are made by the contractor to set right contravention of law, as soon as the notice pointing out the same is received from the Labour Enforcement Officer, and reports “on action taken” are sent to the Labour Enforcement officer at the earliest with copies to the Employer.

TECHNICAL SPECIFICATIONS

CHAPTER 1

EXTERNAL / HT & INTERNAL ELECTRIFICATION WORKS

The Contractor shall carry out and complete the Electrical work as per standard specifications / as stipulated in this contract and relevant IS recommendations in coordination with other agencies like Interior, AC and civil contractors and to the satisfaction of the Bank. Bank may issue further written instructions, detailed directions and explanations with respect to the specifications, quality or quantity of works or the addition or omission or substitution of any work.

METER BOARD: The Main DB/Meter Board shall be provided in the place free from leakages and in a covered location. The Meter Board shall be as per local ESCOMS requirements and shall be fixed firmly on the wall. Any opening made in the wall for feeder cable entry should be sealed properly after installation to avoid entry of rodents and rain water. The meter Board shall be properly earthed as per the regulatory requirements.

OUTDOOR RMU (2 LBS + 1 VCB): Fabrication and supply of 3 unit outdoor ring main unit panel made out of 2.5 mm cold rolled, mild steel, metal clad, free standing, totally enclosed, cubicle type, fully compartmentalized, outdoor installations and suitable for operation on 11 kV, 3-phase, 50 Hz., AC earthed system.

The panel shall contain the equipment and components as described below, complete with busbar inter connections control wiring, designation labels, caution notices, EB sealing and pad locking facilities, wherever required. Necessary space is provided for entry of HT cables from the bottom through detachable gland plates.

The panel shall be painted with one coat of air drying epoxy primer and two coats of epoxy paint confirming to shade 631 of IS:5.

TECHNICAL PARTICULARS for Transformer

SPECIFICATION:		
Quantity	No.	**1**
Rating	KVA	**NA**
Voltage Ratio	Volts	5000/433V
Tappings	%	+5% to -5% in steps of 2.5% On HV for HV variations
Type of Tap Changer		**Off Circuit Tap Switch**

Type of Cooling		**ONAN**
Vector Group		Dyn11
Total Losses at 50% Load	W	570(As per IS 1180 Level - 3)
Total Losses at 100% Load	W	1700(As per IS 1180 Level - 3)
Impedance	%	4.5(As per IS 1180)
Terminal Arrangement	HV	Cable Box
	LV	Cable Box
Max Ambient Temperature	^{0}C	50
Max Temperature rise in Oil	^{0}C	35 (As per IS 1180)
Max Temperature rise in Winding	^{0}C	40 (As per IS 1180)
No. of Phase and Frequency		3 phase - 50 Hz
Installation		outdoor
Material		Copper
Star Rating		5 star rated by BEE (09.06.2022*)

TECHNICAL SPECIFICATION FORTRANSFORMERS

SCOPE: The following specification covers the supply of transformer required for the proposed project.

GENERAL INFORMATION:Transformer shall be designed, manufactured and equipped with accessories in accordance with this specification and the applicable standards indicated below.

The design and workmanship shall be in accordance with the best engineering practices to ensure satisfactory performance and service lift.

Transformers shall be suitable for the following ambient conditions:

Design ambient temperature – 50° C

Maximum humidity – 100%

CODE AND STANDARDS: The transformers shall conform to the requirement of the revisions of the following codes and standards:

Sl.	Code	Standard for
1	IS: 1886	Installation and maintenance of transformers, code of practice.
2	IS: 2026 (Part I to IV)	Power Transformers.
3	IS: 3639	Power Transformers, fittings and accessories.
4	IS: 2099	Bushings for alternating voltage above 1000 V

Sl.	Code	Standard for
5	IS: 5-1961	Colours for ready mixed paints and enamels.
6	IS: 648	Non-oriented electrical steel sheets for magnetic circuits.
7	IS: 1866	Code of practice for maintenance of insulating oil.
8	IS: 2166	Guide for insulating co-ordination.
9	IS: 6600	Guide for loading of oil-immersed transformers.

Wherever Indian Standards are not available, the transformer shall conform to relevant International Standard.

DESIGN CRITERIA: The transformers shall be oil filled type and designed for natural cooling (ON).

The transformer impedance shall be as specified to limit the fault level on the LV side. The neutral of the low voltage winding will be solidly grounded.

