SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD., (SBIIMS)  
(WHOLLY OWNED SUBSIDIARY OF SBI)

INVITES TENDERS ON BEHALF OF LHO, HYDERABAD.  
in a TWO BID THROUGH E-TENDERING PROCESS.

Contractors who are on the panel of SBI, Hyderabad Circle, (LHO) in the appropriate category 
are only eligible. (Contractors should submit proof of the same)

FOR

PROPOSED INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) WORKS FOR 
STATE BANK OF INDIA,

SME BALANAGAR BRANCH, AO SECUNDERABAD.

Last date for submission of E Tender: 3.00 P.M. (IST) on 21/04/2020.
Opening of E Tenders: 3.10 P. M. (IST) on 21/04/2020.

The Vice president,  
SBI Infra Management Solutions Pvt. Ltd.  
Ground Floor, Adj Commercial Branch, SBI LHO campus,  
Bank Street, Koti,  
Hyderabad – 500 095  
Phone:040-23466310/46
NOTICE INVITING TENDER. (NIT)

Online E-Tenders are invited from competent contractors who are on the banks approved panel of Hyderabad LHO in the appropriate category as per eligibility for INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) Works for STATE BANK OF INDIA, SME BALANAGAR BRANCH, AO SECUNDERABAD, HYDERABAD. (TELANGANA.)

by State Bank of India Infra Management Solutions Pvt. Ltd.,(SBIIMS)

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The SBIIMS reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.
INSTRUCTIONS TO CONTRACTORS.

1. This tender is for the "INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) Works for STATE BANK OF INDIA. It is a Single Bid containing Technical and Price Bid.

   In their own interest the contractors are advised to use their own specific seals and desist from using currency coins for the purpose. Tenders with incomplete or broken seals are liable to be rejected, the matter solely resting at the discretion of the EMPLOYER/ARCHITECTS. If a Contractor does not quote for one or more items, the Tender will be considered as incomplete and will be rejected.

2. Clients/Architects reserve to itself the right to accept or reject any tender without assigning any reason for doing so and does not bind itself to accept the lowest or any other tender.

3. General Specifications are for guidance only. The latest ISI codes and Specifications and mode of measurements will be referred to during execution.

4. The term "THE ARCHITECTS" in the said conditions shall mean SBIIMS.

5. Employer or Client shall mean Vice President, State Bank of India Infra Management Solutions Pvt. Ltd.,

6. Tenders are to be uploaded directly to M/S e-procurement Technologies Limited. E-mail: shubhangi@auctiotiger.net
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1. TENDER FORM

PROJECT: PROPOSED INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) WORKS FOR STATE BANK OF INDIA,

REF : INTERIOR WORKS

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 your Architects.

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 and at which rate the items specified amount to Rs.101.00LAKHS.

I/We are depositing as Earnest Money a sum of Rs. 1,01,000/- (Rupees of One Lakh One Hundred Only) in favor of SBIIMS, Hyderabad along with this tender for due execution of the work at my/our tendered rates together with any variations which shall be adjusted by the Architects 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 12months 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 your Architects for this contract work.

I/We agree to and to get the work, workers, employees (of contractor, Architect & 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. Draft Insurance deed will be got vetted by the Architect, before obtaining the same. 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/we are inclusive of same.

Yours faithfully,
Contractor’s Signature

Address: _____________________________ Date: _____________________________

__________________________________  ________________________________

__________________________________  ________________________________

__________________________________  ________________________________

__________________________________  ________________________________
2. NOTICE TO CONTRACTOR

ADDRESS:

________________________________________

________________________________________

________________________________________

PROJECT: PROPOSED INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) WORKS FOR STATE BANK OF INDIA,

REF : INTERIOR WORKS

Dear Sirs,

1. On behalf of our clients, M/s SBIIMS Hyderabad, we have pleasure in inviting you to tender for the aforesaid work.

2. The scope of work broadly as given below is for Proposed INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) Works for STATE BANK OF INDIA.

3. Tender Documents should be filled and uploaded on the site of M/S e-procurement Technologies Limited. E-mail: shubhangi@aucliotiger.net

4. 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.

5. 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.

6. The tender documents must be filled in English and all the entries 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.

7. Each and every one of all erasures and additions/alterations made, while filling the tender, must be attested by initials of the tenderer. Over-writing of figures must be attested by initials of the tenderer. Overwriting of figures is not permitted. Failure to comply with either of these conditions will render the tender void. After submission of the tender no advice or any change in rate or conditions will be entertained. All the rates should be quoted both in figures and words. In-case of any discrepancy in rates quoted in words/figures and the amounts, the rate quoted in words shall be taken as final and binding.

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

9. TOTAL SECURITY DEPOSIT : shall comprise of:
The intending tenderer shall deposit with SBIIMS HYDERABAD, by Demand Draft a sum of Rs. 1,01,000/- (Rupees One Lakh One Hundred Only) 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, without 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.

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 in favour of SBIIMS HYDERABAD within 14 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.

Together with the money paid under clause 11.1 & 11.2 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 the Architect’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 Architects and agreed to by the Bank. Also refer condition 23(ii) on Page 7 of Volume 1.

Within one month of the receipt of intimation from the Architects 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.

All compensation or other sums of money payable by the contractors to the clients, under the terms of this contract, may be deducted from the Security Deposit or from any sum that may be or may become due to the contractor on any account whatsoever, and in the event of the Security deposit being reduced by reasons of any such deductions, the contractor shall within 90 DAYS of being asked to do so make good in cash or cheque, any sum which have been deducted from his security deposit.

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, neither the Architect nor the clients will be responsible for such damage or wash out of the construction work.

Time is the essence of the contract. The work should be completed within 45 DAYS from the date of commencement. The date of commencement shall be within ONE day after confirmation.

a) The day two weeks from the date of issue of work order.
Or

b) The day on which the contractor receives the possession of the site which ever 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 90 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 ½% 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) as per clause 31 of the General conditions of contract.

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 Architects 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 tenderers. 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.

17. Our clients, SBIIMS, 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 or SBIIMS 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 or SBIIMS. 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 or SBIIMS 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) Airconditioning works (3) Fire fighting systems & (6) 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 as stipulated under para 9 on page 12 of Volume I, Appendix to General Conditions of contract,
ii) Balance 50% of Retention money will also be released as noted under(i) above, subject to submission of a Bank Guarantee, to the satisfaction of SBI for an equivalent amount. This Bank Guarantee shall be valid upto completion of defects/removal liability period plus 3 months.
3. ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made the ____________ day of __________ 2020 between ________________________________________________________________
_______________________________________________________________________
of _____________________________________________________________________
_____________________________________
_____________________________________
(hereinafter called the “Employer”) of the one part and ___________________________
of ________________________________________ (hereinafter called “The Contractor”) of the other part,
where as the Employer is desirous of
“______________________________________________________________________” executed and has
caused drawings, conditions of contract, specifications and schedule of quantities etc., describing the
works prepared by Bank.

AND WHEREAS the SAID DRAWINGS numbered as per list attached inclusive of and the conditions of
contract, specifications and schedule of quantities etc., have been signed by or on behalf of the parties
hereto.

AND WHEREAS THE CONTRACTOR has agreed to execute upon and subject to the conditions set forth
in the Schedule hereto (hereinafter referred to as “Said Conditions”) the works shown upon the said
drawings and described in the same specifications and included in the said schedule of quantities for
such sum as may be ascertained to be payable in terms of the Bills of Quantities, and which sum is
estimated to be Rs. ____________ (Rupees____________________________________________________
(hereinafter referred to as “Said Contract Amount”).

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said sum to be paid at the times and in the manner set forth in the said
conditions, the contractor shall upon and subject to the said conditions, execute and complete the
work shown in the said drawings and described in the said specifications.

2. The Employer shall pay the contractor the said sum or such sums as shall become payable
hereunder at the times and in the manner specified in the said conditions.

3. The term “Architect” in the said conditions shall mean the said Bank, or in the event of their
ceasing to be the Architect for the purpose of this contract, such other person as shall be
 nominated for that purpose by the Employer, not being a person to whom the contractor shall
object for reasons considered to be sufficient by the Arbitrator mentioned in the said conditions
provided always that no persons subsequently appointed to be the Architect under this contract
shall be entitled to disregard or over-rule any previous decision or approval or direction given or
expressed by the Architect for the time being.

4. Tender documents containing work order Notice to the Contractor, Conditions of Contract,
Appendix thereto, Special Conditions of Contract, Specifications and Schedule of Quantities with
the rates entered therein, shall be read and studied as forming part of this agreement and the
parties hereto shall respectively abide by and submit themselves to the conditions and stipulations
and perform the agreement on their part respectively in such conditions contained.

5. The contract is neither a fixed lumpsum contract or a piece work contract, but is a contract to carry
out work in respect of the entire works to be paid for according to actual measured quantities,
including variations from BOQ at the rates contained in the Schedule of rates and Probable bill of quantities or as provided in the said conditions.

6. The Employer through the Architect, reserves to himself the right of altering the drawings and natures of the work, of adding/substitution to or omitting any items of work or having portions of the same carried out through alternate agencies without prejudice to this contract.

7. Time shall be considered a the essence of this agreement and the contractor hereby agrees to commence the work soon after the site is handed over to him but within 90 DAYS reckoned from the date of issue of work order to execute the work, as provided for in the said conditions and complete the entire work in 45 DAYS subject to nevertheless to the provisions for extension of time.

8. This agreement and contract shall be deemed to have been made in Hyderabad and any questions or dispute rising out of or in any way connected with this Agreement and Contract shall be deemed to have arisen in Hyderabad and only the courts in Hyderabad shall have jurisdiction to determine the same. The limitation period will be 90 days from the date of dispute having arisen.

AS WITNESS our hand this ___________ day of ___________ 2020

Signed by the said in the presence of:

WITNESS : SIGNATURE

NAME :

ADDRESS : 

EMPLOYER

WITNESS : SIGNATURE

NAME :

ADDRESS :
4. APPENDIX TO GENERAL CONDITIONS OF CONTRACT

1. Earnest Money Deposit (EMD): Rs. 1,01,000/- (Rupees of One Lakh One Hundred Only)

2. Initial Security Deposit (ISD): 2% of contract value including EMD.

3. Period of completion: 45 DAYS

4. Defects Liability period: 12 months after completion as recorded in the completion certificate.

5. Agreed Liquidated Damages: ½% of contract amount per week of delay subjected to a maximum of 5% of contract value.

6. Period of final measurement: Three months after completion as recorded in the completion certificate.

7. Minimum value of work to be Executed for issue of interim Certificates for making payment: Minimum Rs.30.00 Lakhs

8. a) Retention money from each bill: 10% of gross value of each interim bill, subject to 8(b) below.

   b) Total retention money including Earnest money and initial security Deposit: 5% of the contract value.

9. Release of Security deposit after Virtual completion: 50% of the total security to be released 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, and its associated banks in the prescribed manner and valid till the completion of defects liability period of 12 months plus 3 months.

10. Period for honouring certificate: 15 working days from date of Architects certificate of payment for interim bills and 45 working days for final certificate.

WITNESS:

DATE: SIGNATURE OF THE CONTRACTOR WITH DATE
5. INDEX TO GENERAL CONDITIONS OF CONTRACT

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3. Drawings and Specifications
4. Schedule of Quantities
5. Sufficiency of Schedule of Quantities
6. Errors in schedule of Quantities
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8. Authorities, Notices, Patent rights and royalties
9. Materials and workmanship to conform to description.
10. The setting out
11. Removal of all offensive matters
12. Opening up works
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26. Other persons engaged by the Employer
27. Insurance in respect of damage to persons and property
28. Contractor’s All risk policy
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30. Commencement and completion
31. Delay and extension of time
32. Damages for Non-completion
33. Failure by contractor to comply with Architect’s instructions
34. Architect’s delay in progress.
35. Supervision of works
36. Prime cost and provisional sums
37. Certificates and payments
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39. Termination of contract by the Employer.
40. Termination of contract by the contractor.
41. Matters to be finally determined by the Architects
42. Settlement of dispute (Arbitration)
6. GENERAL CONDITIONS OF CONTRACT

1. **INTERPRETATIONS:**

   In constructing these conditions and the specifications, schedule of quantities and contract agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise required:

   a. “Employer” shall mean Vice President, SBIIMS – Hyderabad and shall include his/their heirs, legal representatives, assignees and successors.

   b. “Contractor” shall mean ______________________________________ and shall include his/their heirs, legal representatives, assignees and successors.

   c. “Banks Engineer” shall mean any Engineer who is employed by SBIIMS or any other Engineer appointed from time to time by the Employer, and certified in writing to the Architect and the contractor, to act as Engineer for the purpose of the Contract in place of the said engineer.

   d. “Architects” shall mean any Engineer/ representative appointed by SBIIMS.

   e. “Works” shall mean the works to be executed in accordance with contract specifications, quantities etc.

   f. “Contract” shall mean the Articles of Agreement, the General Conditions, Special Conditions, the Appendix, the Schedule of Quantities, Specifications and drawings, work order etc., attached hereto and duly signed.

   g. “Contract Price” shall mean the sum named in the Tender, subject to such amount additions thereto or deductions there from as may be made under the provisions, hereinafter contained.

   h. “Site” shall mean the Premises, on which the works are to be, provided, by the Employer or Architect for the purpose of the Contract.

   i. “Drawings” shall mean the drawings referred to in the contract etc., and any modifications of such drawings approved in writing by the Architect and the Bank and such other drawings as may from time to time be furnished or approved in writing by the Architect and Employer.

   j. “Notice in Writing” or written notice shall mean a notice in writing, typed or printed characters sent (unless delivered personally or otherwise provided to have been received) by registered post to the last known private or business address or registered office of the address and shall be deemed to have been received, when in the ordinary course of post, it would have been delivered.

   k. “Act of Insolvency” shall mean any Act of Insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any act amending such original.
m. “Net Prices” if in arriving at the Contract Amount, the contractor has added to or deducted from the total of the items of the Tender any sum, either as a percentage or otherwise, then the net price of any items, in the tender, shall be the sum arrived at by adding to or deducting from the actual figure appearing in the Tender, as the price of that item, a similar percentage or proportionate sum. Provided always that in determining the percentage or proportion of the sum so added or deducted by the contractor, the total amount of any Prime cost items and provisional sums of money shall be deducted from the total amount of the Tender. The expression “net rates” or “net prices” when used with reference to the contract or account shall be held to mean rates or prices so arrived at.

n. “Virtual Completion” shall mean that the building is in the opinion of the Architect and Employer, sufficiently completed for occupation by the Employer, in relation to the scope of work of this contract.

o. Words importing persons include firms and corporations. Words importing the singular only, also include the plural and vice versa, where the context requires.

2. **SCOPE OF CONTRACT:**

The contractor shall carry out and complete the said work in every respect in accordance with this contract with the directions of and to the satisfaction of the Architect and Employer. Architect, with the approval of the Employer, may issue further drawings and/or written instructions, details, directions and explanations, which are hereafter collectively referred to as “Architect’s Instructions” in regard to:

a. The variations or modifications of the designs, quality or quantity of works or the addition or omission or substitution of any work.

b. Any discrepancy in the drawings or between the Schedule of Quantities/ or drawings and/or specifications etc.

c. The removal and/or re-execution or any works executed by the contractor.

d. The removal from the site of any material brought there on by the contractor, and the substitution of any other material there from.

e. The dismissal from the works of any person employed thereupon.

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

g. The amending and making good of any defects under clause 24 “Removal of Improper works and Materials”.

h. The shifting the exiting counters and kept in running condition without effect of banking working hours(arrangements electrical LAN etc).

The contractor shall forthwith comply and fully execute any work comprised in such Architect’s instruction, provided always that instructions, directions and explanations given to the contractor or his representative upon the works by the Architect shall, if involving a variation, be confirmed in writing by the contractor or within 7 days, and if not
zdissented from in writing within further 7 days by the Architect, such shall be deemed to be the Architects instructions within the scope of contract.

If compliance with the Architect’s instructions as aforesaid involved work and/or expense and/or loss beyond that contemplated by the contract, then unless the same were issued owing to some breach of this contract by the contractors, the employer shall pay to the Contractor on the Architect’s certificate, the price of the said work (as an extra to be valued as herein after provided) and/or expense and/or loss.

3. DRAWINGS AND SPECIFICATIONS:

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

No drawing shall be taken as in itself an order for variation, unless in addition to the Architect’s signature, it bears express works stating that it is intended to be such an order or bears a remark “VALID FOR CONSTRUCTION”. No claim for payment for extra work shall be allowed, unless the said work shall have been executed under the provisions of clause 8 (Authorities, notices, patents, rights and royalties) or by the authorities, of directions in drawing of the Architect as herein mentioned.

One complete set of the signed drawings and a copy of contract document (specifications and schedule of quantities etc) shall be furnished by the Architect to the contractor. The Architect shall furnish within such time as he may consider reasonable, one copy of any additional drawings, which in his opinion may be necessary for the execution of any part of the work. Such copies shall be kept at the works, and the Architect or his representatives shall, at all reasonable times have access to the same and shall be returned to the Architect by the Contractor, before the issue of the final certificate. The original contract documents shall remain in the custody of employer.

Please refer clause 36 of Special conditions of contract.

4. SCHEDULE OF QUANTITIES:

The Schedule of Quantities unless otherwise stated shall be deemed to have been prepared in accordance with the Standard Procedure of the Architects and shall be considered to be approximate and no liability shall attach to the Architect for any error/variations that may be discovered therein.
Please refer Clause 5, 6 and 40 of Special conditions of contract.

5. **SUFFICIENCY OF SCHEDULE OF QUANTITIES:**

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

Please refer clauses 5, 6 and 39 of Special Conditions of Contract.

6. **ERRORS IN SCHEDULE OF QUANTITIES:**

Should any error appear in the Schedule of Quantities, other than in the Contractor’s prices and calculations, it shall be rectified and such rectification shall not vitiate the contract but shall constitute a variation of the contract and be dealt with as an authorized extra or deduction.

7. **CONTRACTOR TO PROVIDE EVERYTHING NECESSARY:**

The contractor shall provide everything necessary for the proper execution of works according to the true intent and meaning of the drawings, specifications and the Schedule of Quantities etc., taken together, whether the same may or may not be particularly shown or described there in, provided the same can be inferred there from. The several document forming the contract are to be taken as mutually explanatory to one another; detailed drawings and figured dimensions in preference to scale, and special conditions in preference to General conditions and particular specifications in preference to General specifications.

In case of discrepancy between the Schedule of Quantities, the specifications and/or the drawings, the following order of preference shall be observed:-

i) Description of Schedule of Quantities.
ii) Particular specifications and special condition, if any.
iii) Drawings.
iv) C.P.W.D. specifications.
v) Indian Standard specifications of B.I.S.

If there are varying or conflicting provisions made in any document forming part of the contract, the Architect shall be the deciding authority, with regard to the intention of the document and his decision shall be final and binding on the contractor.

Any error in description, quantity or rate in schedule of quantities or any omission therefrom shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works expressed therein according to drawings and specifications or from any of his obligations under the contract.

The contractor shall make his own arrangements for providing water, for carrying out the work, at his own cost. If water from any source other than Municipal main is to be used for construction, the same shall be tested at the contractor’s cost, and a report submitted to the Architect for his approval, before such water is used for the works. Temporary Electrical connections shall be
obtained by the contractor to facilitate execution and completion of work at their cost and all the charges there of should be borne by them.