The transformers with all accessories shall be capable of withstanding the thermal and mechanical effects of short circuits at the terminals of any winding without adverse effect.

Account shall be taken of the different forms of system fault that can be arise in service, such as line to earth faults and line faults associated with the relevant system and transformer earthing conditions. The short circuit levels will be as specified in the Data Sheet.

The transformer shall be capable of continuous operation at its rated output without exceeding the temperature limits as below (50° C above ambient temperature).

In top oil by thermometer – 50° C
In winding by resistance – 55° C

Overheads shall be allowed within the conditions defined in the loading guide of the applicable standard. Under these conditions no limitations by terminal bushings, on-load tap changers or other auxiliary equipment shall apply.

The transformer shall be capable of continuous normal operation at its rated output under the following conditions:

Voltage varying by +/- 10%
Frequency varying by +/- 3%

The transformer shall be designed and constructed so as not to cause any undesirable interference in radio or communication circuits.

Steel bolts and nuts exposed to the atmosphere shall be either galvanised or zinc passivated.

Nuts, bolts and pins used inside the transformer and tap changer compartments shall be provided with lock washers or locknuts.

Transformer design shall take care of protection against surge voltage.

Internal design of transformer shall ensure that air is not trapped in any location.

The neutral terminal of windings shall be designed for the highest over current that can flow through this winding.

The design of transformers shall be such as to reduce noise and vibration to the level obtained in good modern practice. The noise level shall not be more than 5db above the NEMA TR-1.

All rated quantities such as voltage ratios, impudence, load losses and no load losses subject to the Supplier's guarantees shall be within the tolerances given in applicable standards.

TRANSFORMER TANK: The tank shall be of electrically welded construction and fabricated from sheet steel of adequate thickness. Tanks shall be hydraulically tested to ensure that they are leak proof and subjected to vacuum test.

The tank shall have adequate strength to withstand without any deformation (i) mechanical shock during transportation and (ii) oil filling by vacuum.

The tank shall also be provided with two numbers grounding pads for earthing.

The transformer tank shall be provided with sets of bi-directional flat wheels for rolling the transformer parallel to either centre lines.

Jacking pads, lifting eyes and pulling lugs shall be provided to facilities lifting and movement of the transformer, filled with oil. All heavy removable parts shall be provided with eye bolt for case of handling.

The transformer top shall be provided with a detachable tank cover with a bolted flanged gasket joint. Lifting lugs shall be provided for removing the cover. If necessary the surface of the cover shall be suitably stopped so that it does not retain rain water.

Adequate space shall be provided at the bottom of the tank for collection of sediments.

The transformer base shall be designed to permit skidding of the complete transformer unit in any direction. Pulling eyes shall be provided for moving the transformer in either directions.

The material used for gaskets shall be Nitrile Rubber or approved equivalent. Gasketted joints for the tank and manhole covers bushings and other bolted attachments shall be oil tight and so designed that the gasket will not be exposed to the weather.

Tank shall be provided with a pressure release device which shall operate at a pressure below the test pressure for the tank and radiators. The device shall be rain-proof after blowing and shall be provided with a device visible from ground to indicate operation. An equalizer pipe connecting the pressure relief device to the conservator shall be supplied.

Materials in contact with oil shall be such as not to contribute to the formation of acid in oil. Surface in contact with oil shall not be galvanised or cadmium plated.

Inspection covers of manholes of sufficient size shall be provided for access to leads, windings, bottom terminals of bushings and taps.

Oil sampling taps shall be provided with valve at top and bottom to collect sample of oil from the tank for testing.

To facilitate the oil filtration by streamline filter, suitable inlet and outlet taps with valves at the bottom and at the top of the tank on diagonally opposite corners shall be provided. The valve at the bottom may be used as drain valve.

Thermometer pocket for top oil temperature measurement by liquid thermometer shall be provided.

Marshaling kiosk boxes, etc. shall be weatherproof having a degree of protection to IP:54.

Cooling tubes or radiators shall permit every part of the cooling surface to be cleaned by hand and shall be suitably braced to protect them from mechanical shock. Each radiator tank shall be detachable type and provided with oil isolating valves at either sizes.

The transformer tank shall be fitted with a double diaphragm type of explosion relief vent at the top with equaliser pipe connection to oil conservator.

Explosion relief vent should be located on the top cover and directed in such a way that on bursting of diaphragm the oil forced out will not fall in any of the auxiliary equipment of the transformer and the other electrical equipment in the vicinity.

CORE AND COIL: The core shall be built up of high quality, low loss, non-ageing high permeability grain oriented, cold rolled silicon steel lamination with very low magnetization losses and annealed to relieve stresses and develop excellent magnetic properties.

The core clamping frame shall be provided with lifting eyes for the purpose of taking and inspecting the core with drawings mounted thereon and shall have ample strength to take the full weight of the core and winding assembly. The core assembly shall be electrically connected to the transformer tank for effective core earthing.

All insulating material shall be of proven design. Coils shall be so insulated that voltage stresses are minimum.

The winding shall be from electrolytic copper conductor of high conductivity with suitable class “B” insulation. The windings shall be duly sectionalized. Similar coils shall be connected by accessible joints braced or welded and finished smooth.

Coil assembly shall be securely positioned with spacers, pressed board cylinders, barriers and shall be so arranged as to allow free circulation of the oil.

All leads from the windings shall be suitably supported to prevent damage from vibration or short circuit stresses.

The core and coil assembly shall be rigidly braced and fixed on to the tank so that no shifting or deformation occur during transport and installation or during short circuits.

The finally assembled core with all the clamping structure shall be free from deformation and shall not vibrate during operation.

The core clamping structure shall be designed to minimise eddy current loss.

The end turn on the high voltage windings shall have reinforced insulation to withstand any of the voltage surges likely to occur during switching or any other abnormal system condition.

INTERNAL EARTHING: All internal metal parts of the transformer, with the exception of individual laminations, core bolts and their individual clamping plates shall be earthed.

The top clamping structure shall be connected to the tank by a copper strap. The bottom clamping structure shall be also earthed.

The magnetic circuit shall be connected to the clamping structure at one point only and this shall be brought out of the top cover of the transformer tank through a suitably rated bushing. A disconnecting link shall be provided on transformer tank to facilitate dis-connections from the ground for IR measurement purpose.

TAPPING'S: Off circuit taps as specified shall be provided on the high voltage winding.

The transformer shall be capable of delivering its rated output at any tap position.

The winding including the tapping arrangement shall be designed to preserve the electromagnetic balance between HV and LV winding at all voltage ratios.

INSULATING OIL: The insulating oil shall conform to the latest revision of IS:335, properly inhibited for prevention of sluding.

The necessary first filling of oil shall be supplied for the transformer. 10% excess oil shall also be provided (to take care of wastages) in non-returnable containers suitable for outdoor storing.

TRANSFORMER BUSHING: All transformer bushings shall conform to the requirements of the latest revisions of IS:2099 and IS:3347.

All porcelain used in bushings shall be homogenous, nonporous uniformly glazed to brown colour and free from bilsters, burns and other defects.

Stresses due to expansion and contraction in any part of the bushing shall not lead to deterioration.

Fittings made of steel or malleable iron shall be galvanised. Each bushing shall be so coordinated with the transformer insulation that all flash over will occur outside the tank.

The bushings shall be located so as to provide adequate electrical clearances between the bushings and also between bushing and ground.

TERMINAL ARRANGEMENT: The HV terminals shall be brought to an air insulated disconnecting chamber forming a weatherproof assembly.

The secondary terminations shall be brought to an air insulated disconnecting chamber which inturn connected to bus-ductable box connection as required forming a weatherproof assembly.

The cable boxes shall have all standard facilities suitable for XLPE/PILC/PVC cables/copper/Aluminium wire bus duct as mentioned in the data sheet.

The disconnecting chamber shall be air insulated. Bushings, drain plugs, relief vent, levels glass,

removable links and removable covers shall be provided for the dis-connecting chamber. Plates through which high current carrying conductors pass shall be non-magnetic.

Phase to phase and phase to ground clearances within the chamber shall be such as to enable either the transformer or each cable to be subjected separately to HV tests.

NEUTRAL TERMINAL: The size of the neutral bushings shall be as that of phase bushings. On the LT side two bushings shall be provided for neutral, one through top side wall bushings to the LV bus duct and other connection to earthing. A neutral CT of required ration, burden and knee point voltage shall be mounted inside the transformer LV cable box for restricted earth fault protection. This will be a matched current transformer which will be mounted in HT switchgear. Secondary of the CT to be brought out to a marshaling box of IP:54 suitable for connection to control cable.