The contractor shall supply, fix and maintain at his cost, during the execution of any works, all the necessary scaffolding, staging, hoarding, watching and lighting during nights as well as by day required not only for the proper execution and protection of the said works, but also for the protection of the public and the safety of any adjacent road, streets, cellars, vaults, pavements, walls, houses, buildings and all other erections, matters or things. The Contractor shall take down and remove any or all such scaffolding, staging, etc., as occasion shall require or when ordered or so to do, and shall fully reinstate at his own cost and make good all the matters and things disturbed during the execution of the works to the satisfaction of the Architects.

Please refer clause 7 of Special conditions of contract.

8. **AUTHORITIES, NOTICES, PATENT RIGHTS AND ROYALTIES:**

The contractor shall conform to the provisions of the statutes relating to the works, and to the regulation and by laws of any local authority, and of any water, lighting and other companies or authorities, with whose systems the structures are proposed to be connected; and shall before making any variation from the drawings or specifications, that may be necessitated by so conforming, give to the Architects a written notice, specifying the variations proposed to be made and the reason for making it and apply for instruction thereon. In case, the contractor shall not within ten days receive such instructions, he shall proceed with the work conforming with the provisions, regulations or by laws in question.

The contractor shall bring to the attention of the Architect all notices required by the said acts, regulations or bylaws to be given to any authority, and pay to such authority or to any Public Officer all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Architects.

The contractor shall indemnify the Employer against all claims in respect of patent rights, designs, trademarks or name or other protected rights in respect of any constructional plant, machine, work or material used for or in connection with works or temporary works and from and against all claims, demands, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto. The Contractor shall defend all actions arising from such claims, unless he has informed the Architects, before any such infringement and received their permission to proceed, and shall himself pay all royalties, licence fees, damages, cost and changes of all and every sort that may be legally incurred in respect thereof. Please refer clause 23 of special conditions of contract.

9. **MATERIALS AND WORKMANSHIP TO CONFORM DESCRIPTION:**

All materials and workmanship shall, so far as procurable be of the respective kinds specified in the Schedule of Quantities and/or specifications and in accordance with the Architect’s instructions and the contractor shall on the request of the Architects furnish to them all invoices, accounts, receipts and the other vouchers to prove that the materials comply therewith. The contractor shall at his own cost arrange for and/or carry any test of any materials, which the Architect & Employer may require. The costs of materials used for testing, packing, transportation and testing shall be borne by the contractor and his quoted rates/amounts shall include all such expenses/contingencies.
9a. In case of non-availability of specified Make/brand of any material the alternate make/brand will be given by the Employer/Architect.

10. THE SETTING OUT:

The Contractor shall at his own expense, set out the works accurately in accordance with the plans and to the complete satisfaction of the Architect. The Contractor shall be solely 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. If at any time any error shall appear during the progress or on completion of any part of the work, the contractor shall at his cost rectify such error if called upon to the satisfaction of the Architects/Employer. The work shall from time to time be inspected by the Architect and/or his representatives, but such inspections shall not exonerate the contractor in any way form his obligation to remedy any defects, which may be found to exist at any stage of the work or after the same is completed, at his own cost.

11. REMOVAL OF ALL OFFENSIVE MATTERS:

All debrix arising out of the work shall be disposed off as per the rules and regulations of the Local authorities concerned.

12. OPENING UP WORKS:

In the event of the Architect / Employer feels that the work is not carried out as per tender specifications, contractor at his cost shall open the concealed work at his cost for which no Extra cost will be paid.

12. CONTRACTOR’S SUPERINTENDENCE & REPRESENTATIVE ON THE WORKS:

The contractor shall give all necessary personal superintendence during the execution of the works and so long thereafter as the Architect may consider it necessary until the expiration of the “Defects Liability Period” stated in clause 25. The Contractor shall meet the Architect or his representative, whenever required and so informed by the Architect.

The Contractor shall maintain and be represented at site at all times, while the work is in progress, by a responsible and efficient foreman, approved by the Architect and who must thoroughly understand all the trades entailed and be constantly in attendance while the men are at work. Any directions, explanations, instructions or notices give by the Architect & Employer to such foreman shall be deemed to have been given to the contractor and shall be binding as such on the contractor. The Foreman shall be thoroughly conversant with the English language and should be able to read, write and speak English.

13. DISMISSAL OF WORKMEN:

The contractor shall on the request of the Architect and Employer immediately dismiss from the works any person employed thereon who may, in the opinion of the Architect and Employer be unsuitable or incompetent or who may misconduct himself, and such person shall not again be employed or allowed on the works without the permission of the Architect & Employer.

14. ACCESS TO WORKS:
The Architect, the Employer and any person authorised by them shall at all reasonable times have free access to the works and to the workshops, factories or other places where materials are being prepared or constructed by the contract and also to any place where the materials are lying or from which they are being obtained. The Contractor shall give every facility to the Architect and the Employer and their representatives for inspection and examination and test of the materials and workmanship. No person, unless authorised by the Architect or the Employer, except the representatives of Public authorities, shall be allowed on the works at any time. If any work is to be done at a place other than the site of works, the contractor shall obtain the written permission of the Architect for doing so.

15. **EMPLOYER’S REPRESENTATIVE/PMC:**

The Employer may appoint an assistant to the Engineer, any Site Engineer or Project Management Consultant (PMC), who shall be the representative of the Employer. The duties of the Employer’s representatives are to watch and supervise the works and to test any materials to be used and of workmanship employed in connection with the works. He shall have no authority either to relieve the contractor of any of his duties or obligations under the contract, or except those expressly provided hereunder, to order any work involving delay or any extra payment by the Employer or any variation of or in the works.

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

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

16. **ASSIGNMENT OF SUB-LETTING:**

The works included in the contract shall be executed by the contractor and the contractor shall not directly or indirectly transfer, assign or underlet the contract or any part/share thereof or interest therein without the written consent of the Architect and Employer, and no undertaking shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the works during their progress.

17. **SUB-CONTRACTORS:**

All specialists, merchants, tradesmen, and others, executing any work or supply and fixing any goods for which prime cost prices or provisional sums are included in the Schedule of Quantities and/or specifications, who may be nominated or selected by the Architect and employer and hereby declared to be sub-contractors employed by the Contractor, are herein referred to as nominated sub-contractors. No nominated sub-contractors shall be employed on or in connection
with the works, against whom the contractor shall make reasonable objection or (see where the Architect and contractor shall otherwise agree), who will not enter into a contract provided.

a. The nominated sub-contractors shall indemnify the contractor against the same obligations in respect of the sub-contract as the contractor is under, in respect of this contract.

b. The nominated sub-contractors shall indemnify the contractor against claims in respect of any negligence by the sub-contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, the property of the contractor or under any Workman’s Compensation Act in force.

c. Payment shall be made by the contractor to the nominated sub-contractor, within 14 days of receipt of the Architect’s certificate, provided that before any certificate is issued, the contractor shall upon request furnish to the Architect proof that all nominated sub-contractor’s account included in the previous certificates have been duly discharged; in default whereof the Employer may pay the same upon a certificate of the Architect and deduct the amount thereof from any sums due to the contractor. The exercise of this power shall not create any contract between Employer and Sub-contractor.

18. **VARIATIONS NOT TO VITIATE CONTRACT:**

The contractor shall when directed in writing by the Architect, omit from or vary works shown upon the drawings or described in the specifications or included in the priced schedule of quantities, but the contractor shall not make any alterations or additions to or omissions from the works or any deviations from the provisions of the Contract without such authorizations or direction in writing from the Architect and Employer.

No claim for any extra item or deviations shall be allowed, unless it shall have been executed by the Authority of the Architect and Employer as herein mentioned. Any such extra item or deviation is hereinafter referred to as an authorised extra item or deviation. No variations i.e., additions, omissions or substitutions shall vitiate the contract.

The rate of items not included in the bill of quantities shall be settled by the Architect and Employer in accordance with the provisions of clause 21, hereof.

19. **MEASUREMENTS OF WORKS:**

The Architect/PMC may from time to time intimate the Contractor that he requires the works to be measured and the contractor shall forthwith attend or send a qualified agent to assist PMC/Architect’s representative in taking measurements and calculations, and to furnish all particulars or give all assistance required by either of them.

Should the contractor no attend or neglect or omit to send such an agent, then the measurements and calculations, and to furnish all particulars or give all assistance required by either of them.

Should the contractor not attend or neglect or omit to send such an agent, then the measurements taken by the PMC/Architect’s representative approved by them shall be taken to be the correct measurements. The mode of measurements wherever not mentioned in contract documents be taken in accordance with the Indian Standard of Method of measurements of building works (I.S.1200 – 1958) and its revisions, if any. In case of any discrepancy between various contract
documents on mode of measurements, the mode given in Bill of Quantities will take precedence over others.

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

All authorised extra works, omissions and all variations made without the Architect’s knowledge, if substantially sanctioned by him in writing shall be included in such measurements.

22. **PRICES FOR SUBSTITUTIONS/EXTRA ETC., ASCERTAINMENT OF:**

Should it be found after the completion of the works from measurements taken (in accordance with the previous paragraph) that any of the quantities or amounts specified for the works in the priced schedule of quantities of work thus ascertained are less or greater than the amounts and/or tender or that any variations, is made, and any substituted/extra (new) items have been executed, the valuation of such quantities/items, amounts or variations, unless previously or otherwise agreed upon, shall be made in accordance with the following rules:

a. The net rates or prices in the original tender shall determine the valuation of the extra (additional quantities and or extra/substituted item of work), where that work is of a similar character and executed under similar conditions of the work priced therein. This applied to extra and substituted items of work to the extent, they are similar in nature to the items in the contract.

b. The net prices given in the original tender shall determine the value of the items omitted, provided if omissions vary the conditions under which any remaining items of work are carried out, the prices for the same shall be valued under thereof.

c. Where extra/substituted item of works are not of similar character (either partly & fully) and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items of works are carried out or if the amount of any omission or additions relative to the amount of the whole of the contract works or to be any part thereof shall be such that in the opinion of the Architects the net rate or price contained in the priced schedule of quantities or tender or for any item of the work involves less or more beyond that reasonably contemplated by the Contractor or is by reason of such omission or addition rendered unreasonable for in-applicable, the Architect shall fix in consultation with the Employer such other rates or prices as in the circumstances he shall think reasonable and proper, which shall be final and binding on the contractor. For extra and substituted items this will apply for portions of the items for which, items of similar nature are not available in the contract.

d. Where extra and or substituted items of work cannot be properly measured or valued, the contractor shall be allowed based on the net local day work rates and wages for the district and prevalent market rates for materials etc., at the time of ordering that item; provided that in either case vouchers for wages paid specifying the daily time (and if required by the Architect, the workmen’s name) and materials employed at or before the end of the week following that in which the work has been executed.

The measurements and valuations in respect of the extra and substituted items of work shall be completed within the “Period of final measurement” or within 3 (three) months.
23. **UNFIXED MATERIALS:**

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

24. **REMOVAL OF IMPROPER WORK AND MATERIALS:**

The Architect shall, during the progress of the works, have power to order in writing from time to time the removal from the works, within such reasonable times as may be specified in the order, of any materials which in the opinion of the Architect and Employer are not in accordance with the specifications or the instructions of the Architect and Employer; and the substitution with proper materials and the removal and proper re-execution of any work, which has been executed with materials or workmanship, not in accordance with the contract/drawings and specifications or instructions etc., the contractor shall forthwith carry out such orders at his own cost. In case of default on the part of the contractor to carry out such orders, the Employer shall have the power to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor, and shall be recoverable from the contractor by the Employer, or may be deducted by the Architect, from any money due or may become due to the contractor for this work or on any other account.

Instead of this procedure for work not done in accordance with the contract, the Architect and Employer may allow such work to remain, and in that case may make allowance for the difference in value together with such further allowance for damages to the Employer, as in his opinion may be reasonable. This allowance shall be recoverable from the contractor by the Employer, or may be deducted by the Architect, from any money due or may become due to the contractor for this work or on any other accounts. The decision of Architects in these matters shall be final and binding on the contractor.

25. **DEFECTS AFTER COMPLETION:**

Any defect, shrinkage, settlement or other faults which may appear within the “Defects Liability Period” stated in the Appendix on Page 10 i.e. within 12 months after the virtual completion of the works arising in the opinion of the Architect and the Bank, from materials or workmanship not in accordance with the contract, shall upon the directions and writing of the Architect and Employer and within such reasonable time as shall be specified therein, be rectified and made good by the Contractor at his own cost. In case of default, the Employer may employ any other person to amend and make good such defects, shrinkage, settlements or other faults. All damages, loss and expenses consequent therein or incidental thereto shall be made good and borne by the contractor and such damage, loss and expenses shall be recoverable from him by the employer or may be deducted by the Employer, the damages, loss and expenses from any sums that may be due to the contractor or amount retained under condition 38 (Certificate and payment) and in event of the
amount retained being insufficient recover the balance from the amount held against EMD & Security deposit under clause 10.1 & 10.2 on Page 5 or any other amounts due or may become due later.

26. **CERTIFICATE OF VIRTUAL COMPLETION:**

The contractors shall intimate in writing to the Architects, as and when the works are complete in all respects in order to enable the Architect to intimate the Employer to take possession of the same. The works shall not be considered as virtually completed, until the Architect has certified in writing that the same have been “Virtually completed” and accepted by the employed. The defects liability period shall commence, only from the date of such virtual completion certificate.

27. **OTHER PERSONS ENGAGED BY THE EMPLOYER:**

The Employer reserves the right to use the premises and any portions of the site for the execution of any work not included in this contract which he may desire to carry out through other persons, and the contractor is to allow all reasonable facilities for the execution of such work, except by special arrangement with the Employer. Such work shall be carried out in such a manner a not to impede the progress of the works included in the contract, and the contractor shall not be responsible for any damage or delay which may happen to or be occasioned by such work.

28. **INSURANCE IN RESPECT OF DAMAGE TO PERSONS AND PROPERTY:**

The contractor shall be responsible for all injury to persons, animals or things and for all structural and decorative damage to property, which may arise from operation or neglect of himself or any of his or sub-contractor’s employees, whether or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include, interalia any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, caused to the buildings and works forming the subject of this contract by frost or other inclement weather. The contractor shall indemnify the employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of government or otherwise, and also in respect of any award of compensation or damages consequent upon such claim.

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

The contractor shall indemnify the Employer against all claims which may be made against the Employer, by any member of the Public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own cost, effect and maintain until one month after the works are taken over by the Employer or three months after the date of completion of the contract with an approved office, a policy of Insurance in the joint names of the Employer and the contractor against such risks and signing of the contract. The contract shall also indemnify the employer against all claims which may be made upon the Employer whether under the Workmen’s compensation act or any other statute in force during the currency of this contract or at common law in respect of any employees of the contractor or of any sub-contractor and shall at his own expense effect and maintain until one month beyond the virtual completion of the contract, with an approved office. A policy of Insurance in the joint names of the Employer and
the Contractor against such risks and deposit such policy or policies with the Architects from time to time, during the currency of the contract. In default of the contractor insuring as provided above, the Architect on behalf of the Employer may so insure and may deduct the premiums paid from any money due or which may become due to the contractor.

The contractor shall be responsible for anything which may be excluded from the Insurance Policies above referred to and also for all other damages to any property arising out of and incidental to the negligent or defective carrying out of this contract however, such damage shall be caused.

The Contractor shall also indemnify the Employer in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any Award of or compensation of damages arising therefrom.

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

29. **CONTRACTOR’S ALL RISK POLICY:**

The contractor shall within 14 days from the date of commencement of the work insure the works at his cost and keep them insured until one month after the works are taken over by the Employer or three months after the date of completion whichever is earlier, against loss or damage by fire and usual risks other than fire against which insurers generally provide cover in a CONTRACTOR’S ALL RISK POLICY, with an insurer to be approved the Architects, in the joint names of the Employer and contractor (the name of the former being placed first in the policy), progressively for the full amount of the contract, in three stages, beginning with 1/3 of the contract value, and for any further sum as called upon to do so by the Architect, with the prior written consent of the Employer, the premium of such further sum being allowed to the contractor as an authorised extra. Such policy shall cover the property of the Employer only and Architects and surveyor’s fees for assessing the claim and in connection with his services generally in reinstatement and shall not cover any property of the contractor of any subcontractor or employee. The contractor shall deposit the policy and receipts for the premiums paid with the Architects, within twenty one days of the date of commencement of work, unless otherwise instructed, as provided above failing which the employer or the Architect on his behalf may insure and may deduct the premium paid from any money that may be due or that may become due to the contractor. The contractor shall as soon as the claim under the policy is settled, or the work reinstated by the insurers should they elect to do so, proceed with all due diligence with the completion of the works in the same manner as though the fire or other such risk had not occurred and in all respects under the same conditions of contract.

The contractor in case of rebuilding or reinstatement after fire or other such usual risk shall be entitled to such extension of time for completion as recommended by the Architect.

Please refer Special Conditions of Contract, clauses.

30. **MINIMUM AMOUNT OF THIRD PARTY INSURANCE:**

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

The minimum insurance cover for physical property, injury, and death is Rs.5.00 lakhs 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.

31. **COMMENCEMENT AND COMPLETION:**

The contractor shall be allowed admittance to the site on the “Date of Commencement” stated in the Appendix, and he shall thereupon and forthwith begin the works and shall regularly proceed with and complete the same (except such painting or other decorative work as the Architect may desire to delay) on or before the ‘Day of Completion” stated in the Appendix subject nevertheless to the provisions for extension of time hereinafter contained.

Refer clause 9 & 36 of Special Conditions of Contract.

32. **DELAY AND EXTENSION OF TIME:**

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

a. by force majeure, or

b. by reason of any exceptionally inclement weather, or

c. by reason of proceedings taken on threatened by or dispute with adjoining or neighbouring owners or public authorities arising otherwise, than through the contractor’s own default, or

d. by the works or delays of the contractors or tradesmen engaged or nominated by the Employer or Architect and not referred to in the Schedule of Quantities and/or specifications, or

e. by reason of civil, commotion, local combination of workmen or strike or lock-out affecting any of the buildings/traders, or

f. by reason of the Architect’s instructions as per clause 2, or

g. In consequence of the contractor not having in due time, necessary instructions from the Architect, for which he shall have specifically applied in writing ahead of time, giving reasonable time to prepare such instructions.

The Architect shall make a fair and reasonable assessment for extension of time, for completion of the contract works which may be approved by the Employer.

In case of such strike or lock-out, the contractor shall as soon as possible, give written notice thereof to the Architect, but the contractor shall nevertheless constantly use his endeavours to prevent delay and shall do all that may reasonably be required, to the satisfaction of the Architect to proceed with the work.
33. **DAMAGES FOR NON-COMPLETION:**

If the contractor fails to complete the works by the date stated in clause 31 (date of completion) or within any extended time certified under clause 32 (extension of time) and if the Architect shall certify in writing on or before the date of issue of the certificate for the last payment to which the contractor may become entitled hereunder that the works could have been reasonably completed by the said date or within the said extended time, then the contractor shall pay to the Employer or allow the employer to recover from dues to the contractor on any account the sum stated in clause 16 of “Notice to contractors” (Page 6) (liquidated damages and not by way of penalty), subject to a maximum amount of 5% as stated in Appendix of General Conditions of contract (page 10) and as stated in clause 16 of “Notice to contractors” (Page 6) and such damages may be deducted from any money due or which may become due to the contractor.