Earth portion of the cable end box shall be provided with 2 nos. grounding pads suitable for purchaser's 50x6 mm G.I/Copper flat.

TEMPERATURE INDICATORS: One set of dial type thermometers with a pointer to register the highest temperature attained for oil temperature indication/winding temperature indication shall be supplied and fitted inside the marshalling box. Two separate sets of contacts shall be provided, one for alarm and the other for circuit breaker trip on higher temperature.

BUILT ON RADIATORS: The following accessories shall be provided for radiator:

Top and bottom shut-off valves and blanking plates on each radiator.

Lifting lugs.

Top oil filling plug.

Air release plug at top.

Oil drain plug at bottom.

CONSERVATOR TANK: The conservator tank shall be connected with the main tank by a pipe through buchholz relay (having separate sets of contacts for alarm and tripping) with isolating valves at both ends.

The conservator tank shall be provided with dial type (magnetic) level indicator visible from ground level and fitted with low oil level alarm contact.

A weather proof dehydrating breather shall be provided with silica gel as the dehydrating agent.

MARSHALING BOX: A dust and weather proof marshaling box suitable for outdoor use shall be provided. The box shall contain terminal blocks meant for Buyer's control cable connections and all auxiliary devices. The marshaling box shall be provided with a blank detachable plate for mounting the control glands. The control cable glands are not within the scope of this specification. The marshaling box shall have glass front for reading the temperature indicators from outside. Degree of protection IP: 54.

GAS AND OIL ACTUATED RELAY (BUCHHOLZ RELAY): A double float type Buchholz relay as per specified standards shall be provided if specified in data sheet. All gases evolved in the

transformer shall collect in this relay. The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation. A 5 mm copper pipe shall be connected from the relay test cock to a valve located about 1.25 M above ground level to facilitate sampling with the transformer in services. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure. These contacts shall be wired upto the transformer marshaling box. The relay shall be provided with shut-off valves on the conservator side as well as the tank side.

WIRING: Wiring for winding and oil temperature indicators, magnetic level gauge, buchholz relay contacts and neutral CT etc. provided on the transformer shall be wired upto the terminal blocks inside the marshaling box by means of 2.5 Sq.mm for CT's) flexible PVC copper cables. Wires shall be identified at the terminations by numbered plastic ferrules.

Not more than two wires shall be connected to one terminal. 10% spare terminals shall be provided.

Auxiliary supply to all indications, alarms and trip contacts provided shall be suitable for operation on a suitable AC/DC system.

All devices and terminal blocks within the marshaling box shall be clearly identified by symbols corresponding to these used on applicable schematic or wring diagram.

METAL TREATMENT AND PAINTING: All steel surfaces shall be thoroughly cleaned by sand blasting or chemical agents as required to produce a smooth surface, free of scale, rust and grease.

All paints shall be carefully selected to withstand tropical heat, rain, etc. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.

Tanks are coated inside with oil and heat resistant paint. The external surfaces shall be given a coat of high quality zinc chromate primer followed by two coats of high quality paint as per IS:5-1961.

TOLERANCES ON PERFORMANCE GUARANTEES: The permissible tolerances on the performance guarantee are as follows:

Sl.	Particulars	Description
A	Voltage ratio at no. load	0.5% of the declared ratio. A percentage of the declared ratio equal to 10% of the actual percentage impedance voltage at rated current.
B	No. load loss	+/- 10%
C	Load loss	+/- 10%
D	Impedance voltage at rated current	+/- 10% on principal tap
E	Efficiency & regulation	In accordance with the tolerances on impedance voltage and losses as applicable.

REJECTION: Buyer may reject any transformer if during tests or services any of the following conditions arise:

1 no. load and load losses exceeds the guaranteed value by 15% or more.

Impedance voltage at principal tapping differs the guaranteed value by +/- 10% or more.

Transformer fails during any of the tests.

Transformer is proved to have been manufactured not in accordance with the agreed specification.

Buyer reserves the right to retain the rejected transformer and take it into service until the supplier replaces at no extra cost to Buyer, the defective transformer by a new acceptable transformer.

Seller shall repair or replace the transformer within a reasonable period to the Buyer's satisfaction at no extra cost to the Buyer.

DIMENSIONS: The overall dimensions of the transformer shall be indicated alongwith the offer.

TESTS:

Routine Tests: During manufacture and on completion, transformers shall be subjected to the routine tests as laid down in IS:2026-1977 as amended upto date.

These includes:

Resistance measurement of all windings at the rated voltage connection on all taps.

Ratio tests at the rated voltage connection on all taps.

Polarity and phase relation tests.

Impedance and load loss at rated current on the rated voltage and connection on all taps.

No-load loss and current at rated voltage on the rated voltage connection and at 95, 110 and 115% of the rated voltage.

Power frequency withstand test.

Insulation resistance tests in windings, auxiliary devices, core and tank.

In addition, the following tests shall be performed on each transformer:

After fabrication, each tank fitted with all valves, covers, etc. shall be tested for leaks with normal head of liquid plus 0.352 Kg. /Sq.cm for a period of 12 hours. If any leak occurs, the test shall be conducted after all leaks have been repaired.

The tank shall be subjected to vacuum as per CBIP specifications.

TYPE TESTS: Typical type test certificates shall be furnished for approval before dispatch of

equipments.

TEST CERTIFICATES: Three (3) copies of test certificates including for bought-out items like relays, valves, etc. shall be furnished to the Buyer, along with complete identification of data including serial number of the transformer.

The Buyer will depute his representative to witness any (or) all the tests.

If the tolerance exceeds the limits prescribed in standards, Buyer has right to reject the transformer.

SPARES: The spares as in data sheet shall be quoted along with the supply of transformers.

PACKING: Packing should be of high quality to avoid any damage of the equipment's during transit.

DRAWING/DETAILS/DOCUMENTS: A general outline drawing of each transformer shall be furnished with the offer. The drawing shall indicate dimensions net weights, quantity of insulating oil, general constructional features, dimensions of the largest part to be transported etc.

After acceptance of the offer, the Seller shall furnish the following drawings for approval.

General arrangement drawing showing the plan, front elevation, side elevation, foundation plan complete with details of bill of materials, detailed dimensions, net weights, details/drawings of HV/LV terminals, cable boxes, LT trunking arrangement, clearances between HV/LV terminals, ground etc.

Rating and terminal marking plates details.

Control and wiring diagram for marshaling boxes, with interconnection details of cable sizes and number of cores required between various equipment such as relays, marshaling box, etc.

Four copies of all final approved drawings shall be furnished by the Seller before dispatch of the equipment.

Any other relevant drawing and data necessary for operation and maintenance purpose shall be furnished.

Three sets of instructed manual of transformer, its various fittings and gauges (the manual shall clearly indicated the installation methods, check-ups and tests to be carried out before commissioning of the equipment's) shall be furnished to Buyers. One set of the above shall be submitted to Architects.

STANDARD FITTING AND ACCESSORIES FOR 160KVA 5000/433VOCTCONAN TRANSFORMERS

Sl.	Description
1	Oil filling hole with cover on conservator.
2	Conservator with sump and drain plug.
3	Oil level indicator on conservator.

	Thermometer pocket plug.
4	Air release plug on tank cover.
5	Lifting lugs for complete transformer.
6	Off circuit tap switch with key and lock.
7	Drain valve cum bottom filter valve.
8	Top filter valve.
9	Silica gel breather.
10	Base channels with towing holes.
11	Earthing terminals.
12	Rating & diagram plate.
13	Manufacturer's logo.
14	Radiators.
15	Explosion Vent.
16	HVCable Box.
17	LV Cable Box.
18	Additional Neutral Bushing.
19	Explosion Vent.

SPECIFICATION FOR
ERECTION, TESTING & COMMISSIONING OF TRANSFORMER

Inspection, storage, installation, testing and commissioning of transformer shall be in accordance with IS 10028 (Part III), and manufacturer's instructions.

Whenever stated, transformer will be delivered without oil, filled with inert gas and without bushings and externally mounted accessories as applicable. The contractor shall:

Assemble the transformers with all fittings such as bushings, cooler banks, radiators, conservators, valves, piping, cable boxes, marshalling boxes, OLTOG, cooling fans/pumps etc.

Arrange for oil filtration before filling.

Provide wedges/clamps to rigidly station all transformers on rails.

Connect up the transformers terminals.

Lay and terminate the Owners cables/conduits between all the accessories mounted on the transformer marshalling Kiosk. If necessary, the oil filtration equipment shall be arranged by the Contractor.