The deduction of such sums shall not, however, absolve the contractor of his responsibility and obligations to complete the work in its entirety.

Please refer clauses 9 & 36 of special conditions of contract.

34. **FAILURE BY CONTRACTOR TO COMPLY WITH ARCHITECT’S INSTRUCTIONS:**

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

35. **ARCHITECT’S DELAY IN PROGRESS:**

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

36. **SUSPENSION OF WORKS:**

If the contractor, except on account of any legal restraint upon the employer preventing the continuance of the works, or on account of any of the causes mentioned in the clause “Extension of time” or in the case of certificate being withheld or not paid when due, shall suspend works or in the opinion of the Architects, shall neglect or fail to proceed with due diligence in the performance of his part of the contract or if he shall more than once make default in the respects mentioned in clause 24 (removal of improper work and materials), the Employer through the Architect shall have the power to give notice in writing to the contractor required that the works be provided within a reasonable manner, and with reasonable despatch, such notice shall not be unreasonably given and must signify that it purports to be a notice under the provisions of this clause and must specify the acts or defaults on the part of the contractor upon which it is based. After such notice shall have been given, the contractor shall not be at liberty to remove from the site of works, or from any ground contiguous thereto, the site of works, or from any ground contiguous thereto, any plant or materials belonging to him which shall have been placed thereon for the purpose of work, and the Employer shall have lien upon such plants and materials to subsist from date of
such notice being given until the notice shall has been complied with, provided always that such line shall not under any circumstances subsist after the expiration of 30 (thirty) day from the date of such notice given, unless the employer shall have entered upon and taken possession of the works and site, as hereinafter provided.

If the contractor shall fail for seven days after such notice has been given, to proceed with the works as therein prescribed, the Employer may enter upon and take possession of the works and site, and of all such plants, machinery and materials thereon intended to be used for the works, and the Employer shall retain and hold a lien upon all such plants, machinery and materials until the work shall have been completed, under powers hereinafter conferred upon him;

If the Employer shall exercise the above power, he may engage any other person to complete the works and exclude the contractor, his agents and servants from entry upon or access to the same, except that the contractor or any person appointed in writing may have access at all times during the progress of the works to inspect, survey and measure the works. Such written appointments or a copy thereof shall be delivered to the Architects before the person appointed comes on to the works and the Employer shall take such steps as in the opinion of the Architect may be reasonably necessary for completion the works, without undue delay or expenses using for that purpose the plant, machinery and materials above mentioned in so far as they are suitable and adopted to such use.

Upon the completion of the works, the Architects shall certify the amount of the expenses properly incurred consequent on and incidental to the default of the contractor as aforesaid and in completion the works by other persons.

Should the amount so certified as the expenses properly incurred be less than amount which should have been due to the contractor upon the completion of the works by him, the difference shall be paid to the contractor by the Employer, should the amount of the former exceed the later, the difference shall be paid by the contractor to the Employer. The Employer shall not be liable to make any further payments or compensations to the contractor for or on accounts of the proper use of the plant for the completion of the works under the provisions herein before mentioned other than such payments as is included in the contract.

After the works shall have been so completed by persons other than the contractor, under the provisions herein before contained, the Architect shall give notice to the contractor to remove his plan and all surplus materials as may not have been used in the completion of the works from the site.

If such plant and materials are not removed within a period of 14 days after the notice shall have been given, the Employer may remove and sell the same, holding the proceeds less the cost of the removal and sale, to the credit of the contractor. The Employer shall not be responsible for any loss sustained by the Contractor from the sale of the plant in the event of the Contractor not removing it after notice.

37. **PRIME COST AND PROVISIONAL SUMS:**

a. Where “Prime Cost” (P.C.) prices or provisional sums of money are considered for any goods or works in the specifications or Schedule of quantities or deviations hereof, the same are exclusive of any trade discounts, or allowances, discount for cash, or profit which the contractor may require and or carriage and fixing.
b. All goods or work, for which prime cost prices or provisional sums of money are considered may be selected or ordered from any manufacturer’s or firms, at the discretion of the Architect or the Employer. The Employer reserves to himself the right of paying directly for any such goods or work and the Architect may deduct the said prices or sums from the amount of the contract. Should any goods or works for which prime cost prices or provisional sums are considered or portions of same be not required, such prices or sums, together with the profits allowed for such additional amount as the Contractor may have allowed for carriage and fixing will be deducted in full from the amount of the Contract. Whether the goods be ordered by the Contractor or otherwise, the contractor shall at his own cost fix the same, if called upon to do so, and the contractor shall also receive and sign for such goods and be responsible for their safe custody as and from the date of their delivery upon the works.

c. In cases in which provisional quantities of items/materials are contained in the contract, the contractor shall provide such materials and or execute such items to such amounts or to greater or lesser amounts as the Architect shall direct in his schedule of quantities.

d. No prime cost sum or sums (or any portion thereof) shall be included in any certificate for payment to the contractor until the receipted accounts relating to them have been produced by the contractor to the Architect. Such accounts shall show all discounts and any sum or sums in respect of such discounts shall be treated as a trade discount. Provided always, that should the contractor in lieu of producing such receipted accounts, request the Architect in writing to issue a certificate to the Employer for such sum or sums, due either on account or in settlement to a sub-contractor direct, the Architect shall, upon satisfying himself that the sub-contractor is entitled to the same, so issue the certificate and such sum or sums be deducted from the amount of the contractor, at the settlement of accounts and any profit or sum to which the contractor is properly entitled, in respect of such sub-contract, and which is in conformity with the terms of contract as though the amount of such certificates to the sub-contractor has been included in a certificate drawn in favour of the contractor.

e. If the contractor neither produces the receipt not gives authority to the Architect to issue a certificate in favour of such sub-contractor direct, the Architect may upon giving the contractor SEVEN DAYS NOTICE in writing of his intentions to do so, issue to the sub-contractor such certificate direct to the Employer and obtain a receipt from the sub-contractor, which receipt shall be deemed as a discharge for the amount of such certificates, as though given by the contractor. In such event, the contractor shall not be allowed any profit he may have added in the Schedule of Quantities upon such sub-contract.

f. The exercise of the option before referred to by the Contractor and the issue of certificates, as before described to sub-contractor direct of certificates by the Architect, shall not however, relieve the contractor from any of the liabilities in respect of insufficient, faulty of incompleted work of the sub-contractor for which he may be liable under the terms of the contract.

38. **CERTIFICATES AND PAYMENTS:**

The contractor shall be paid by the Employer after due checking and after making necessary correction from time to time, by instalments under Interim Certificates to be issued by the Architect on account of the works executed by the contractor based on the joint measurements taken by the PMC, the Architect’s representative and the contractors representative when in the opinion of the Architect, work to the approximate value named in the Appendix on Page 10 as “Value of work for Interim Certificates”, (or less at the reasonable discretion of the Architect &
Employer) has be executed in accordance with the Contract, subject however, to a retention of the percentage of such value named in the Appendix hereto mentioned as “Retention Percentage for Interim Certificates”, until the total amount retained shall reach the sum named in the appendix as Total Retention Money, after which time the instalments shall be upto the full value of the work subsequently so executed plus such amount as he may consider proper on account of materials delivered upon the site by the contractor for use in the work and available on the date of billing.

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

The Contractor shall be entitled to the payment of the final balance (balance security deposit/retention money) in accordance with the final certificate to be issued in writing by the Architect at the expiration of the period referred to as ‘The Defects Liquidation Liability period’ in appendix on page 10 hereto, from the date of virtual completion or as soon after the expiration of such period as the work shall have been finally completed and all defects made good according to the true intent and meaning hereof, whichever shall happen, provided always that the issue by the Architect of any Certificate during the progress of the works or after the completion shall not relieve the contractor from his liabilities in cases of fraud, dishonesty or fraudulent concealment relating to the works or materials or any matter dealt within the certificate, and in case of all such defects and insufficiencies in the works or materials, which reasonable examination would have disclosed. No certificate of the Architect shall by itself be conclusive evidence that any works or materials to which it relates are in accordance with the contract.

The Architect shall have power to withhold any Certificate, if the works or any parts thereof are not being carried out to his and employers satisfaction. The Architect may by any certificate make any correction in any previous Certificate, which shall have been issued by him. Payment upon the Architect’s Certificates shall be made within the period named in the Appendix as ‘Period of Honoring of Certificates, after such certificates have been delivered to Employer.

Please refer clause 37 & 46 of Special conditions of agreement.

39. **NOTICES:**

Notices for the Employer, the Architect, or the Contractor may be served personally or by being left at or sent by registered post to the last known place of abode or business of the party to whom the same is to be given or in the case of the contractor by being left on the works. In case of a company or corporation, notices may be served at or sent by registered post to the Registered Offices of the Company or Corporation. Any notice sent by registered post shall be deemed to be served at the time, when in the ordinary course of post it would be delivered.

40. **TERMINATION OF CONTRACT BY THE EMPLOYER:**

If the contractor being an individual or a firm, commit any act of insolvency, or shall be adjudged as Insolvent or being an incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution for winding up voluntarily or subject to the Supervision of the Court 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 requiring him to do so, to
show to the reasonable satisfaction of the Architect that he is able to carry out and fulfill the contract, and to give security thereof, if so required by the Architect.

Or if the contractor (whether an individual, firm or incorporated Co.) 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 Architects/Employer first obtained.

Or shall charge or encumber this Contract or any payments due or which may be due to the Contract thereunder.

Or if the Architect shall certify in writing to the Employer that the contractor,

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 Architect written notice to proceed, or

c. has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or

d. has failed to remove materials from the site or to pull down and replace work for 7 days after receiving from the Architect written notice that the said materials or work were condemned and rejected by the Architect under these conditions, or

e. has neglected persistently to observe and perform all or any of the acts, matters or things by this contract to the observed and performed by the Contractors for 7 days after written notice shall have been given to the contractor requiring the contractor to observe or perform the same, or

f. has to the determent of good workmanship or in defiance of the Architect’s instructions to the contrary, sublet any part of the contract.

Then and in any of the said cases the Employer with written consent of the Architect, may notwithstanding any previous waiver, after giving 7 days notice in writing to the contractor, determine the contract, but without hereby affecting the powers of the Architect to continue in force as full as if the contract has not been so determined and as if the works subsequently executed has been executed by or on behalf of the contractor.

And further, the Employer under recommendations of the Architect, by his Agents, or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery, and other equipment and materials also laying upon the premises or the adjoining lands or roads, and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completion the works or by employing any other contractors or other persons to complete the works and the contractor shall not in any way interrupt or do not act, matter or thing to
prevent or hinder such other contractor or other persons or person employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or soon thereafter as convenient, the Architect shall give a notice in writing to the contractor to remove his surplus materials and plant, and should the contractor fail to do so, within a period of 14 days, after receipt thereof by him, the Employer shall sell the same by publication and shall give credit to the contractor for the amount realised. The Architect shall thereafter ascertain and certify in writing under his hand when (if anything) what shall be due to or payable by the Employer for the value of the said plant and materials so taken possession of by the Employer, and the expense or loss, which the Employer shall have incurred due to the contractor, and the amount which shall be so certified shall thereupon be paid by the Employer to the contractor or by the contractor to the Employer, as the case may be.

41. TERMINATION OF CONTRACT BY CONTRACTOR:

If payment of the amount payable by the Employer under certificate of the Architect as provided for hereinafter shall be in arrears and unpaid for 30 (thirty) days after notice in writing requiring payment of the amount, as aforesaid shall have been given by the Contractor to the Employer, or if the Employer obstructs the issue of any such certificates, or if the employer commits any Act of insolvency, or if the Employer (being an incorporated company) shall have an order made against him or pass an effective Resolution for winding up, either compulsorily or subject to the supervision of the Court or voluntarily, or if the Official Liquidator or the Employer shall repudiate the contract, or if the Official Liquidator in any such winding up shall be unable within 90 DAYS notice to him requiring him to do so, to the reasonable satisfaction of the contractor that he is not able to carry out and fulfill the contract and to give security for the same (including Earnest money), or if the works be stopped for any payments due, and to become due thereunder and if required under the order of the Architects or the Employer or by an injunction or other order of any court of law, then in any of the said cases, the contractor shall be at liberty to determine the contract by notice in writing to the Employer/Architect, and he shall be entitled to recover from the Employer, payment for all works executed and for any losses he may sustain, upon any plant or materials supplied or purchased or prepared for the purpose of the contract.

In arriving at the amount of such payment, the net rates contained in the contract shall be followed, or where the same may not apply, valuation shall be made in accordance with clause 22 thereof.

42. Matters to be finally determined by the Architects and the Bank (Called excepted matters) – (refer 43(a) below), which shall be final, conclusive and binding on the following matters:

a) Instructions
b) Transactions with local authorities
c) Proof of quality of materials
d) Assigning or under letting of the contract,
e) Certificate as to the causes of delay on the part of the contractor and justifying extension of time or otherwise,
f) Rectification of defects pointed out during the defects liability period.
g) Notice to the contractor to the effect that he is not proceeding with due diligence.
h) Certificate that the contractor has abandoned the contract.
i) Notice for determination of the contract by the Employer.
43. **ARBITRATION:**

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

b. Vice President, SBIIMS, Mumbai shall be appointed to refer those disputes for adjudication to a sole arbitrator.

c. It is also a term of the contract that if the contractor does not make any demand for Arbitrator in respect of any claims within 90 days of receiving the intimation from the Bank that the final bill is ready for payment, the claims if any received after 90 days period shall be absolutely barred from reference to the Arbitrator.

d. All disputes or differences of any kind whatsoever, which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof this contract, or the rights touching or of this contract, effect thereof, or to the rights or liabilities of the parties arising out of or in relation thereto, whether during progress or after determination, foreclosure or breach of the contract (other than those in respect of which the decision expressed to be final and binding in cases listed out in condition 40 above), Architects shall, after written notice to either party to the contract and to the appointing Authority, who shall be appointed for this purpose by the employer refer those disputes for adjudication to a sole arbitrator, to be appointed as hereinafter provided.

e. For the purpose of appointing the sole arbitrator referred to above, the Appointing authority will send, within thirty days of receipt by him of the written notice aforesaid, to the contractor a panel of three names of persons, who shall be presently unconnected with the organization for which the work executed.

f. The contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole arbitrator and communicate his name to be appointed as a sole arbitrator to the Appointing Authority, within thirty days of receipt of the names by him. The Appointing Authority shall thereupon without any delay appoint the said person as the sole arbitrator. If the contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the sole arbitrator.

g. If the Appointing Authority fails to send to the contractor the panel of three names as aforesaid within the period specified, the contractor shall send to the appointing authority a panel of three names of persons, who shall be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint his as the sole arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole arbitrator within 30 days of receipt by him of the panel and inform the contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the sole arbitrator and communicate his name to the Appointing Authority.

h. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reasons whatsoever, another sole arbitrator shall be appointed as aforesaid.
i. The work under the contract, shall however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.

j. The arbitrator shall be deemed to have entered on the reference, on the date he issues notice to both the parties, fixing the date of first hearing.

k. The arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.

l. The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such a place, as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator, if required to be paid before the award is made and published, shall be paid half and half by each of the parties. The costs of the reference and of the award including the fees, if any, of the Arbitrator, who may direct to any by whom and in what manner such costs or any part thereof shall be paid and may fix or settle the amount of costs to be so paid.

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

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

1. Inspection of drawings
2. Contractor to visit site
3. Execution of work (Prices to include)
4. Schedule of Quantities
6a. Quantities liable to alterations
   b. Filling of tenders
7. Access for inspection
8. Dimensions
9. Program of works
10. Water and Electricity
20. Procurement of materials
21. Facilities to other contractors
22. Testing
23. Site meetings
24. Custody and security of materials
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27. Statutory regulations
28. Measurements to be recorded before work is covered up.
29. Working at night or on holidays.
30. Working on holidays
31. Action where there is no specification
32. Reporting of accident
33. Cleaning the site on completion/determination of work
34. Possession of buildings/work completed
35. Typographic, Clerical and other errors.
36. Information to be supplied by the Contractors.
37. Bench marks
38. Force Majeure
39. Architect’s drawings and instructions
40. Completion of work and liquidated damages
41. Bill of payments
42. Workmanship
43. Schedule of quantities
44. Site Supervision
45. Engagement of Apprentices
46. Rates
47. Income tax
48. Extra items rates
49. Service drawings/shop drawings/catalogue
50. Payment
51. Permission
52. Maintaining Registers at site
53. Agreement
54. Insurance
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56. Work performed at contractor’s risk
57. Photographs
58. Inspection by the Chief Technical Examiner
59. Special conditions of contract
60. B.I.S. Codes
8. 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/sign-boards 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.

5. 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.

Please refer clause 4 of General Conditions of Contract.

6.a. 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 exceeds 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 substitution of particular items, change of designs or specifications during the course of execution. The contractor, in either case, is bound to carryout the modified quantities upto +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.
b. **FILLING OF TENDERS:**

The rates and amounts for each tendered item should be 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 paisa 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 overwritings in rates may entail the rejection of the tender.

In case the rate written in figures/words/amount differ, 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 client.

Refer clause 7 of General Conditions of Contract.

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 discrepancy, 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 authorised 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 Architects, 10 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.

Please refer clause 29 & 30 of General Conditions of 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 weather proof 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 clients 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 neighbouring areas even with longer leads, as required and directed, at no extra cost.

Please refer clause 9 of General Conditions of contract.

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 Architect & Employer, 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 Architect & Employer, 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 materials 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 Architect/client 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 Architect’s decision basing on the general practice being following shall be final.

17. **SITE MEETINGS:**

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

18. **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, equipments etc., including cement and steel at site and ensure that at no time unauthorised persons gains any access at works site.

23. **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.

Please refer clause 8 of General Conditions of Contract.

24. **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.

25. **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) and Architect’s representative 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.

Refer clause 20 of General Conditions of Contract.

26. **WORKING AT NIGHT OR ON HOLIDAYS:**

The contractor can carry out major work at night, only with prior permission of the Site Engineer of Employer/Architect 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.

27. **WORKING ON HOLIDAYS:**

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

28. **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.

29. **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 on 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.

30. **CLEARING THE SITE ON COMPLETION/DETERMINATION OF WORKS:**

   The contractor shall clear the site of works as per the instructions of the Architect. 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 Architect, within a period one week after the job is completed. In case of failure by the contractor, the Employer, under advice to the Architect, have the right to get the site cleared to his satisfaction at the risk and cost of the contractor.

31. **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 Architect & Employer.

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

   Please refer Appendix to General Conditions of contract.
32. **TYPOGRAPHIC, CLERICAL AND OTHER ERRORS:**

The Architects/Employer’s clarification regarding partially omitted particulars or typographical, clerical and other errors shall be final and binding on the contractors.

33. **INFORMATION TO BE SUPPLIED BY THE CONTRACTOR:**

The contractor shall furnish to the architect & Employer 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 authorised representative, who will be in charge for the execution of work.

c. The list of technically qualified persons (to be approved by the Architect) employed by him for the execution of the work within 90 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.

Last para of clause 33:

Failure to submit any of these details in time, shall be treated as a breach of the contract and likely to result in,

i) Levying a fine of Rs.500 for each default for each month, and or

ii) Witholding payments, otherwise due.

iii) For the periods for which name of technically qualified persons are not given or for which such persons are not employed, recoveries shall be made at Rs.7,500/- per month for each month of default.

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

See clause 41 also.

34. **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.

35. **ARCHITECT’S 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 Architects and the SBIIMS 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 Architect.