Care shall be taken during handling of insulation oil to prevent ingress or moisture of foreign matter. In the testing, circulating, filtering or otherwise handling of oil, rubber hoses shall not be used. Circulation of filtering of oil, the heating of oil by regulated short-circuit current during drying runs and sampling and testing of oil shall be in accordance with the manufacturers instructions and specified Code of Practice.

HANDLING: Transformer and all its accessories shall be handled carefully in its upright position as indicated in the packing case. Lifting lugs and jacking pads shall be used for lifting of the transformer. While using jacking pads utmost care shall be taken in proper application of jacks. Where transformer is dragged or pulled on sleer or rollers. The traction eyes provided at the bottom frame shall be used with suitable wire ropes and shakles.

STORAGE: Transformer shall be stored under shelter in a place free from fire and explosion hazards. Care should be taken to see that moisture will not contaminate Oil inside the tank by checking all gaskets, bolts and nuts and accessories.

CABLING AND EARTHING: Cable shall be terminated at cable boxes only after IR values are, measured and found to be in order. Cable termination shall be carried out with utmost care and H.T. cable box shall be filled with compound, after jointing and termination. Neutral of the transformer shall be connected to two separate and distinct earth station through double run of earth tapes of suitable size. The body of the transformer shall also be provided with effective earthing as per the drawings and specifications.

MOUNTING AND ERECTION: The transformer shall be lifted by lugs or shackles or by any other suitable means (such as dragging on rollers) and mounted on the concrete plinth prepared for the purpose. Care shall be taken to see that the transformer is not titled during lifting and erection. The roller shall be checked to prevent movement of the transformer after being positioned on the plinth. Adequate and necessary clearance from walls, other equipments, etc. shall be provided as indicated on the drawings.

All the accessories and parts such as conservator tank Buchholz relay, breather, explosion vent, thermometer etc. should be mounted on the transformer, Tighten all bolts and nuts should be tightened and checked for any leakage. Any leakages shall be rectified.

Check the oil level and top it up, if necessary with new oil dielectric strength of oil shall be tested as per IS/BS specifications, with an electric gap of 4 mm + or –0.02 mm polished Electrodes of 12.5 mm dia using three samples of oil drawn from the oil drain valve of the transformer. The test voltage shall be raised from 15kV to 50kV in about 10 seconds. At-least two samples of oil must withstand 40kV voltage for one minute.

The insulation resistance of the winding shall be measured with 1100 V DC megger and results shall correspond to the factory test results.

If dielectric strength of oil is not as per the requirement, the drying of oil shall be done with the help of suitable streamline oil treatment plant. While drying of oil is being done, the transformer shall be provided with suitable lagging alround. The temperature of oil in the spray tank shall not exceed 80°C during conform to the conditions laid down in IS Specifications.

Phasing out test with 416 Volts applied to HV winding and voltage across LV winding being checked.

Measurement of neutral and body earth resistance with earth testing megger. The values shall not exceed 1 to 2 ohms as required.

Functioning of bucholz relay (for alarm and trip), thermometer, oil level indicator shall be checked and adjusted, if necessary. The transformer shall be checked and only after the above tests are conducted and approval of neutral and body of the transformer shall be done as per I.E. regulations and the requirements and of local authorities.

However general mode of earthing arrangement indicated on the drawings. The contractor shall supply all the materials and labour for erection and commissioning of transformers.

TESTS: The following Preliminary checks and Pre-commissioning tests shall be carried out before coming the transformers.

PRELIMINARY CHECKS:

Compare nameplates details with the specifications.

Check for any physical damage, in particular of bushings.

Check tightness of all bolts, nuts, clamps, gasketing and connecting terminals.

Check cleanliness of bushings.

Check for oil leakage and oil level.

Breather condition, check whether.

Check for clearance, particularly in case of bus ducts.

Water tightness of terminal boxes and bus ducts.

Earthing of transformer tank and neutral bushing.

Releasing of air from bushings (very important) buchholz relay.

Check that the transformer is correctly installed with reference to its phasing.

Pre Commissioning tests:

Test the transformer oil for dielectric strength.

Phase sequence test.

Line connection as per phasing diagram.

Insulation resistance of control wiring.

Buchholz relay operation (for alarm and trip).

Operation test of all protecting devices and interlocks.

Calibration of temperature indicator (oil and winding) and temperature relays.

OLTC gear/control panel operational test.