Refer clause 2 & 3 of General conditions of contract.

37. **COMPLETION OF WORK AND LIQUIDATED DAMAGES:**

The work shall be completed in 45 DAYS, and reckoned as under: **WITHIN ONE DAY AFTER CONFIRMATION.**

(a) The day two weeks 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.

Refer clause 30 & 31 of General Conditions of contract.

38. **BILLS OF PAYMENTS:**

The minimum value of work for interim payments will be Rs. 20.00 lakhs, 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 Architects representatives. The bill will be certified by the Architect within 15 working days from the date of submission of the bill by the contractor, and the Employer will 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 Employer and Architect’s instruction and directions.

39. **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 Architect and Employer, with strict control on the materials, workmanship and supervision.

Refer clause 9 of General Conditions of Contract.

40. **SCHEDULE OF QUANTITIES:**
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 Architect & Employer. The work shall be executed and completed accordingly.

Refer clause 4, 5 and 6 of General Conditions of Contract.

41. **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 Architect & Employer. The site engineers shall not be removed from the site without the written consent of the Architect & Employer.

See clause 33 above also.

42. **ENGAGEMENT OF APPRENTICES:**

The Contractor shall during the currency of the contract, when called upon by the clients, 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 clients. 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 clients under the said Act, including the liability to make payment of apprentices, as required under the said Act.

43. **RATES:**

Contractor shall quote all the rates both in figures and in words and any alterations shall have to be initialled 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 Architect / SBIIMS.

44. **INCOME TAX:**

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

45. **EXTRA/SUBSTITUTED ITEM RATES:**

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

The work on extra/substituted items shall be started only after the receipt of written order from the client/Architect. 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.

See clause 21 of General Conditions of Contract.

46. **SERVICES DRAWINGS/SHOP DRAWINGS/CATALOGUE:**

After getting approval from the Architect & Employer, 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 Architect & Employer. 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.

47. **PAYMENT:**

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

See clause 36 & 37 of General conditions of contract.

48. **PERMISSION:**

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

49. **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 Architect & Employer from time to time.
50. **AGREEMENT:**

The successful contractor shall be required to enter into an agreement in accordance with the Draft Agreement and Schedule of Conditions etc., within 90 DAYS from the date the contractor is advised by the Architect & Employer 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.

51. **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 clients 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 Architect/Client 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 client, 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.

52. **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 sub-contractor 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.

53. **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.
54. **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 Architect/Client and submit two copies of each photograph with minimum size 20 cm x 15 cm to the client/Architect.

55. **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 Architect & Employer 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.

56. **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.

57. **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.

58. **AS BUILT DRAWINGS**

The contractor shall prepare and submit a set of as-built drawings, duly certified by the Architect. The set consists of 2 soft copies and 3 sets of hard copies.
9. 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 colours, 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 neighbourhood.

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, sales tax or any other taxes and duties, octroi, transportation to worksite etc.

The rates are firm and no escalation on any account shall be allowed on accepted rates.
14. **Timber:** Hardwood and Teakwood shall be the best wood locally available and should be well & properly seasoned of mature growth, free from worm holes, large loose or dead knots or other defects and will not suffer warping, splitting or other defects through improper handling.

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

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

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

15. **Plywood:**

Plywood shall be of urea formaldehyde phenol bonded of approved B.W.P. type, make, brand, etc. Thickness of plywood shall be as per details given in the drawings/specifications.

16. **Workmanship for Joinery:**

Timber is to be cut to required size and length and the joinery should start immediately after the line out is finalised. 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.

17. 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.

18. 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.

19. 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.

20. **List of Indian Standards referred to:**

- IS : 1200 : Latest Measurements of buildings & Civil Engineering works, methods of


IS : 1137 – 1965  Specification for ready mixed paint brushing
IS : 113 – 1950  matt or egg shell flat/wooden coating under-
IS : 133 – 1975  coating/finishing, Grey filler etc., for
IS : 129 – 1950

IS : 1948  Aluminium doors, windows & partitions.

26. **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.
10. MODE OF MEASUREMENTS

1. **Partition Panelling** : Sq.mt. area – one side only panelling finished length x finished height (frame work including vertical/horizontal members above the false ceiling will not be included in measurements and such members shall be treated as included in this mode of measurement in the case of partition having difference finished heights on either sides average height shall be considered e.g., 2400mm and 2500 then 2450mm will be average height. This will also include T.W. bends.

2. **Storage Units** : Sq.mt area – front elevation finished length x finished height

3. **False ceiling** : Sq.mt area finished length x finished width No. deduction of AC grills, lights, cutouts, cornices, drops etc., to be measured separate in Sq.mt.

4. **Soffits** : Sq.mt total finished length x total finished depth (width including drops of pelment, if any).

5. **Rounding off measurements** : All measurements shall be rounded off to the nearest second decimal point e.g., 21.465m will be **21.47m**.

6. **Measurement for venetian blinds** : Area of the window opening in Sq.m. to which it is specified.

7. **PVC flooring** : Sq.mts area Finished length x Finished width (deducting shall be made for columns, cutouts, etc) only finished area shall be paid.

Wherever not mentioned measurements shall be measured as per ISI S.P.No.27.
14. 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 holds 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 atleast 900mm high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends there of 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 atleast 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 defence 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 equipments as considered adequate by the Architects 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 is 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.

   a. 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, the following precautions should be taken.

   i) No paint containing lead or lead products shall be used except in the form of paste or ready made paint.

   ii) Suitable face masks should be supplied for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scrapped.

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

IX. 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.

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

1.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.

2. 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.

3. In case of every hoisting machine and of every chain, ring hook, shackle swivel and pulley 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.

4. In case of departmental machines, the safe working load shall be notified by the clients. 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.

XI. 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 minimise 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.

XII. 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.

XIII. 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 clients or the Architect.

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

XV. Not withstanding the above clauses for (i) to (xiv), 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.
15. 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


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 the this sort in an objective manner.

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 licence 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 are 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.
SPECIAL CONDITIONS.

1. Contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, what ever the cause of the delays may be, including delays arising out of modifications to the work entrusted to him or in any subcontract connected there with or delays in awarding contracts for other trades of the project or in commencement or completion of such works in obtaining water and power connections for construction purpose or for any other reason what so ever and the Employer shall not be liable for any claim in respect thereof. The Employer does not accept liabilities for any sum besides the tender amount, subject to such variations as are provided for herein.

2. The successful tenderer is bound to carry out any items of work necessary for completion of the job if such instructions in respect of such additional items and their quantities will be issued in writing by the Architects with the prior consent in writing of the Employer.

3. The contractor must bear in mind that the work shall be carried out strictly in accordance with specifications made by the Architects.

4. The rates quoted in tender shall also include electric consumption charges for power. If no power is available at site the contractor shall have to make his own arrangement to obtain power connection and maintain at his expense an efficient service of electric light and power and shall pay for the electricity consumed. The Employer shall give all possible assistance to the contractor to obtain the requisite permission from the various authorities, but the responsibility for obtaining the same shall be that of contractor.

5. Contractor shall strictly comply with the provisions of safety code in addition to all local rules and regulations.

6. The contractor shall be responsible for the observance of all rules and regulations framed by the government under the contract labour act. The Employer shall be entitled to deduct all losses, damages that he might suffer on account of non-observance of these rules by the contractor, from the amount payable to the contractor.

7. Time shall be considered the essence of this contract. The entire work must be completed within 45 days from the commencement of the work. If the completion of the work is delayed beyond 1 month, a penalty at the rate of \( \frac{1}{2} \% \) per week over the contract value will be imposed subjected to a maximum of 5%.

If the work is delayed beyond 30 days after the date of completion, the remaining work will be carried out through other agencies at the risk and cost of the contractors under the contract with prevailing market rates.

8. The successful tenderer shall submit the phased programme of execution of different items of work within 2 days after receipt of acceptance letter.

9. Payment will be made subjected to a minimum of Rs. 15,00,000/- (Rupees FIFTEEN Lakhs Only) and will be made within a period of TWO weeks after the bill is submitted to the Employer’s Office with Architects Certificate.
10. Before filling in the tender the contractor will check all the drawings and schedule of quantities and will get an immediate clarification from the employer / Architects on item not clearly understood. No claims for any loss or compensation will be entertained on this account.

11. All the work shall be carried out as per detail drawings and specifications or as directed by employer / Architects.

12. The rates quoted in the tender shall be for the finished items of work They shall include all the charges labour, materials, transportation of material equipment, double scaffolding water and electric charges, tool and plants, marking out and cleaning of site, to do all things necessary to provide complete finished item for work consistent with the specifications attached to this tender document. The rates shall be inclusive of octroi duty, excise duty, packing and forwarding, loading or unloading or any other duties or fees levied by any government, public or local bodies. The rates shall be firm and shall not be subject to exchange variations, labour conditions or any other conditions whatsoever.

13. The calculations made by the tenderer should be based upon the probable quantities of the several items of work which are furnished for the tenderer's convenience in the schedule of quantities, but it must be clearly understood that the contract is not a lumpsum contract, that neither the probable quantities nor the value of individual items nor the aggregate value of the entire tender will form part of the contract and that the employer / Architects do not in any way assure the tenderer or guarantee that the work would correspond there to.

14. Adequate engineering and technical staff to be appointed at site. INTERIOR contractor should inform of their number and qualification. An Approval of employer / Architects should be taken prior to appointing such technical staff on site.

15. The contractor shall keep the tender submitted by him open for acceptance for a minimum period of three months from the date of it's submission. When once the tender is accepted the rates quoted by the successful tenderer shall be firm and the variation in rates of any one or all the items on any account shall not be allowed during the entire duration of the contract.

16. During the execution of work, contractor must check the work with his drawings. The contractor shall be responsible for all the errors in this connection and shall have to rectify all the defects at his own cost, failing which the client reserves the right to get the same rectified at the risk and cost of contractor.

17. No claim for extra item or deviation from specification shall be entertained unless the same is pointed out and accepted as such before the work is taken in hand or within 90 DAYS of work by the successful tenderer.

18. The contractor shall comply with all bye-laws and tax regulations (including GST) of local and other statutory authorities having jurisdiction over the works and shall be responsible for the payment of all the fees and other charges and for giving and receiving of all necessary notices drawings and test certificates.

19. The successful tenders shall properly safeguard against damage or injury to the public and to any property or thing and shall alone be responsible for any such damage and injury to any person or persons or thing arising in connection with it's execution of work. The successful tenderer shall protect and hold harmless the employer against any or all claims for any such injury or damage.
20. The work in every respect during the progress and till final acceptance by the employer, including raw materials delivered at the site to be incorporated or used in INTERIOR work by the successful tenderer will be at his own risk. Any loss or damage to any such material or work shall immediately be replaced by the successful tenderer at his own expense.

21. The employer shall have the right to direct the contractor to purchase and use the materials from any source for proper execution of work.

22. The employer / Architects or their authorized representatives shall have full power for inspecting the contractor's works or at any place from which the material is obtained. Acceptances of any such materials shall no way relieve the contractor of his responsibility for meeting the requirements and /or analysis not called for in the specifications shall be borne by the employer in case the material or work is found defective or of inferior quality. Tests and /or analysis shall be done in the laboratory approved by the client and the contractor shall permit SBIIMS and or the client's or their authorized representative to be present during any of the tests and /or analysis.

23. **INSURANCE**

The contractor shall indemnify the employer up to CAR Policy (Contractor’s All Risk Policy) against all claim which may be made against SBIIMS by any member of the public or third party in respect of anything which may arise in consequence thereof and shall at his own expense arrange to effect and maintain up to one month, after the virtual completion from an office approved by the SBIIMS a policy of insurance in the joint names and deposit such policy or policies with the employer from time to time during the currency of this contract. The contractor shall also indemnify SBIIMS against all claims which may be made upon the employer under the workman's compensation act or any other statute in force during the currency of this contract or at common law in respect of any employee of the contractor or any sub contractor and shall at his own expenses effect and maintain up to one month after virtual completion of the contract, from an office approved by SBIIMS a policy or policies of insurance in the joint names of the employer and the contractor as aforesaid. The contractor shall be responsible for any other thing which may be excluded from the insurance policies above referred to and also for any other damage to any property arising out of and incidental to the negligent or defective carrying out of this contract.

He shall also indemnify SBIIMS in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any award of compensation or damage arising therefrom. SBIIMS shall be at liberty and is hereby empowered to deduct the amount of any damages, compensation caused, charges and expenses arising or occurring from or in respect of any such claims or damages from any sum or sums due or to become due to the contractor.

24. **WORKMAN AT SITE :**

The contractors workpeople shall not be allowed to live on the site at any time throughout the contract nor to trespass beyond the limits of the site. The contractor will be held responsible for any acts of trespass by his workpeople.

25. **DIMENSIONS :**

Figures dimensions are to be taken in preference to scaled dimensions in all cases. Before commencing any work the contractor shall verify all measurements. If any discrepancies are found they shall immediately be brought to the notice of the Architects.
26. DISCREPANCIES

All the items shown on the drawings or specifications are taken to be included in both. Any discrepancies, which occur in either the drawings or specifications, shall immediately be brought to the attention of the Architects.

27. CUTTING AND MAKING GOOD

Where it is found necessary to interfere with finished work in order to execute this contract, the contractor will be required to do all necessary work at his expenses. Only approved hangers and bolts or other metal fixing devices shall be used to secure frames panels and other units in position. Wooden plugs will not be permitted. Holes shall be formed with electric drills whenever possible. Structural members shall not be cut or drilled without prior consent of the client.

28. MAINTENANCE AND GUARANTEE

The whole of the work to be performed under this contract shall be completed to the satisfaction of the Architects / Bank.

The contractor without additional charge to the employer renew or replaces any works which prove faulty from workmanship or materials and fully maintain the whole installations for a period of 6 months after the commencement of defects liability period of the main contract and a sum of 5% of the contract amount shall be retained by the employer for his period.

29. PREVENTION OF SPOIL DUMPING

The contractor shall take all reasonable steps to prevent spoil, rubbish, debris surplus materials etc., arising from a work being dumped on an area other than a recognized or approved tipping area and the Contractor will be held responsible for and shall indemnify the employer against any claim or loss arising therefrom.

30. LEAVE PERFECT:

The Contractor shall remove all rubbish and superfluous material from the site of the works with all reasonable speed from time to time and at completion. On no account shall W.C'S or the employer's receptacles to be used for this purpose.

The client reserves its right to clear contractors un cleared debris at contractors own cost without any reasons & not more than one notice will be given for this.

31. 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 of materials used on the work or as to any other question, claim, right matter or thing whatsoever in any way arising out of our 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 work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter.
(a) 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 Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 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 has been given by the Contractor The Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 in writing in the manner and within the time aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to The Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 in writing in the manner and within the time aforesaid.

(b) The Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 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 Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 submit his claims to the conciliating authority namely the Circle Development Officer, State Bank of India, Local Head Office, Hyderabad for conciliation along with all details and copies of correspondence exchanged between him and The Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095.

(c) 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 SBIIMS 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.

(d) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes of 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 SBIIMS. It will also be no objection to any such appointment that the Arbitrator so appointed is a Officer and that he had to deal with the matters to which the Contract relates in the course of his duties as Officer. 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 SBIIMS. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

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

It is also a term of this contract that no person other than a person appointed by such SBIIMS as aforesaid should act arbitrator.
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 thereunder.

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. However, no fees will be payable to the arbitrator if he is a Bank Officer.

It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their settlement 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.

32. TERMINATION OF CONTRACT BY EMPLOYER:

If the contractor (being an individual or a firm) commit any “ Act of Insolvency “, or shall be adjudged as insolvent, or shall enter into a Deed of Assignment with his creditors, or (being an incorporated Company) shall have an order made against him or pass an effective Resolution for winding up either compulsorily, or Subject to the supervision of the court or voluntarily, or if the official Assignee of the contractor shall repudiate the Contract, or if the Official Assignee or the Liquidator in any such winding up shall be unable, within seven days after notice to them requiring him to do so, to show to the reasonable satisfaction of the Architect that he is able to carry out and fulfill the Contract and if required by the Architect to give a security there for, or if the contractor shall suffer any payment under this contract to be attached by or on behalf of any of creditors of the Contractor, if the Contractor shall assign or sublet the contract without the consent in writing of the Architect first obtained, or if the contractor shall charge or encumber his Contract for any payments due or which may become due to the Contractor thereunder, or if the Architect shall certify in writing to the Employer that in his opinion the Contractor:

(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 work for fourteen days after receiving from the Architect written notice to proceed, or
(c) Has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to completed within time agreed upon or
(d) Has failed to remove materials from site or to pull down and replace works within seven days after receiving from Architect written notice that the said materials or work where condemned and rejected by the Architect under these conditions or
(e) Has neglected or failed persistently to observe and perform all or any of the acts, matters or things required by this Contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor requiring the contractor to observe or perform the same, or
(f) Has to the detriment of good workmanship or in defiance of the Architects instructions to the Contrary, submit any part of the contract or has used in the permanent works
important materials which are substandard and not as per specification fraudulently making the Architect / Employer to believe that it is the specified material.

Then and in any of the said caused the Employer with the written consent of the Architect may, notwithstanding any previous waiver, after giving seven days notice in writing to the Contractor, determine the contract, but without thereby affecting the powers of the Architect or the obligations and liabilities of the Contractor, the whole of which shall continue to be in force as fully as if the contract has not been so determined and as if the works subsequently executed and being executed by or on behalf of the contractor. And further, the Employer with the consent of the Architect by his agents or servants may enter upon and take possession of the works and all plant, tools, scaffolding, shed, machines, steam and other power utensils and materials lying upon premises or the adjoining lands or roads, and use the same as his own property or may employ the same by means of his own servants and workman in carrying on and completing of the works or by employing any other Contractor or any other person or persons to complete the works and the Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other Contractor or other person or persons employed for completing and finishing or using the materials and plant for the works, when the work shall be completed, or as soon thereafter as convenient, the Architect shall give a notice in writing to the Contractor, to remove his surplus material and plant and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Employer may sell the same by public auction and shall give credit to the Contractor for the amount so realized. The Architects shall thereafter shall assertion and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer, for the value of the said plant and materials so taken possession of by the Employer, and the expense or loss which the Employer shall have been put to in getting the works to be so completed, and the amount, if any owing to the Contractor and the amount which shall be so certified shall, thereupon, be paid by the Employer to the Contractor or by the Contractor to the Employer as the case may be, and the certificate of the Architect shall be final and conclusive between the parties.

33. The mode of measurements shall be as per IS: 1200.

34. The contractor should co-ordinate with other agencies viz., Electrical, HVAC (Air-Conditioning), Civil, LAN cabling etc.,

35. CONTRACTOR SHOULD WORK AT ODD HOURS, ON HOLIDAYS TO KEEP UP TIME SCHEDULE. CONTRACTOR TO CO-ORDINATE WITH L/W WITH REGARDS TO WORKING HOURS.

36. Partitions shall be measured from finished floor level to bottom level of false ceiling.

38. The Contractor shall not be eligible for any material advance.
### Abstract Terms and Conditions:

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<tbody>
<tr>
<td>1.</td>
<td>Defects Liability Period.</td>
<td>12 calendar months.</td>
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<tr>
<td>2.</td>
<td>Period for final measurement and valuation.</td>
<td>2 weeks.</td>
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<tr>
<td>3.</td>
<td>Date of commencement.</td>
<td>Within 1 day after confirmation.</td>
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<td>4.</td>
<td>Date of completion.</td>
<td>45 DAYS from date of commencement.</td>
</tr>
<tr>
<td>5.</td>
<td>Minimum value of Interim Certificate.</td>
<td>RS. 30,00,000/- (Rupees Thirty Lakhs Only.)</td>
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<td>6.</td>
<td>Agreed liquidated damages.</td>
<td>½ % of the total contract amount per week beyond the date of completion subject to maximum of 5%.</td>
</tr>
<tr>
<td>7.</td>
<td>Initial Security Deposit.</td>
<td>1% to be paid along with the Tender, balance 1% to be paid within seven days from the date of receipt of work order.</td>
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<tr>
<td>8.</td>
<td>Retention Money.</td>
<td>10% of interim certificate amount of running account bill.</td>
</tr>
<tr>
<td>9.</td>
<td>Total retention money in final bill including EMD &amp; ISD Amount.</td>
<td>5% of the contract value.</td>
</tr>
<tr>
<td>10.</td>
<td>Installment after virtual completion.</td>
<td>Initial Security Deposit – after the contractor removes all the left over materials, machinery and cleans the entire premises to the satisfaction of SBI etc.,</td>
</tr>
<tr>
<td>11.</td>
<td>Period of honoring certificate.</td>
<td>15 days.</td>
</tr>
<tr>
<td>13.</td>
<td>Insurance, Custom duties and taxes.</td>
<td>To be provided and paid by contractor.</td>
</tr>
<tr>
<td>15.</td>
<td>Rate of BOQ’s items.</td>
<td>To include item complete in all respects.</td>
</tr>
<tr>
<td>16.</td>
<td>GST TAX:</td>
<td>The rate quoted by contractor must be exclusive of GST. GST will be paid as per prevailing government norms.</td>
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</table>
ARTICLES OF AGREEMENT


Articles of agreement made at Hyderabad, this _______ day of_______2020 between The Vice President, SBI Infra Management Solutions Pvt. Ltd., SBIIMS, Hyderabad Circle, Adj. to Commercial Branch, SBI LHO Campus, Bank Street, Kothi, HYDERABAD – 500 095 (hereinafter called the employer which expression shall include its successors and assignees) of the one part and_______________________(hereinafter called the contractors which expression shall include its successors and assignees) of the other part.

Whereas the employer desires to get the above mentioned work namely INTERIOR, ELECTRICAL & HVAC (AIR-CONDITIONING) Works for STATE BANK OF INDIA, HYDERABAD. (TELANGANA). as envisaged in tender documents dated ________________, schedule of quantities, specifications and the drawings.

And whereas the Contractor agreed to execute upon and subject to conditions set forth herein and to the conditions set forth in special conditions and in schedule of quantities, specifications, conditions of contract, drawings etc., (all of which are collectively hereinafter referred to as the said conditions) at the respective rates therein set forth amounting to the sum as herein arrived at or such sum as shall become payable there under (hereinafter referred as the said contract sum)

Now it is hereby agreed as follows:

1. In consideration of the said contract amount to be paid at the times and manner setforth in the said conditions the contractor shall upon and subjected to the said conditions and complete the work shown upon the said drawings and described in the specifications and schedule of quantities.

2. The employer will be pay the contractor a sum of RS.______________ (Rupees ____________________________) herein after referred to as the contract sum or such other sum as shall become payable at the times and in the manner specified in the said conditions.

3. The term ‘THE ARCHITECTS’ in the said conditions shall mean the said " SBIIMS which expression shall include successors and assignees or in the event their ceasing to be the Architects for the purpose of this contract for what ever reason such other person or persons as shall be nominated for that purpose by the employer, provided always that no person or persons subsequently appointed to be the architects under this contract shall be entitled to disregard or overrule any previous decisions or approval or directions given or expressed in writing by the Architects for time being.

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

5. The following documents shall be deemed to form and read and construed as part of this agreement:

   a) Notice Inviting Tenders. (NIT)
   b) Tender Form.
   c) Special Conditions of Contract.
d) General Specifications.

e) Drawings.

f) Employers letter of intent no._____________.

g) Contractors letter of acceptance.

6. This contract is neither a fixed lumpsum contract nor a piece work contract but a contract to carry out the work in respect of the entire building to be paid for according to actual measured quantities at the rates contained in schedule of quantities in the said conditions.

7. The Employer reserves to himself the right of altering the drawings and nature of work by adding or omitting any items of work having portions of the same carried out through the other agencies without prejudice to this contract.

8. The time shall be considered as essence of this contract and the contractor hereby agrees to commence the work from the _______________(which shall be considered as the date of commencement of the work) and to complete the entire work within 90 DAYS from the date of commencement. The work shall throughout the stipulated period of contract, be proceeded with all due diligence and if the contractor fails to complete the work within the specified period, he shall be liable to pay compensation as provided in clause 7 of the special conditions of contract.

9. That the several conditions of this contract have been read to & fully understood by us.

As witness our hands, this __________day of __________2019 in the presence of:

Witness:

1. EMPLOYER:

2. CONTRACTOR.
GENERAL SPECIFICATIONS – INTERIOR WORKS.

TIMBER:
All timbers used are to be of top quality, free from knots, shakes, wormholes, and with a moisture content of not more than 8% to 10% depending on the climatic conditions prevailing at the site.

JOINTS:
All Joints will be standard mortise and tenon, dovetails, dowel, cross-halved, mitred, tongued and grooved and invited. Nailed or glued butt joints will not be permitted. Except in exceptional cases nailed butt joints will not be accepted.

FASTENINGS:
Screws, nails, bolts, will generally be of M.S. G. I wire, except in following examples: "Out door Furniture" fastenings will be of brass or other non-Corrosive metal. In hardware, they will match the finish of the hardware item. Brass Nails in a finished surface shall be neatly punched and the hole filled with wood filler matching the finish. Screws in a finished surface will be round head, raised head or sunk (beneath the surface and the hole plugged with matching colour and grain of the wood surface) unless specially detailed.

PLYWOOD:
Used mainly for the bodywork of this furniture, shall be Luaan or similar close-grained plywood suitable for veneering painting or bonding plastic laminate. It will be a resin bonded (PFB) weatherproof brand, and for "out door" furniture, standard specifications, 'marine' 'Mysore ply', 'Anchor ply' or Indian plywood brand or equivalent. Exposed edges will be finished with a piece of soiled wood, tongued and grooved and glued or as detailed.

HARDWARE:
Hinges, lock, latches, door tracks etc., shall be as specified and as far as it possible, by the manufacturer specified. In any variation of this the quality of the substitute shall be equal to or better than the original specified, and sampled should be submitted to the Designer for prior approval.

METAL:
Where metal logs frames etc., are used these shall be welded, brazed, bolted or riveted as required and on finished surfaces. Welding, brazing riveting shall be neatly smoothed so that no evidence of this is apparent on the final finish of the metal, which will be as specified on drawing. On all legs, wood or metal, nylon glides or castor as indicated are to be installed.

FINISH:
This will be as indicated on the drawing and colour scheme chart and materials (timber, plastic laminates, lacquer, paints, etc.) must be specified. No variations will be accepted unless with the prior approval of the Designer. "Backs" of cabinets etc., where wall hung, shall be treated with an approved brand of wood preservative. Full size drawings or sample prototypes are to be submitted for approval as requested.

Note: This specification is of a general type only, and must be used in conjunction with the drawing of the particular item being made. Anything shown on the drawing, but not in the specification must be complied with, and vise versa.

MATERIALS:
Finished timber shall be of the type specified colour, pattern, substance to be as specified and manufactured or supplied by the company specified. No variation of this will be permitted unless with prior approval of the Designer.
FINISH:

This will be as specified on the drawing and colour scheme chart. Where timber is finished in natural colour, care must be taken to "match" each separate piece of colour before assembly. Where timber is stained, the stain or colour on each member must "match".
SPECIAL CONDITIONS AND SAFETY CONDITIONS

The contractor is hereby advised to read the following conditions carefully before quoting rates and to be strictly adhered during execution of work.

SPECIAL INSTRUCTIONS

a) Contractor shall submit copies of all statutory compliance certificates such as ESIC, PF, Contract labour registration, shop & establishment and or any other local authority registration as applicable.

b) All workmen, engineers, supervisors shall be converted as per ESIC, PF & minimum wages act.

c) All workmen, engineers, supervisors shall under go pre employment medical check up through company recognized medical officer and submit copies of test report.

Contractor to provide proof of monthly remittances with regard to the workmen deployed at the site.

Contractor is responsible to ensure that his workmen are confined to their work area and comply with all safety, security and administrative instructions given by the site engineer.

Contractor shall provide identification badges to all his people. On completion of day’s work, the entire area shall be kept clean and neat. All debris, surplus material etc., shall be removed immediately from the site.

Any such standard material used during execution will be rejected and fully deducted from the bills.

The contractor has to carry out the work in coordination with the other appointed agencies. The contractor should study the situation at site and organize the work accordingly. Whenever work needs to be done in coordination with other agencies, the contractor shall work out the actual time required to complete his part of the job in respects and inform the company.

Revision of rates is not allowed and will be not paid for any reason due to unexpected increase in the cost of the materials or delay in completing the works etc.,

No labour hutment is allowed inside the premises.

The areas is in “No smoking Zone” therefore smoking is strictly prohibited. All workmen, Mastri, supervisor and Engineers wearing shoes and safety helmets are only allowed to enter the gate.

Every day contractor / his supervisor should take necessary “ Work permit ” from the company engineer before starting the job.
Workers are not allowed to sleep during night and cook good inside the premises.

Work to be carried out only under supervision of the qualified engineer.

Contractor should strictly following safety guidelines. Contractor should use only angle/pipe scaffolding. Wooden scaffolding is not allowed. All contractor’s people need to undergo induction/safety training and formal interview by company selection committee.
Contractor shall submit a copy of competency certificates like wiremen license, supervisor’s license, IBR welder license etc., issued by competent authority before starting the work.

Contractor shall maintain daily master roll book for his people at site. Based on that, ESIC & PF contribution to be made.

**COMPANY SAFETY GUIDE LINES**

**WORKING BELOW GROUND LEVEL:**

Check that there are no underground cables/ water/sewage lines prior to start of work area. If found inform site in-charge. Disconnect power supply to any cables found in work areas with permission.

For pits deeper than 3 feet workmen should be provided with lifelines. Ladders should be provided for quick escape from the pit. Provide firmly supported side shuttering or shoring to prevent accidental collapse of earth into pits; cordon off the area around the pit to prevent accidental falls. ( cordon must be at least 3 feet beyond the pit edge) excavated earth from the pit must be stacked only beyond the cordon.

Refill the pit promptly on completion.

In case pits need to be left open for any reason, ensure proper covers over the pits.

**WORKING AT HEIGHTS :**

All personnel working at heights beyond 1.8M should wear safety belts.

Ensure that safety belts are tied security to anchors while working at heights.

Ensure that rigging is well anchored to solid supports prior to erecting items like trusses at a height.

Ensure that debris is cleared on a daily basis from work spots.

Ensure that a nylon safety net is securely fitted under the trusses to provide safety against accidental falls to personnel ( who will need to have safety belts securely fastened) working on the trusses and roofing. Alternatively well-supported platforms with protected railings should be used a height suitable for personnel to work while standing.

Ensure that roof top ladders are used while laying and working on the roof.

Ensure that ladders used for climbing to heights are firmly secured against slippage.

All scaffolding should be in steel frames.

Scaffolding should be provided with 3 feet wide working platforms. The platforms should be provided with protective railings.

**WORKING WITH ELECTRICITY**

Ensure proper earthing of all electrical machines used.
Ensure that all connections are taken throughout earth leakage’s circuit breakers. Providing ELCB on the main distribution board prevents accidental shocks.

Ensure that welders always use suitable welding goggles and gloves while welding.

Ensure availability of 2 CO2 type fire extinguishers at any easily accessible location at site for fire fighting.

Provide a paid of fire buckets filled with dry sand for fire fighting at site.

As far as possible DC generators sets shall be used instead of AC transformer sets.

Contractor shall get his welding sets certified by inspector of electrical department.

The welding transformer shall be fed through an armored cable.

All connections from main to individual M/C (such as cutter, planer, compressor etc) to be taken through shielded cable and 3-pin plug only.

The portable machines should be of fully insulated or plastic body. No metal body is allowed.

During welding the earthing to be provided directly to the member to be welded throughout cable only not using any reinforcement rod/angles.

PERSONAL PROTECTIVE GEAR

Following is a list of items to be provided to workmen by the contractor as and when required the items must be ISI certified.

Safety shoes
Hard hats
Safety belts
Goggles
Gloves
Safety nets
Roof top laddes

GENERAL

BREAKING WORKS:

Workmen engaged in breaking stones/chipping of concrete should wear safety goggles.
OTHER CONDITIONS:

CONTENTS:

A) SPECIAL CONDITIONS
B) TECHNICAL SPECIFICATIONS

Chapter 1  INTERNAL ELECTRIFICATION
Chapter 2  POWER CONTROL CENTERS
Chapter 3  LAYING OF CABLES
Chapter 4  EARTHING
Chapter 5  STANDARD DRAWINGS
   GI PIPE EARTH STATION
   COPPER PLATE EARTH STATION

C) RECOMMENDED MAKES OF MATERIAL

D) SCHEDULE OF QUANTITIES

SPECIAL CONDITIONS

1. General:

1.1 These special conditions shall be read in conjunction with the description of the item of work in the Bill(s) of Quantities, the particular Specifications, Local Statutory Regulations, Indian Standards Specifications/Codes and the drawings. All the above quoted documents, shall be considered supplementary to each other. However, in the case of conflict amongst the various provisions the owner's and the consultants opinion will be final and shall be adopted.

1.2 The tenderer is advised to inspect the site to ascertain the nature of site, access thereto, local facilities for procurement of materials and working labour rates prevalent in the area, in fact all matters affecting his prices and execution of the work. The tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

2. Rates

2.1 The rates quoted shall be deemed to allow for all minor extras and constructional details which are not specifically shown on drawings or given on the specifications but are essential in the opinion of the Engineer-in-charge to the execution of works to confirm to good workmanship and sound engineering practice. The Consultant/SBIIMS reserves the right to make any minor changes during the execution without any extra payment.

2.2 The Consultants/SBIIMS decision to clarify any item under minor changes, minor extras and constructional details shall be final, conclusive and binding on the Contractor.

2.3 The rates quoted by the Contractor shall be net so as to include all requirements described in the contract agreement and no claim whatsoever due to fluctuations in the price of material and labour will be entertained.

2.4 The rates quoted by the Contractor shall include for supplying materials and labour necessary for completing the work in the best and most workmanship like manner to the satisfaction of the Consultant/SBIIMS and which in the opinion of the Consultant cannot be made better, and for
maintaining the same. The rates shall be complete in all respects also including cost of materials, erection, fabrication, labour, supervision, tools and plant, transport, sales and other taxes, royalties, duties and materials, contingencies, breakage, wastage, sundries, scaffoldings, etc., on the basis of works contract. The rates quoted shall include all transport, insurance, octroi, or any other levies applicable under the statute.

3.0 Materials:

3.1 The Contractor shall ensure to the satisfaction of the Consultant/SBIIMS that the materials are packed in original sealed containers/packing bearing manufacturer's markings and brands etc., except where the gross quantity required is a fraction of the smallest packings. Materials not complying with this requirement shall be rejected.

3.2 Testing of Materials:

a) When required by the Consultant / SBIIMS, the Contractor shall provide all facilities at site or at manufacturer's works or in an approved laboratory for testing the materials and/or workmanship. All the expenditure in respect of this shall be borne by the Contractor unless specified otherwise in the Contract. The Contractor shall, when required to do so by the Consultant shall submit at his own cost, manufacturer's certificate of tests, proof sheets, mill sheets etc., showing that the materials have been tested in accordance with requirements of these specifications. The samples for Tests shall be selected by SBIIMS / Consultant.

4.0 Rectification of Defects:

4.1 Any defect in the work done or materials used in the works pointed out by the Consultant / SBIIMS shall be rectified within a week or such extended time as may be allowed in this failing which the said defect shall be got rectified by the Consultant at the risk and cost of the Contractors.

5.0 Conduit and Cables Layout:

5.1 Prior to the pulling of wires, the Contractor shall verify the conduits laid at site by Civil Contractors and satisfy themselves about the adequacy of the same. The contractors shall prepare Wiring layout along with Conduit layout and submit for approval. Prior to laying of the cables, the Contractor shall submit to the Consultant/SBIIMS detailed layout plans of the cable network and get the same approved. The layout plans shall contain particulars regarding size and routes of the cables. The Cables shall be procured only after approval of Layout Drawings.

6.0 Regulations & Standards:

6.1 The installation shall conform in all respects to Indian Standard Code of Practice for Electrical Wiring Installation IS:732 and IS:2274. It shall also be in conformity with the current Indian Electricity Rules and Regulations and requirements of the local Electric Supply Authority in so far as these become applicable to the installation. Wherever this specification calls for higher standard of material and/or workmanship than those required by any of the above regulations then this specification shall take precedence over the said regulations and standards.

7.0 Shop Drawings:

7.1 The Contractor shall prepare and submit to the Consultant / SBIIMS for the approval of detailed fabrication drawings for Main LT Panels/ SwitchGears/ Rising Mains special boxes and Distribution
Board, switch board, special any other equipment to be fabricated by Contractor within 7 days of signing of the contract.

8.0 Completion Drawings:

8.1 At the completion of the work and before issuance of certificate of virtual completion the contractor shall submit to the consultant / SBIIMS layout drawings drawn at approved scale indicating the complete wiring system "As Installed". These drawings shall in particular, give the following information.

(a) Run and size of conduits, inspection, junction and pull boxes.

(b) Location and rating of sockets and switches, controlling the light and power outlets.

(c) Number and size of conductors in each circuit.

(d) Location and details of distribution boards, mains, switches, switchgear and other particulars.

(e) A complete wiring diagram, as installed and schematic drawings showing all connections in the complete electrical system.

(f) Location of telephone outlets, T.V. Music & Fire Alarm outlet boxes, junctions boxes, sizes of various conduits.

(g) Locations of all earthing stations, routes and size of all earthing conductors, manholes etc.

(h) Layout and particulars of all cables.

9.0 Manufacturer's Instructions:

9.1 Where manufacturers have furnished specific instructions, rating to the materials used in this job, covering points not specifically mentioned in the documents, these instructions shall be followed in all cases.

10.0 Completion Certificate:

10.1 On completion of the Electrical Installation a certificate shall be furnished by the Contractor counter signed by a licensed supervisor, under whose direct supervision the installation was carried out.

This certificate shall be in the prescribed form as required by the local supply authority. The Contractor shall be responsible for getting the drawings and Electrical Installation inspected and approved by the local Authority concerned.

11.0 Qualified Competent Supervision:

11.1 The Contractor shall employ competent fully licensed, qualified full time Engineer to direct the work of Electrical installation in accordance with drawings and specifications. The Engineer shall be available at all times on the site to receive instructions from Consultant in the day to day activities, through out the duration of the contract. The foremen shall co-relate the progress of the work in conjunction with all relevant requirements of the supply authorities.
12. Approval from SEB/ Electrical Inspectorate:
The Contractor shall prepare and submit all the relevant drawings as per the Requirement of AP TRANSCO/ Electrical Inspectorate and obtain the Approvals from CEIG, CEA, Hyderabad. No incidental expenses will be paid towards the same. Only statutory fees if any will be paid by SBIIMS.
1.0 Scope:

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

2.0 Standards:


3. Construction

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

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

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

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

4. Capacity of circuit:

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

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

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

Lamp holders: Lamp holders for use on brackets and the like shall have not less than 1.3 cm nipple and all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with shade carriers. Where centre contact Edison screw lamp holders are used, the outer or screw contact shall be connected to the 'middle wire' or the neutral or to the earthed conductor of the
Lamps: All incandescent lamps, unless otherwise specified shall be hung at a height of not less than 2.5 m above the finished floor level.