OLTC control indicating and alarm circuits.

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 continuos 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 hard wares 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 ad other compartments shall have covers screwed on with captive screws so that these do not fall of 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 drawings to 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 busbars shall be of Hard drawn high conductivity electrolytic grade (63401 WP) Aluminium confirming to IS:5082. The busbars shall be of uniform cross section along its entire length. No tapering of the busbar 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 busbars shall be provided with PVC sleeves of high quality.

The joints in the busbars 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 busbars for the 3 phases and neutral. The Busbars fed by the incomer shall run continuously throughout the length of the switchboard.

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

The busbars 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. Busbars 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 busbars shall be uniform throughout.

Busbars shall be supported on tough, non-hygroscope, 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. Busbars 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 busbars and between the phase and earth busbars in air shall be not less than 25 mm and 16 mm respectively.

All busbars 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 hard ware shall have adequate cove r of the protective cadmium coating to obviate corrosion while the boards is in service.

The busbars 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 busbar chamber.

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

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

The busbars shall run horizontally in a separate enclosure but may run in an enclosure located within the power busbar 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 corre-

sponding 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/marking 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. Identifications 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 property 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 POLYETYLENE) 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 over-heated.

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 e done only with the help of cable drum rolling supports. The cables shall be laid in trenches over the rollers places 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. Oneither 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 guage 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 900 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 of 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 vise-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 cal 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 alongwith conduit accessories such as bends, inspections 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.

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 alongwith 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 colored as follows: Phase R: Red Color of wire, Phase Y: Yellow Color of wire, Phase B: Blue Color of wire, Neutral: Black Ground: Yellow Green or Green (One color 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 form 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 of1000mm (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 dhori & 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 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 conceal-

ing.

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 15amperes may be of the piano flush type and the switch shall be 'ON' When the knob is down.

Lamp holders : Lamp holders for use on brackets and the like shall have not less than 1.3 cm nipple and all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with shade carriers. Where centre contact Edison screw lamp holders are used, the outer or screw contact shall be connected to the 'middle wire' or the neutral or to the earthed conductor of the circuit.

Lamps: All incandescent/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 side line.5 Amps and 15 Amps socket-outlet shall normally be fixed at any convenient place 60 cm above the floor level or near such level as indicated in drawing. 15 Amps socket outlets in kitchen shall be fixed at convenient place 23cm above the working

platform. In a room containing a fixed bath or shower, there shall be no socket outlet and there shall be no provision for connecting a portable appliance.

5. Recessed 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 over lapping 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 ELECTRI

ELECTRICAL WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY THE CONSULTANT/ ENGINEER

S.No	Description	Approved Makes
1.	FRLS copper wire	Finolex, RR Kabel, Kundan, Polycab, Havells
2.	Modular switches and sockets	MK- Blenze plus, Panasonic Vision, Legrand – Arteor / Myrius
3.	MCBs and DBs	Legrand-DX3, L&T, Siemens, GE, Havells
4.	UG cables (1.1)	Polycab, Kei, Universal, Finolex
5.	UG cable gland and lug	DOWELLS / JAINSON / LOTUS
6.	Tel cable	RR Kabel, Anchor, Delton, Finolex
7.	MCCB	Legrand, L&T, Schenider, Siemens
8.	PVC conduits 2mm thick (ISI)	Avon Plast, Aeroplat, Sun, Vasavi
9.	MS conduits (ISI)	BEC, Vimco, Gupta
10.	Krone block housing	Henzel
11.	Capacitors	Epcos, Electronica, Baluk, ABB, Schenider
12.	Timers	Schenider, L&T, Legrand
13.	Contactors	GE, Siemens, Schenider, L&T, Legrand
14.	Speaker	Bosch, JBL, Yamaha
15.	Music system cable	Finolex, RR Kabel, Polycab
16.	APFC relay	Epcos, Baluk, ICD
17.	APFC panel	Wave form, ICD, Unitech
18.	Change over switch	Legrand, L&T,CS
19.	Multi-function meter	ICD, Socomec, Conserve, Rishab, Trinity
20.	Exhaust fan& ceiling fan	Crompton, Bajaj, Usha,
21.	Light fittings	Wipro, Crompton, Philips, Bajaj, GE, Havells
22.	Current Transformer	KAPPA/RISHAB/KALPA
23.	Indicating lamps	SCHNEIDER / ABB / L&T

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

FORM OF BANK GUARANTEE

(On non-judicial stamp paper of Rs.500/-)

Place: ……..
Date:……...

BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT
B.G.No._____ Value Rs._____
State Bank of India,
(Address)

Sub: Bank Guarantee of Rs……towards Security Deposit for the work offer State Bank of India.
(Name of Branch/Office)

Dear Sir,

WHEREAS (Name and address of contractor/ vendor) (hereinafter called the Contractor) have entered into contract for (Name of Work) with State Bank of India (SBI) as mentioned in the letter of SBI's Consultants (Name & address of consultants) vide their letter No…….. dated …….and the correspondence and tender relating thereto which is hereinafter referred to as "the said contract" the Contractor has now agreed to produce a Bank Guarantee amounting to 2% of the contract value less earnest money deposit of Rs…….(Rupees only), to State Bank of India for performing their part of the contract obligations.

AND WHEREAS in terms of said contract, the contractor is required to furnish to State Bank of India a Guarantee of a Scheduled Bank for a value of Rs…… to be valid upto (date).

AND WHEREAS (Name of Bank and its branch) having their office at (address) the Guarantor, at the request of the contractor hereby furnishes a PBG in favour of State Bank of India and Guarantees in the manner hereinafter appearing.

In consideration of the premise, we (name of Bank and its branch) having our office at (address) here after called the "Guarantor" (which expression shall include its successors and assigns) here by expressly, irrevocably &unreservedly undertake and guarantee under that if the Contractor fails to execute the work according to his obligations under the said contract, then not withstanding any dispute between State Bank of India and the contractor the Guarantor shall, on demand without demur and without reference to the contractor pay to State Bank of India immediately any sum claimed by State Bank of India under the said contract up to a maximum amount of Rs._____ (Rupees only).

In case the amount demanded by State Bank of India is not paid within 48 hours of receipt of demand, he Guarantor agrees to pay the aforesaid amount of Rs. _____/- (Rupees _____only).

i) Such payment shall be notwithstanding any right the contractor may have directly against State Bank of India or any disputes raised by the Contractor with State Bank of India or any suits or proceedings pending in any competent court or before any arbitrator. State Bank of India's writ-

ten demand shall be conclusive evidence to the Guarantor that such payment is payable under the terms of the Contract and shall be binding in all respect on the guarantor.

(ii) The Guarantor shall not be discharged or released from the the undertaking and Guarantee, by any arrangement, variations made between SBI and the Contractor and or indulgence shown to the contractor by SBI, with or without the consent and knowledge of the guarantor or by alterations in the obligations of the contractor by any forbearance, whether as to payment, time performance or otherwise.

(iii) This guarantee shall remain valid until or as may be caused to be extended by the contractor or until discharged by SBI in writing whichever is earlier.

(iv) This guarantee shall be a continuing guarantee and shall not be revocable during its currency except with the previous written consent of SBI.

(v) This guarantee shall not be affected by any change in the constitution of the contractor, by absorption with any other body or corporation or dissolution or otherwise and this guarantee will be available to or enforceable against such body or corporation.

(vi) In order to give effect to this guarantee SBI will be entitled to act as if the Guarantor were the Principal debtor and the Guarantor hereby waives all and any of its rights or surety ship.

(vii) This guarantee shall continue to be in force notwithstanding the discharge of the contractor by operation of law and shall cease only on payment of the full amount by the Guarantor to SBI of the amount hereby secured.

(viii) This guarantee shall be in addition to and not in substitution for any other guarantee or security for the contractor given or to be given to SBI in respect of the said contract.

(ix) Any notice by way of request and demand or otherwise here under may be sent by post or any other mode or communication to the guarantor addressed as aforesaid and if sent by post it shall be deemed to have been given at the time when it would be delivered in due course of post and in providing such notice when given by post it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of SBI that the envelope was so posted shall be conclusive.

(x) These presents shall be governed by and constructed in accordance with Indian Law.

Notwithstanding anything contained hereinbefore the liability of the guarantor under this guarantee is restricted to a sum of Rs._____.

This guarantee will remain valid upto _____unless a demand or claim under this guarantee is made in writing on or before _____ the guarantor shall be discharged from all liability under the guarantee thereafter.

Dated the ……
For (Name of Bank)
(Signature/s with designation/s of signatory/ies)
(Name and Stamp of Bank)