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

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

5 Recessed MS conduit wiring system

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

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

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

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

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

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

6. MS Conduits:

MS conduit shall be black enameled and of thickness not less than 16SWG and of size minimum 19 mm dia. The Conduit shall conform to IS 9537/ Part II
Bunching of cables: Separate conduits shall be used for bunching of conductors of AC supply and DC supply for lighting and small power outlet circuits.

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

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

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

7. TESTING OF WIRING:

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

i) Insulation resistance test,

ii) Electrical continuity test,

iii) Earth continuity test,

iv) Earth electrode resistance test,

v) Switch polarity test.

i) Insulation Resistance test:
The insulation resistance shall be measured by using 500 v megger between the following points.

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

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

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

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

(ii) Electrical continuity test:

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

(iii) Earth continuity test:

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

iv) Earth electrode resistance test:

The earth electrode resistance shall be tested as specified in section (v).

(v) Switch polarity test:

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

8 Distribution Boards:

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

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

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

All marking shall be clear and legible.

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

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

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

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

The incoming and outgoing cables shall be neatly bunched.

9. MOUNTING HEIGHTS:

The Mounting heights of various fixtures shall be as specified in the Drawings.
CHAPER 2
POWER CONTROL CENTRES

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

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

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

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

3.2 Constructional requirements:
The power control centre shall be of
i) Metal clad, cubicle, indoor, free standing type suitable for Mounting on Built up Trenches with U Channels of adequate size.

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

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

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

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

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

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

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

3.4 Sheet Steel Cubicle:

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

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

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

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

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

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

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

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

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

3.4.6 All doors / covers providing access to live power equipment / circuits shall be provided with tool operated fasteners to prevent unauthorized access.
3.4.7 Provisions shall be made for permanently earthing the frames and other metal parts of the switchgear by two independent connections.

3.5 Metal treatment and finish:
All steel works used in the construction of the switch boards shall have undergone a suitable rigorous metal treatment process so as to remove oxide scales and rust formation and to facilitate a durable coating of the paint on the metal surfaces and also to prevent the spreading of rust, in the event of the paint film being mechanically damaged.

Two coats of Anti Corrosive primer followed by a finishing coat of Epoxy spray power coating of the shade 631 of IS : 5 (i.e. Siemens grey) shall be given. The total thickness of paint shall not be less than 25 micron.

3.6 Bus Bars:

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

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

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

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

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

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

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

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

4.0 Circuit Breakers:

4.1 General:

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

i) A short circuit breaking capacity of not less than 50 KA RMS at 415 volts, 50 Hz AC.
ii) A short circuit making capacity of 105 KA.

iii) A short time withstand capacity of 150 KA for one second.

iv) Electrical overload performance at 6 times the rated current, 100% of the rated voltage as recovery voltage at 0.5 power factor.

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

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

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

4.2 Operating Mechanism:

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

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

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

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

4.3 Protection:

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

4.4 Housing of Circuit Breaker:

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

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

i) `Service' position: With main and auxiliary contacts connected.
ii) ‘Test’ position : with power contacts fully disconnected and control circuit contacts connected.

iii) ‘Isolated’ position : with both power and control circuit contacts fully disconnected.

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

4.5 Interlocking:

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

i) It shall not be possible either to isolate it from the connected position, or to plug it in from the isolated position with the breaker closed.

ii) The circuit breaker can be closed only when it is in one of the three positions or when it is fully out of the castle.

iii) It shall not be possible to open the hinged door of the castle unless the breaker is drawn to the isolated position.

iv) Inadvertent withdrawal of the circuit breaker too far beyond the supporters is prevented by the suitable stops.

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

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

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

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

5.0 Switch Fuse Units:

5.1 General:

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

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

The switch fuse units shall be double break and have quick make break mechanism, designed to ensure positive operation.
All switch fuse contacts shall be silver plated at the current transfer surfaces.

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

5.2 Interlocks and Safety:

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

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

5.3 HRC Fuses:

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

6.0 Current Transformers.

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

7.0 Indicating / Integrating Meters:

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

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

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

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

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

10.0 Indicating lamps and push buttons:

Indicating lamps shall be of the LED type of low watt consumption, provided with series resistors where necessary and with translucent lamp covers. Bulbs and lenses shall be easily replaceable from the front.
Push buttons shall be of the momentary contact, push to actuate type fitted with self-reset contacts and provided with plates marked with its junctions.

11.0 **Cable terminations** :

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

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

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

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

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

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

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

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

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

13.0 **Terminal blocks and labels** :

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

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

Provisions shall be made for label inscriptions.

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

14.0 **Tests** :

i) The power control centre shall be completely assembled, wired, adjusted and tested for operation under simulated conditions to ensure correctness of wiring and interlocking and proper functioning of all components.
ii) Each power control centre and components shall be subjected to standard routine tests as per applicable clauses of relevant standards.

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

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

i) Outline dimensional drawing of the PCC showing the general arrangement indicating the following:
   a) Busbar clearances;
   b) Power and control cable entry points;
   c) Configuration of busbars;
   d) Details of support insulations and spacings;
   e) Outgoing power cable termination arrangements.

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

iii) Cubicle wiring diagram.

iv) List of Firements with Ratings & models / Models

16.0 Installation Testing and commissioning:

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

The pre-commissioning tests as required shall be done and the PCC shall be commissioned.
CHAPTER 3
LAYING OF CABLES

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

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

3.0 Laying of Cables:

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

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

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

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

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

3.1.6 A cable loop of about five meters length and as directed by the Engineer-in-Charge / SBIIMS shall be provided at the following locations.
   a) Near the termination points
   b) Near to the straight through joint

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

3.1.8 Whenever cable passes through hume pipes/GI pipes embedded across the wall in a building, both the ends of the pipe shall be suitably sealed.
3.1.9 Identification tags indicating the size of the cable and feeder designation shall be securely attached at both ends of the cable. Such tags shall also be attached to the cable at intervals of 50 Mtrs. The materials of the tag shall be of either 12 SWG GI sheet. In case of plastic, the details have to be engraved and in case of GI sheet, the details should be punched. Cable route markers shall be provided at the intervals of 200 M with a minimum of one number route marker. The details of the route makers shall be as per the drawing. At the locations of straight through joints, necessary joint-markers shall be provided.

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

3.2 Cable laid in ground :

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

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

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

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

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

3.3 Cables laid in built up trench :

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

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

3.4. Cable terminations and straight through joints :

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

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

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

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

3.5 **Sealing boxes**:

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

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

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

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

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

In all cases where screwed plugs are used, one or more air vents shall be provided to ensure complete expulsion of air and total filling of the box with compound.

3.5.6 The box shall be of sufficient length to allow for manipulation of the insulated cover without damage to them or to the insulation.

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

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

4.0 **Testing**

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

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

Tests conducted shall be as per Indian Standards and National Electrical Code.
CHAPTER 4
EARTHING

1.0 SCOPE:

This specification is intended to cover the requirements of supply, installation, testing and commissioning of
a) Pipe earthing
b) Plate earthing
c) Strip earthing

2.0 STANDARDS:

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

3.0 Earth electrode arrangement:

3.1 Pipe electrode:

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

3.1.2 Electrodes shall be embedded below permanent moisture level.

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

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

3.2 Plate electrode:

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

3.2.1 GI plate electrode : 600 x 600 x 6 mm thick.
3.2.2 Copper plate electrode : 600 x 600 x 3.15 mm thick
3.2.3 The electrode shall be buried in ground, with its faces vertical and top not less than 2.5 M from the surface of the ground.

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

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

3.3.1. Strip electrode shall not be smaller than 25 x 1.6 mm, if of copper and 25 x 3 mm, if of galvanized iron and steel. If round conductors are used as earth electrodes, their cross sectional area shall not be smaller than 3 sq.mm, if of copper and 6 sq.mm, if galvanized iron and steel.

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

4.0 General:

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

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

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

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

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

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

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

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

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

5.0 Testing:

The earth resistance of each electrode shall be measured by using a reliable and calibrated earth megger and the value shall be as per IS/IE rules.
### LIST OF I.S.CODES FOR INTERNAL ELECTRIFICATION INSTALLATIONS

**B.**

1. **EXTERNAL ELECTRIFICATION** wiring installation (system voltage not exceeding 650V)  
   - IS 732 - 1989

2. Graphical symbols used in Electro-technology art-XI-Electrical Installation buildings  
   - IS 2032-1969

3. Fire safety of buildings (General) Electrical Installation  
   - IS 1646-1961

4. 3 pin plugs and sockets  
   - IS 1293

5. Earthing.  
   - IS 3043-1966

6. Rigid steel conduits for electrical wiring  
   - IS 9537-PII-1989

7. Fittings for electrical wiring  
   - IS 2667-1964

8. Flexible steel conduits electrical wiring  
   - IS 3430-1966

9. Accessories for rigid steel conduit insulated cables  
   - IS 3837-1966

10. General and safety requirements for electric lighting fittings  
    - IS 1913-1969

11. Protecting of buildings and allied structures against lightning  
    - IS 2309-1967

12. Busbar ratings  
    - IS 8084-1976

13. On load change over switches  
    - IS 4064-1978
SPECIAL CONDITIONS OF CONTRACT

GENERAL

1.1 These conditions are meant to amplify the specifications. If any discrepancy is noticed between these conditions, Specifications, Bill of Quantities and Drawings the most stringent of the above shall apply for execution of the work.

1.2 The materials, design and workmanship shall satisfy the specifications contained herein and Codes referred to. Where the technical specifications stipulate the requirement in addition to those contained in the Standard Codes and specifications those additional requirements shall also be satisfied. In the absence of any Standard/Specifications covering any part of the work covered in this tender document, the instruction/directions of Consultant will be binding on the contractor. The contractor shall quote as per specification and shall not be accepted to deviate from the same. No alternative offer shall be accepted for the works.

1.3 The scope of this section is to describe materials and systems for Heating, Ventilation & Air Conditioning (HVAC) which form together with the project documents, a complete volume of work and quality description.

1.4 All HVAC works shall be of high quality, complete and fully operational including all necessary items and accessories whether or not specified herein. All HVAC works shall be completed in accordance with the regulations and standards to the satisfaction of the Consultants. The general provisions, special provisions and general requirements apply to the entire installation.

1.5 During the progress of work completed portion of the building may be occupied and be put to use by the owner but the contractor shall remain fully responsible for the maintenance of Heating, Ventilation & Air-conditioning works till the entire work covered by this contract is satisfactorily completed by him and handed over to the owner.

1.6 Contractor shall calculate the capacities for areas and confirm the inside conditions specified in the basis of design. Contractor shall be liable to make do any changes/modifications to the system for achieving the inside conditions without any extra expenditure to the client.

2.0 RATES

2.1 The rates quoted shall be deemed to allow for all minor extras and constructional details which are not specifically shown on or given in the specifications but are essential in the opinion of SBIIM / Owner / Consultants to the execution of works to conform to good workmanship and sound engineering practice. The SBIIM / Owner/Consultants reserve the right to make any minor changes during the execution without any extra payment.
2.2 The Consultants decision to clarify any item under minor changes, minor extras and constructional details shall be final, conclusive and binding on the Contractor.

2.3 The rates quoted by the Contractor shall be nett so as to include all the requirements described in the contract agreement and no claim whatsoever due to fluctuations in the price of material and labour will be entertained.

2.4 The rates quoted by the Contractor shall include for supplying materials and labour necessary for completing the work in the best and most workmanship like manner to the satisfaction of the SBIIM / Owner/Consultants and which in the opinion of the Consultants cannot be made better. The rates shall be complete in all respects including cost of materials, erection, fabrication, labour, supervision, tools and plant, transport, sales and other taxes, royalties, duties and materials, contingencies, breakage, wastage, sundries, scaffoldings etc on the basis of works contract. The rates quoted shall include all taxes, duties, transport, Insurance’s, octroi, or any other levies applicable under the statute.

2.5 In case the rates of identical items under different sub-heads/parts are different, the lowest of these will be taken for the purpose of making the payments.

2.6 The rates for different items are for all heights, depths, widths and positions, unless otherwise specified against the item. No claim in respect of any leads/lifts for any item specified in the Schedule of Quantities, for which separate items for lead/lift do not exist in that schedule, will be entertained.

3.0 AWARENESS OF SITE CONDITIONS AND CARRYING OUT OF SITE INSPECTION PRIOR TO TENDER SUBMISSION

3.1 Prior to the preparation and submission of his Tender, the Contractor shall make visits to the site and carry out all the necessary inspections and investigations in order to obtain all information and to make his own assessment of the conditions and constraints at site, including the means of access to it. The Contractor shall make himself aware of all the features of the site and the working conditions and space and shall, in general, be responsible for obtaining all the necessary and requisite information needed for him to prepare and submit his Tender.

3.2 Should the Contractor require any clarifications he shall seek these in writing from the Owner before submitting his Tender. At no stage will any extra claims be entertained or allowed on any matter or for any reason arising from or as a consequence of the Contractor’s failure to comply with all the requirements stipulated in this Clause.

4.0 WORK AND WORKMANSHIP

To determine the acceptable standard of workmanship, SBIIM / Owner/Consultant may order the Contractor to execute certain portions of works and services under the
close supervision of the SBIIM / Owner/Consultant. On approval, they shall be labelled as guiding samples so that further works are executed to conform to these samples.

5.0 ASSOCIATED CIVIL WORKS

5.1 Major Civil works associated with Heating, Ventilation & Air conditioning installation are excluded from the scope of this tender. These shall be executed by other agencies to suit the requirements of Heating, Ventilation & Air conditioning contractor. Minor Civil & finishing works have to be carried by the Air conditioning Contractor.

5.2 RCC/PCC Foundation for units shall be carried out by other agencies.

5.3 False ceiling to cover the ducts and piping in corridor shall be carried out by other agencies.

6.0 ASSOCIATED ELECTRICAL WORKS

6.1 The electrical works included in the scope of this proposal are the main panel in the plant room controlling the Equipment, power and control cabling of various equipment and sub panels for Air handling units and FCU’s. Supply, Installation, Testing and commissioning of control cables from field components viz., Thermostats, Pressure cut out, Level Sensing devices, Flow Switches and other control/protection components required for proper sequencing and control of major of equipment shall be carried out by the HVAC contractor.

7.0 PROTECTION OF OTHER CONTRACTOR'S WORKS AND SAFETY OF PERSONNEL AT SITE

7.1 In view of other contractors and agencies being engaged on site and shall be working simultaneously, the Contractor shall ensure at all times that during the execution of his work or during the operations and movements of equipment and supply vehicles and machinery no damage or injury is caused to the work or property or personnel of other contractors and agencies.

7.2 In case of any such loss or damage the Contractor shall take full responsibility for the same and shall bear all cost and expenses thereof. The Contractor shall be responsible and liable for all delays caused due to such damage and or injury and for the consequences which the other Contractors and Agencies may have to face or to which they may be subjected to or be accountable for as a result of such delays.

8.0 SAFETY OF MATERIALS AND MEN

The contractor shall provide proper and adequate storage facilities to protect all the materials and equipment including those issued by the owner against damage/theft from any cause whatsoever. The contractor should also protect the personnel/ inmates from any mishap, which could occur due to negligence of Air conditioning contractor.

9.0 TOOLS, TACKLES, EQUIPMENT & SCAFFOLDING
Tools, Tackles & Equipment, necessary for the electrical installation and testing, shall be provided by the contractor. The quoted rates shall take into account for providing any such equipment, which may not form part of the installation, but are necessary for the execution of the job Contractor shall be responsible to make his own arrangement to provide scaffolding/supports etc., necessary for his work.

10.0 ACTUAL ROUTE OF PIPE LINES
10.1 The location of the HVAC duct and pipe lines, indicated in the drawing is only indicative. The actual route of HVAC pipelines may differ from the plans according to the details of the building construction and the conditions of executions of the installations.

10.2 The contractor shall supply and install at his own expense all secondary materials and special fittings found necessary to overcome the interference and to supply the modifications on the route of HVAC duct and pipe lines that are found necessary during the work to the complete satisfaction of SBIIM / Owner/Consultants.

11.0 RATING
Rating of all items shall be appropriate for the conditions on the particular site on which the item will be used. All the equipment shall be fit for continuous work under the most severe conditions of site and shall be rated for the following ambient condition.
- Outdoor temperature 44º C
- Temperature under shade 42º C

12.0 INSPECTION AND TESTING
12.1 The SBIIM / Owner/Consultant reserves the right to request inspection and testing at manufacturer’s works at all reasonable times during manufacture of items for this contract. Tests on site of completed works shall demonstrate among other things.

12.2 That the equipment installed complies with specification in all particulars and is of the correct rating for the duty and site conditions.

12.3 That all items operate efficiently and quietly to meet the specified requirements.

12.4 The contractor shall provide all necessary instruments and labour for testing shall make adequate records of test procedures and readings, shall repeat any tests requested by SBIIM / Owner/Consultants and shall provide test certificates signed by a properly authorized person. Such test shall be conducted on all materials and equipment’s and on completed work as called for by SBIIM / Owner/Consultants.

12.5 If it is proved that the installation or part thereof is not satisfactorily carried out then the contractor shall be liable for the rectification and re-testing of the same as called for by SBIIM / Owner/Consultants at the cost of the contractor. The SBIIM / Owner/Consultants decision as to what constitutes a satisfactory test shall be final.
12.6 The above general requirements as to testing shall be read in conjunction with any particular requirements specified elsewhere. A test house approved by SBIIM / Owner/Consultants shall carry out all tests.

13.0 TESTING

13.1 All types of routine and other/tests shall be carried out at the works of the Contractor or the manufacturers of the components. The SBIIM / Consultants shall be free to witness any or all tests, if they so desire.

13.2 On completion of the installation, the Contractor shall arrange to carry out various initial tests as detailed below, in the presence of and to the complete satisfaction of the Consultants or his representative. Any defects or short comings found during the tests shall be speedily rectified or made good by the Contractor at his own expense. The initial tests shall include but not be limited to the following:

13.3 To operate and check the proper functioning of all electrically operated components viz. Compressor motor, fan, Air handling unit etc as well as other electrical motors.

13.4 To test and check the proper functioning of electrical switch gear, safety and other controls to ensure proper functioning.

13.5 To check the air distribution system and to provide design airflow in all areas by adjusting the grills, diffusers and dampers for air conditioning.

13.6 To check & balance/adjust the water flow in the water circuits for smooth and noiseless flow.

13.7 To check the systems against leaks in different circuits, alignment of motor, ‘V’ belt adjustments, control setting and all such other tests which are essential for smooth functioning of the plant.

13.8 On the satisfactory completion of all ‘Initial’ tests the plant should be considered to the ‘Virtually Complete” for the purpose of taking over by the employer.

13.9 In addition to the ‘Initial’ test the Contractor shall also give two or three continuous running tests of the plant, each of (3) three days duration, and each one during the full specified outside conditions (when the ambient conditions are close to the specified ambient conditions). The first running test may be taken on the completion of the initial test, provided the ambient temperature and Humidity are near their peak.
13.10 The Contractor shall provide all necessary tools, instruments, gauges, flow meter, Anemometer, etc. as may be required for conducting the various tests. He shall also provide necessary lubricant etc and required personnel for the tests.

14.0 SAMPLES AND CATALOGUES

14.1 Before ordering the necessary material for these installations, the contractor shall submit Technical data sheets for Compressors, Condensers, Fan Coil Units, Air handling units, Ductable units, Motors, Insulation material, Piping, Valves & all other instruments & controls to the SBIIM / Owner/Consultants for approval. A sample of every kind of material such as pipe, fittings, insulation of ducts etc., shall be supplied.

14.2 Also the contractor shall ensure that the dimensional details of the equipment fit into the allotted space provided in the building.

15.0 VENDOR AND SHOP DRAWINGS

15.1 The contractor shall prepare and submit to SBIIM / Owner/Consultants for his approval six (6) sets of detailed layout of all HVAC equipment and piping layouts/ducting layouts.

15.2 He shall prepare shop drawings incorporating the details given by manufacturers for the items included in his contract and also owner supplied items and any other items which need to be coordinated with other contractors for interfacing.

15.3 Before starting the work, the contractor shall submit to SBIIM / Owner/Consultants for his approval in the prescribed manner, the shop/execution drawing for the entire installation.

15.4 The SBIIM / Owner/Consultants, reserves the right to alter or modify these, if they are found to be insufficient or not complying with the established technical standards or if they do not offer the most satisfactory performance or accessibility for maintenance. Contractor shall supply in eight (8) sets of all approved shop drawings for execution.

16.0 “AS BUILT”

At the completion of work and before issuance of certificate of virtual completion the contractor shall submit eight (8) sets to SBIIM / Owner/Consultants, layout drawing drawn at appropriate scale indicating the complete system “as installed”.

17.0 INSTRUCTION / MAINTENANCE MANUAL

The Contractor shall prepare and produce instruction, operation and maintenance manuals in English for the use, operation and the maintenance of the supplied equipment and installations and submit to SBIIM / Owner/Consultants in (8) copies at the time of handing over.
The manual shall generally consist of the following:

a) Description of the project.
b) Operating instructions.
c) Maintenance instructions including procedures for preventive maintenance.
d) Manufacturers catalogues.
e) Spare parts list with prices.
f) Trouble shooting charts.
g) Schematic & control wiring diagrams.
h) Type and routine test certificates of major items.
i) One (1) set of reproducible ‘As Built’ tracings on cloth.

18.0 COMPLETION CERTIFICATE
On completion of the HVAC installation a certificate shall be furnished by the contractor countersigned by the licensed supervisor, under whose direct supervision the installation was carried out.

19.0 GUARANTEE:
At the close of the work and before issuance of final certificate of virtual completion by SBIIM / Owner/Consultants, the contractor shall furnish written guarantee indemnifying the owner against defective materials and workmanship for a period of one year after completion. The contractor shall hold himself fully responsible for reinstallation or replacement free of cost to owner, the following:

1. Any defective work or material supplied by the Contractor.
2. Any material or equipment supplied by the owner, which is damaged or destroyed as a result of defective workmanship by the contractor.
3. Any material or equipment damaged or destroyed as a result of defective workmanship by the contractor.

20.0 RATE ANALYSIS
At any time and at the request of SBIIM / Owner/Consultants the contractor shall provide details or break-up costs and prices of any part or parts of the works.

21.0 WATER AND POWER

The contractor will make his own arrangement for water and electricity. If arranged by the Owner the same shall be supplied at one point only and the contractor shall be required to make his own arrangement for distribution lines required for the work. Recovery for the same shall be made at the prevailing rates based on the meter readings to be installed by the contractor at the source point. In case the Owner does not provide power/water they should make arrangements for themselves for carrying out the works.

22.0 MAINTENANCE OF PLANT AND TRAINING OF PERSONNEL

22.1 The Contractor shall arrange to provide, at no extra cost, necessary personnel and material to carry out all routine and special maintenance of the plant as required regularly
for a period of twelve (12) months from date of handing over including monthly inspection by contractor or his technical representative during the guarantee period.

22.2 The contractor shall train the employer’s personnel to operate the plant and carry out routine checks. During the period of installation and testing, if found necessary, the employer shall train such personnel at his works at no extra cost to the Owners.

23.0 PERIOD AND TIME LIMIT FOR VIRTUAL COMPLETION OF WORKS

The period and time limit for Virtual Completion of the Works shall be 8(Eight) calendar months from the date of issue of Work Order to commence works or handing over of site in respect of the award of Contract.

24.0 PROFESSIONAL INTEGRITY AND TEAM SPIRIT

It is the intent of SBIIM / Owner / Architect that this project will be executed in a spirit of team and full professional integrity. Contractor is expected to cooperate with all the agencies involved in the project to fulfil this objective.

25.0 LIST OF APPROVED MAKES

The Contractor shall quote for one of the makes of materials from the list of approved makes. The contractor shall clearly indicate the list of materials proposed to be used by him & enclose the same with the tender.

26.0 WORK PROGRESS REPORT

The Contractor shall provide the following while carrying out the execution/planning of works:

1. Detailed schedule of events with completion date
2. Fortnightly report showing progress of work
3. Program of works for upcoming weeks every fortnightly
4. Updated PERT charts with monthly progress
5. Material flow as well as cash flow scheduling at the beginning of the job. The SBIIM / Owner/Consultant for work scheduling shall approve the same. On completion of detailed engineering the contract shall submit the bill of quantities which will be within a variation of upto5% of approved drawings from the customer/consultant.

27.0 NOISE CRITERION

27.1 All air conditioning equipment and materials (like pumps, chillers, motors, ducts, grilles, acoustic lining etc.,) will be selected, designed and installed in such a manner that the inside noise criterion for all conditioned spaces will be in the range NC-30 to NC-35. The noise levels in conditioned occupied spaces due to all air conditioning equipment will not exceed 50 dB at 125Hz when measured at any point in the occupied spaces less than 1.5
meter above floor level and not closer than 1.5 meter from any supply air register or 1 meter from any return air grill.

27.2 When taking noise level measurements, the background noise level without the equipment operating shall be at least 7 dB below the actual background noise level when the equipment is in operation.

28.0 DESIGN PARAMETERS

Performance rating of the units shall be based as per the requirement.

Temperature of condensing Refrigerant = 135° F
Compressor speed not exceeding = 2950
Refrigerant = R134A / R407 / R410 - Ozone Friendly and Non CFC Refrigerant
Piping shall be sized for the following design Parameters
Maximum flow velocity = 8 Ft/Sec.
Maximum friction = 5 Ft W C/100 Ft.
Design Parameters for duct design shall be:
Maximum flow velocity for A/c ducts = 1500 Ft/Min
Maximum velocity at supply air outlet = 500 Ft/Min

29.0 MODE OF MEASUREMENTS:

Mode of Measurement for payment of items of ducting and piping & their insulation shall be as follows:

29.1 PIPING:

Shall be measured in units of length along the centre line of installed pipes including all pipe fittings, flanges (with gaskets and nuts and bolts for jointing), unions, bends, elbows, tees, concentric and/or eccentric reducers, inspection pieces, expansion loops etc. The above accessories shall be measured as part of piping length along the centreline of installed pipes and no special rates for these accessories shall be permitted. The quoted unit rates for centre line linear measurement of piping shall include all wastage, allowances, pipe supports includes hangers, MS channel, wooden bunches, nuts and check nuts, vibration isolator suspension where specified or required, and cost of excavation, bedding back filling and finishing as required to complete the piping installation as per the specification. None of these items will be separately measured and paid for. However, all valves (gate/globe /butterfly /check -balancing/purge/drain etc.), strainers, orifice plates, temperature gauge, pressure gauges shall be separately measured and paid as per their individual unit rates, which shall also include their insulation as per specifications, piping measurements shall be taken before application of the insulation. The cost shall also include any excavations and making masonry valve chamber with steel cover etc.

29.2 PIPING INSULATION:
Shall be measured in units of length along the centreline of the installed pipe, strictly on the same basis as the piping measurements described above. The linear measurements shall be taken before the application of the insulation, it may be noted that for piping measurements, all valves, orifice plates and strainers are separately measurable and their quoted unit rates shall include the insulation cost in the valve required and as specified.

30.0 TESTS AT SITE:

30.1 GENERAL:

The Contractor must perform all inspection and tests of the system as a whole and of components individually as required, under the supervision of the Engineer, in accordance with the provisions of the applicable ‘ASHRAE’ standards or approved equal and as per site requirements. All tests shall be recorded in the format approved by SBIIM / Consultant/Owner.

30.2 PIPING SYSTEM:

In general pressure tests shall be applied to piping only before connection of equipment and appliances. In no case shall piping, equipment appliances be subjected to pressures exceeding their test ratings. Tests shall be completed and approved before insulation is applied. After tests have been completed, the system shall be drained and cleared of all dust and foreign material. All strainers, valves and fittings shall be cleaned of all dirt, fillings and debris. All water piping shall be tested and proven tight under hydrostatic pressure of 10 Kg/Sq cm, unless stated otherwise in the specifications. The prescribed pressure shall be maintained at least three complete days of Twenty Four hours each.

30.3 ELECTRICAL EQUIPMENT:

All electrical equipment shall be cleaned and adjusted at site before connection of power. The contractor as per relevant IS/IE rules shall carryout the following minimum tests.

Wire and Cable continuity tests.

Insulation resistance test, phase to phase and phase to earth and phase to neutral on all circuits and equipment, using a 1000 volt Megger. The earth resistance between conduit system and earth must not exceed half (0.5) OHM.

The phase rotation tests Operating tests on all protective relays to prove their correct operation before energizing the main equipment including secondary injection test at site. Operating tests on all starters, circuit breakers, etc.
30.4 PERFORMANCE TESTS:
The installation as a whole shall be balanced and tested upon completion and all relevant information including the following shall be submitted to the Owner.

i) Air volume passing through each unit duct, grill etc.,
ii) Differential pressure readings across each filter, fan, coil and through each Pump, Chiller and Condenser.
iii) Electrical current reading in Amperes of full and average load running and starting together with name plate, current in each electrical motor. Daily records should be maintained of hourly readings, taken under varying degrees of internal heat load and use and occupation, of wet and dry bulb temperatures, upstream ‘ONCOIL’ of each cooling coil. Also suction temperatures and pressures for each refrigerating unit. The current and voltage drew by each machine. Any other reading shall be taken which the Engineer may subsequently specify.

30.5 MISCELLANEOUS:
The above tests are mentioned here in amplification but not by way of limitation to the provisions of conditions of contract and specification. Duration of the test shall be continuous 72 working hours. Contractor shall carry out three seasonal tests each of 72 hours duration defect liability period of the approved dates. The date of commencement of all tests listed above shall be subject to the approval of the Engineer and in accordance with the requirements of this specification. The contractor shall supply the skilled staff and all necessary instruments and carry out any test of any kind on a piece of equipment, apparatus, part of system or on a complete system if the owner requests such a test for determining specified or guaranteed data as given in the specifications or on any damage resulting from the tests shall be repaired and/or damaged material replaced all to the satisfaction of the Owner. In the event of any repair or any adjustment having to be made giving sufficient notice, in order that P.M.G or his nominated representative may be present. The contractor must inform P.F.G. when such tests are to be made, giving sufficient notice, in order that P.M.G or his nominated representative maybe present. Complete records of all tests must be kept and 3 copies of these and location must be furnished to the P.M.G. The contractor may be required to repeat the test as required, should the ambient conditions at the time not given, in the opinion of the P.M.G sufficient and suitable indication of the effect and performance of the installation as a whole or of any part, as required.

31.0 MAINTENANCE

The contractor shall maintain the system in the plant room for a period of 12 months, from the date of successful commissioning of the plant. The contractor shall provide all necessary tools and tackles for maintaining of the plant. In case of poor workmanship or system breakdown the contractor shall repair/replace the defective parts without any extra expenses to the client. This clause shall be in vogue till the guarantee period of the system.
32.0 The Tenderer shall quote his best competitive price for the job in line with the specification.

33.0 PENALTY

In case the units supplied by the manufacturer is not within the specified limits as per tender schedule he shall compensate the for client the expenses incurred by virtue of power or any other means. Over and above he shall compensate for the expenses incurred in running the plant until it is put back to the rating specified and confirmed by SBIIM / consultants/owner. In case the job is not completed within the stipulated time, the contractor shall be penalized at rate of 0.5% of the total contract value per week of delay up to a maximum of 10% of the total contract value.

34.0 TENDER DOCUMENT

The contractor shall submit the tender document duly signing every page of the document. He shall also submit the technical information totally as per the tender document. In case, any technical information is left unfilled the tender would be summarily rejected without any further intimation to the contractor.
SPECIFICATIONS FOR INDOOR UNITS

A. Cassette type indoor units.

These units shall be installed between the bottom of finished slab & top of false ceiling.

The maximum allowable height for the cassette type units shall not exceed 350 mm.

The unit shall be pre charged with first charge of R 134A / R 407 / R 410 refrigerant. Additional charge shall be added as per refrigerant piping at site.

The unit must have in built drain pump, suitable for vertical lift of 750 mm.

The unit casing shall be Galvanized Steel Plate / or as per manufacturer’s specifications.

Unit must be insulated with sound absorbing thermal insulation material, Polyurethane foam. The noise level of unit at the highest operating level shall not exceed 42 dB(A), at a vertical distance of 1.5 m from the grille of the unit.

Unit shall have provision of connecting fresh air without any special chamber & without increasing the total height of the unit (288 mm maximum).

The unit shall be supplied with suitable decorative panel.

The unit shall be supplied with Resin Net filter with Mold Resistance. The filter shall be easy to remove, clean & re install.

The unit will be connected in series to a suitable outdoor unit & it must be possible to operate the unit independently, through cored/ cordless remote specified in the “Bill of quantities”. The unit will be further connected to Intelligent Building Management System (To be supplied by other vendors) & it shall be possible to operate the unit through this IBMS system.

The unit shall be supplied with following from the factory with following:

Operation Manual
Installation Manual
Paper pattern for installation
Drain hose/ Clamp metal/ Washer fixing plate/ Sealing pads/ Clamps/ Screws/
Washer for hanging bracket/ Insulation for fitting

B. Wall Mounted Units.

Wall mounted units must be compact & stylish design that does not detract from the Décor of the room.
The unit shall be precharged with first charge of R 134A / R 407 / R 410 refrigerant.

Additional charge shall be added as per refrigerant piping at site.

Each indoor unit must have electronic expansion valve operated by microprocessor thermostat based temperature control to deliver cooling/ heating as per the heat load of the room.

The unit must have provision of adding drain pump kit if required & specified. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

Unit must be insulated with sound absorbing thermal insulation material, polystyrene/Polyethylene foam. The noise level of unit at the highest operating level shall not exceed 46 dB(A), at a vertical distance of 1.5 m from the grille of the unit.

The unit shall be supplied with Resin Net filter with Mold Resistance. The filter shall be easy to remove, clean & re install.

The unit grille must be washable with soap solution.

It shall be possible to set minimum 5 steps of discharge angle by remote controller.

It shall be possible to fit drain pipe from either side of the unit (Left or right)

The unit will be connected in series to a suitable outdoor unit & it must be possible to Operate the unit independently, through corded/ cordless remote specified in the bill of quantities. The unit will be further connected to Intelligent Building Management System(To be supplied by other vendors) & it shall be possible to operate the unit through this IBMS system.

The unit shall be supplied with following from the factory with following:

Operation Manual
Installation Manual
Installation panel
Paper pattern for installation
Insulation tape/ Clamps/ Screws

A – 1: COPPER TUBING.

The parent material used for air – conditioning system refrigerant tubing should be Copper tubes, tubes and fittings conforming to following specifications:

1. Material composition should be conforming to C-1220 (JIS-H-3300) or C-12200 (ASTM). It should have a minimum Copper content of 99.9 % and Phosphorus content between 0.015
% and 0.040 %. It should have low residue (below 0.038 gm/sq mtr.). The material should also be as per the RoHS norms specified by EU; that is, Mercury, Chromium and Lead contents below 1000 ppm, and Cadmium content below 100 ppm.

2. Physical properties of the material should conform to JIS-H-3300 or ASTM-B-68 & B-75, should be tested for Tensile/elongation/hardness/grain size tests as per ASTM B-280.

3. Dimensional tolerance should be as per JIS-H-3300 or ASTM-B-251. The tubes should be tested using non-destructive Eddy current test before the final anneal, as per JIS-H-3300 or ASTM-E-243.

4. Heat treatment should be carried out in non-oxidizing atmosphere to ensure oxygen free and Cuprous oxide-free surface.

5. Proper certificates describing composition and results of all tests carried out must be supplied with each consignment. These certificates, along with check results for dimensional and thickness accuracy are recommended to be carried out for every delivered lot, should be maintained till handing over of the project.

6. Tubes should have 360 degree concentric wall thickness along their entire length.

7. Wall thickness for soft tubes (bright annealed mirror finish) should be 0.8 mm for ¼", 3/8" & ½" tubes, 1.0 mm for 5/8" tubes, 1.2 mm for ¾" tubes. Wall thickness for hard tubes should be 1 mm for 7/8", 1" and 1.1/8" tubes, 1.1 mm for 1.1/4", 1.2 mm for 1.3/8" and 1.3 mm for 1.5/8" tubes.

8. Wall thickness for elbows and fittings should be minimum 0.2 mm more than corresponding tube/tube size.

9. For 1/4" to sizes up to ¾", pulley type benders should be used for soft tubes and brazed joints should be avoided as far as possible. Similarly, for half hard tubes of size 3/4" or more, one side expanded tubes must be used and use of couplings should be avoided as far as possible.

A -2 : TUBING DESIGN:

1. Contractor should study the tender/GFC drawings carefully, and should carry out detailed survey of site, relating the drawings with site, and understand the system design and site limitations.

2. Contractor should also collect final architectural and reflected ceiling plans from client and study the drawings for any mismatches with the HVAC drawings received.

3. Contractor should discuss any such mismatches and any doubts regarding system
design with the consultant and get all doubts clarified.

4. Before commencement of tubing work, proper shop drawings must be generated by the contractor, and same should be got approved from the consultant. The drawings must clearly indicate schematic flow diagrams for various circuits, tube sizes, description and quantities for refrigerant joints, indoor and outdoor unit models and room / block /floor names, tube routes, levels for horizontal tubes, details regarding insulation type and thickness and surface treatment for insulation, typical and critical sections and any other details to explain the entire tubing layout to the installer.

5. Tube sizing and routing must be carried out taking into consideration various site constraints and system manufacturer’s recommendations.

6. Care should be taken to design tubing as per the manufacturer’s recommendation for maximum tubing total length, maximum tubing length after first tapping, vertical height difference between outdoor and indoor units etc. and necessary corrections should be carried out in outdoor unit capacity if required.

A - 3: REFRIGERANT TUBING INSTALLATION WORK:

1. The installer must first study the shop drawings in detail with respect to the site condition and point out any fouling / alternatives to the agency prepare shop drawing sand necessary revisions must be carried out in the drawings, to be approved by consultant.

2. The layout must be marked on the true ceiling and any civil openings required should be marked and got done from concerned agency.

3. Supports as described in BOQ / specifications should be installed, leaving adjustable free length for supports.

4. Before installation, the tubes and tubes must not be removed from their original packing. Proper storage of tubing is a must to maintain the temper of the tubes / tubes. Any abrasion on ends / surface, or any in grace of dirt / dust must be avoided. Proper Polyethylene sheets should be used for covering the tubes and tubes, while wooden pellets and soft expanded Polyethylene / rubber sheets should be used as floor supports.

5. Necessary loops / slopes must be followed as recommended by system manufacturer.

6. Tubes must be cut to required sizes using cutting tools recommended by system manufacturer.

7. Using proper quality of brazing set, Oxygen / Acetylene and Copper brazing rods having minimum 2% Silver content.

8. During brazing, Nitrogen must be filled in the Copper tubing at a mild positive
pressure and must be kept bleeding out continuously, to prevent any oxidation of parent material.

9. After tubing work, each circuit should be pressure tested as per the system manufacturer’s recommendation and as per the procedure described in the following paragraphs. A certificate mentioning the test pressure, time of first and final pressure readings, make, model, serial number, range and least count of the gauge used, along with a copy of valid calibration certificate must be maintained, duly signed by the inspecting technician, and client /PMC representative.

10. After pressure testing, insulation must be completed as per the material, make and thickness mentioned in the approved shop drawing. The joints of insulation must be sealed by minimum 50 mm wide Aluminium adhesive tape. Care should be taken to avoid any air gaps between tube / tube and insulation sleeves, and between two insulation sleeve joints.

11. Proper tagging must be carried out to trace the tubing to respective indoor and outdoor circuits.

12. The tubes exposed to sunlight must be covered / cladded / treated to prevent damage from UV radiation and bird pecks / tampering, as mentioned in the BOQ. The cladding should be made out of 26 G Aluminium sheet or G.S.S. sheet. While cladding, care should be taken to avoid penetrating the insulation by screws. Short screws Of metallic straps should be used for securing cladding sheets. Instead of cladding, glass cloth, with two coats of protective resin should be used.

13. While charging refrigerant, manufacturer’s recommendations must be strictly followed, and charging must be carried out using proper charging hose, gauge manifold with calibrated gauges and electronic weigh scale. Further leak check using a gas leak detector should be carried out. Charging must be carried out after proper evacuation of the tubing. The quantity of refrigerant to be charged should be calculated by totalizing the liquid tube volume as per the manufacturer’s recommendation.

A – 4 : RECOMMENDATIONS FOR PRESSURE TESTING:

Refrigerant tubes carry refrigerant at pressures different from atmospheric pressure. When pressure inside tubes is more than atmospheric pressure, refrigerant may escape to the atmosphere, causing commercial loss due to loss of refrigerant, inefficient system performance or even system breakdown and contamination of surroundings. When pressure inside the tubes is less than atmospheric pressure, such as in case of suction tubes of some low temperature refrigeration machines, or during pump-down cycle of normal air-conditioning systems, leakages in tubes leads to ingress of air and moisture, causing severe system damage. Therefore, it is a must that the refrigerant tubing is thoroughly tested for leakages. Pressure testing for any tubing must be carried out at a pressure higher than the maximum operating pressure within the system. It is recommended that the pressure recommended by manufacturer be followed very strictly.
Testing at lower pressures may lead to non-detection of some small leakages, while testing at higher pressures may lead to damage to some factory manufactured components within the system. Generally, for R-410 systems a pressure of around 650psig is used. Nitrogen is the most common gas used for carrying out pressure testing. It has numerous advantages, some of which are listed below:

1. Nitrogen is easily available as a commercial gas packed in easy to handle cylinders.

2. Nitrogen, being the most abundant component of the atmosphere, is safe for leaking out without contaminating the atmosphere.

3. Nitrogen is less costly as compared with other gases.

4. Nitrogen is safe for handling and testing.

5. Nitrogen does not readily react with system components Pressure gauge/s used for testing must be calibrated and a calibration certificate with traceability to a Government(National) Physical Laboratory must be documented. The gauge should be capable of measuring pressure at least 10% above the reading to be recorded.

A – 5: PROCEDURE FOR CARRYING OUT PRESSURE TEST

1) Ensure that the tubing to be tested is properly secured/supported and the openings have been sealed off as per manufacturer’s recommendation.

2) Install pressure gauge/s at strategic location/s where it shall not be tampered with, at the same time, should be easily visible.

3) Install a valve and connecting tubing so that the open end of the tube reaches the cylinder outlet without moving the cylinder.

4) Connect the tube to the cylinder and after ensuring proper connection, crack open the cylinder valve, keeping an eye on the pressure gauge. Let the pressure rise to around 10 psig.

5) Check for proper sealing of all flanged / flare nut joints or valves/ valve glands looking for noise of escaping Nitrogen and seal same.

6) Open the cylinder valve again and raise the pressure to 200 psig.

7) Check the tube line for major leakages at brazed joints, elbows, valve glands, equipment end connections and tube seams with the help of soap water. Make up the leaks by tightening nuts. If the leaks are in brazed joints, flush out Nitrogen and carry out necessary re-brazing.

8) Open the cylinder valve again and increase the pressure to 150 psig less than the final
test pressure. Repeat leak check as above.

9) Open the cylinder valve again and slowly raise the pressure to the manufacturer recommended pressure. Carry out a thorough leak check.

10) Record the pressure and time. Let the pressure stand for 24 hours without tampering. Check the pressure again after 24 hours. If pressure has dropped, the tubing should be checked very thoroughly for minor leakages. It is important to follow this 24 hours period as it gives enough time to detect minute leakages, and it removes the doubt created by thermal expansion of Nitrogen (as after exact 24 hours, ambient conditions are generally same).

11) In case of tubing extending to lengths more than 30 m and/or having more than 20 site fabricated joints, the pressure should be recorded after 24 hours as well as after 48 hours, so that all leakages are detected and made up.

12) After detecting and making up any leak, the pressure testing must be carried out once again from beginning.

A - 6 : DOCUMENTATION RECOMMENDED FOR ENSURING PROPER QUALITY ASSURANCE:

1. Manufacturer’s certificate with every Delivery Challan declaring composition of parent material
2. Signed and approved Shop drawings approved by SBIIM / Client / Consultant, prior to start of work
3. Pressure test report signed by SBIIM / Client / Equipment manufacturer / PMC / Consultant.
4. False Ceiling closure check list duly signed by SBIIM / Client / Equipment manufacturer / PMC / Consultant.

GENERAL:

ACR GRADE COPPER TUBES AND FITTINGS : SIZES AND SPECIFICATIONS

Tube material Specification:
(CFC- free refrigerant compatible tubes produced using Total loss lubricants)

1. De-oxidized High Phosphorized copper (DHP grade) raw material, with Chemical Composition of Copper = 99.9 %; Phosphorus = 0.015 to 0.040 %
2. RoHS Compliant
3. 360 degree concentric Wall thickness along the entire length of the tubes

4. Half hard drawn copper tubes should confirm to ASTM B75/ASTM280 (C12200) / JIS H:3300(C1220) / BS2871 part 3 (C106). Use Half Hard Temper Type for tube sizes above 19.1 mm.

5. Soft copper tubes, bright annealed (mirror finish) should confirm to ASTM B68 / JIS H:3300

6. Super clean quality with low residual content below the permissible levels of 0.038 g/m2 for compatibility with use of CFC-free refrigerant.

7. 100 % Eddy Current Tested Tubes are to be used

8. Proper packaging, Storage and Traceability of the tubes.

Copper tube and Fittings Sizes and Insulation Specifications for CFC-free Refrigerant.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>OUTER DIAMETER IN INCH &amp; (MM)</th>
<th>WALL THICKNESS IN GAUGE &amp; (MM)</th>
<th>LENGTH IN FEET &amp; (MTRS.)</th>
<th>TEMPER</th>
<th>WEIGHT PER METER (kg.)</th>
<th>SOCKET AND ELBOW THICKNESS IN SWG &amp; (MM)</th>
<th>RUBBER INSULATION THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1/4&quot; (6.4 mm)</td>
<td>21 (0.8 mm)</td>
<td>50' (15.24)</td>
<td>Soft</td>
<td>0.1265</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>2.</td>
<td>3/8&quot; (9.5 mm)</td>
<td>21 (0.8 mm)</td>
<td>50' (15.24)</td>
<td>Soft</td>
<td>0.199</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>3.</td>
<td>1/2&quot; (12.7 mm)</td>
<td>21 (0.8 mm)</td>
<td>50' (15.24)</td>
<td>Soft</td>
<td>0.2714</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>4.</td>
<td>5/8&quot; (15.9 mm)</td>
<td>19 (0.99 mm)</td>
<td>50' (15.24)</td>
<td>Soft</td>
<td>0.4241</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>5.</td>
<td>3/4&quot; (19.1 mm)</td>
<td>19 (0.99 mm)</td>
<td>50' (15.24)</td>
<td>Soft</td>
<td>0.5147</td>
<td>18 (1.2mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>6.</td>
<td>1/4&quot; (6.4 mm)</td>
<td>21 (0.8 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.1265</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>7.</td>
<td>3/8&quot; (9.5 mm)</td>
<td>21 (0.8 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.199</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>8.</td>
<td>1/2&quot; (12.7 mm)</td>
<td>21 (0.8 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.2714</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
</tr>
<tr>
<td>9.</td>
<td>5/8&quot; (15.9 mm)</td>
<td>19 (0.99 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.4241</td>
<td>18 (1.2mm)</td>
<td>15mm</td>
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<tr>
<td>10.</td>
<td>3/4&quot; (19.1 mm)</td>
<td>21 (0.8 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.4164</td>
<td>18 (1.2mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>11.</td>
<td>7/8&quot; (22.2 mm)</td>
<td>21 (0.8 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.489</td>
<td>18 (1.2mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>12.</td>
<td>1.0&quot; (25.4)</td>
<td>20 (0.88 mm)</td>
<td>12' (3.658)</td>
<td>Half</td>
<td>0.6054</td>
<td>18 (1.2mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>Tube Size</td>
<td>Diameter (mm)</td>
<td>Length (ft)</td>
<td>Flexibility</td>
<td>Density (g/cc)</td>
<td>Insulation Thickness (mm)</td>
<td></td>
<td></td>
</tr>
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<td>-----------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>1 1/8&quot; (28.6 mm)</td>
<td>19 (0.99 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.7865</td>
<td>18 (1.2mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>14.</td>
<td>1 1/4&quot; (31.8 mm)</td>
<td>18.5 (1.1 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>0.843</td>
<td>16 (1.6mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>15.</td>
<td>1 3/8&quot; (34.9 mm)</td>
<td>18 (1.21 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>1.155</td>
<td>16 (1.6mm)</td>
<td>20mm</td>
</tr>
<tr>
<td>16.</td>
<td>1 1/2&quot; (38.1 mm)</td>
<td>17.5 (1.3 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>1.340</td>
<td>16 (1.6mm)</td>
<td>20mm</td>
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<tr>
<td>17.</td>
<td>1 5/8&quot; (41.3 mm)</td>
<td>17 (1.43 mm)</td>
<td>12' (3.658)</td>
<td>Half Hard</td>
<td>1.594</td>
<td>16 (1.6mm)</td>
<td>20mm</td>
</tr>
</tbody>
</table>

Use Soft tube only for Indoor Unit Connection

10. **INSULATION TO REFRIGERANT PIPING:**
FR nitrile rubber / cross linked closed cell polyethylene tube insulation of 13mm upto 1” dia pipes and 19mm thick for 1” and above shall be used for copper piping both for suction line and liquid line. All joints shall be sealed with self-adhesive tape or with heat.

11. **COMMUNICATION CABLE AND CONTROL CABLELING:**
Communication cable and control cabling: Communication cable and control cabling should be of non-polar shielded 2 core cables shall be laid in 20 mm dia PVC conduits of required size. PVC conduit should be clamped neatly maintaining a distance from power cables. Cable terminations and dressing shall be done properly and neatly.

12. **DRAIN PIPING:**
PVC drain piping shall be used for the drain piping. Proper care shall be taken to lay the drain piping with sufficient slope and should be clamped or supported at 1.5 m interval. All drain pipe joints shall be done with adhesive. Drain piping should be tested for leaks before commissioning. After testing for leaks, drain pipe shall be insulated with 9 mm thick nitrile rubber tube insulation. Insulation shall be finished with self-adhesive black cotton tape.
DUCTABLE SPLIT AIR CONDITIONERS

1.0 GENERAL
All the Duct-able split air conditioners units shall be factory assembled and tested complete in all respects and conforming to Indian/ASHRAE standards. They shall be supplied pre-charged with refrigerant gas and oil ready for installation at site. The Air-cooled split Unit shall be a two piece assembly comprising of the following:

1 CONDENSING UNIT
a) Hermetically sealed Scroll type compressors with refrigerant cooled motor.
b) Air-cooled Condenser.
c) Condenser fan with sufficient air discharging capacity.
d) Steel structure with sheet metal casing in which the above are mounted.
e) Automatic capacity control devices along with safety gauges/devices.
f) Full charge of R-22 along with refrigerant oil.

2 EVAPORATOR UNIT
a) Direct expansion-cooling coil.

b) Inter connected Seam less copper refrigerant piping.
c) Centrifugal fan with motor.

3.0 CONDENSING UNIT (OUT-DOOR UNIT)
The condensers should be fitted with in built circuit breaker or external weather proof isolater with encloser of required capacity.

3.1 COMPRESSOR
The Scroll compressor shall be Hermetically sealed in design. The compressor shall be a direct shaft mounting of the refrigerant cooled hermetic motor.

2.1.1 EXTERNAL
The compressor housing shall be made of gas tight steel shell which is made up of two shells, these shells are welded together to form a Hermetic (Airtight) seal. One shell is fitted with a suction tube and a Glass-matic terminal used for supplying power to the motor, fitted inside the compressor shell and the other is fitted with a discharge tube. The shell also acts as an oil sump.

2.1.2 INTERNAL
The internal parts shall be accurately machined for installation of the required parts. The Impellers, valve plate and connecting shaft shall all be made of Aluminum alloy having high compressive strength.

LUBRICATION
The oil pump formed by drilling number of holes on the surface shall do the lubrication of the bearing. One end of the crankshaft shall be always dipped in the oil.
CONDENSER COIL
The condenser coil shall be internally grooved copper tube with split aluminum fins. The condenser shall be fitted with a fan of propeller type. The condenser shall be built on an air-cooled design using outside ambient air up to 45ºC to condense the refrigerant. The condenser coils shall be constructed of 12 mm OD integrally enhanced Seamless copper tubes arranged in staggered rows. This shall have a minimum of 3 rows to provide proper heat rejection. The copper tubes shall be mechanically expanded into lanced and rippled Aluminum fins of minimum 0.1mm thick with 13 fins per inch.

CONDENSER FANS
The condenser fans shall be of propeller type with the motor directly fitted to the shaft of the fan. The fan shall have a minimum of 6 blades for delivering maximum air quantity of air without any motor overloading. The fan blade should be either moulded unbreakable plastic or die cast aluminum material. The motor shall be of TEFC construction and shall be of IP 55 protection with resistant to high ambient.

REFRIGERANT PIPING
The refrigerant piping interconnecting all the condensing unit and the evaporator unit shall be of Seamless copper with tube dia as required and having a wall thickness of minimum 2mm and able to withstand pressure up to 450 PSI. Necessary gas mufflers, flexible connections on discharge and suction side shall be provided to reduce vibration / noise of refrigerant/compressor.

SAFETY DEVICES
The condensing units shall be provided with all necessary safety devices, which are essential for proper operation of the equipment. These shall not be limited to the scope of this specification and shall have all safety devices required for optimum operation of the unit. The following minimum safety devices are suggested:

a. Low voltage cutout
b. Low evaporating cutout
c. In-built internal overload
d. Pressure relief valve
e. Low pressure cutout
f. High condensing pressure cutout
g. Motor overload trip/protection

MOTOR
Motor shall be squirrel cage constant speed, suitable for 220+ 10 % volts, 50 Hz, 1phase power supply. Motor speed shall not exceed 1450 RPM. The fan and motor combination selected for particular requirement shall be for the most efficient type so that sound level and energy consumption is minimal. Motor conduit box shall be mounted on exterior of the casing. Wires from the motor to the conduit box shall be protected from the air stream by enclosing in a flexible metal conduit.

EVAPORATOR UNIT

FAN
Fan impeller and housing shall be fabricated from heavy gauge steel. Fan wheels shall be of double width, double inlet forward-curve multi-blade type enclosed in Housing and mounted on a common shaft. Fan housing shall be made of die-formed steel sheets with streamlined inlets and
guide vanes to ensure smooth airflow into the fans. The fan shall be belt driven with pulley having belt-tensioning arrangements. All rotating parts shall be statically and dynamically balanced. Fan speed shall not exceed 1500 RPM and maximum fan outlet velocity shall be 450 meters per minute (1500 FPM). The average air quantity for the air handling units shall be 400 CFM per TR of refrigeration. However the fan should be facilitated with capacity adjustment for lower or higher air quantities as per individual air requirements as the site demands. Stretch less V-Belts should be used. The fan shall be able to deliver the desired air quantity with sufficient static pressure for carrying out the ducting and also be able to add fresh air.

**COOLING / COILS**

Cooling coils shall have 12.5 to 15 mm dia copper tubes min. 24 gauge thick, with aluminum fins firmly bonded to copper tubes assembled in zinc coated steel frame. Face and surface areas shall be such as to ensure rated capacity from each unit and such that the air velocity across each coil shall not exceed 150 meters per minute. The coil shall be pitched in the unit casing for proper drainage. Each coil shall be factory tested at 21 Kg / Sq. cm. air pressure while submerged in water. Tubes shall be hydraulically expanded for minimum thermal contact resistance with the fins. Fin spacing shall be 13 fins per inch. (4-5 Fins/cm.). The units shall be fitted with minimum 3-row coil for giving the cooling effect.

**STEEL STRUCTURES**

The evaporator unit shall be assembled on formed corrosion resistant galvanized sheet metal steel sections which shall be pre treated and finished with epoxy painting/polyester powder coating. The steel structure shall be sturdy enough to withstand transport without getting distorted and when stationary handle the equipment load. There should be proper encasing of unit with acoustic lining in all inside to reduce noise level of the equipment.

**MOTOR**

Motor shall be squirrel cage constant speed, suitable for 220+10 % volts, 50 Hz, 1 phase power supply. Motor speed shall not exceed 1450 RPM. The fan and motor combination selected for particular requirement shall be for the most efficient type so that sound level and energy consumption is minimal. Motor conduit box shall be mounted on exterior of the casing. Wires from the motor to the conduit box shall be protected from the air stream by enclosing in a flexible metal conduit.

**PERFORMANCE**

The performance of the unit shall be proved at site at the time of installation and also the power consumption should not exceed the confirmed rating throughout the period of service of the equipment. The company shall stand guarantee for the aforesaid condition and shall compensate the client in case the power consumption proved at site is more than the stipulated power. The rate of compensation shall be as indicated in penalty clause as given earlier in the conditions of contract.

The contractor shall submit along with the tender the rating charts of the machines offered indicating the percentage capacity, power consumed, rated amperage, locked rotor amps and also inrush currents of equipment at maximum ambient conditions.

**PAINTING**
Shop coats of paint that have become marred during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with enamel paint to match the finish over the adjoining shop painted surfaces.

TESTING
Cooling capacity of various Unit models shall be computed from the measurements of airflow and dry and wet bulb temperatures of air entering and leaving the coil. Flow measurements meters shall be accurately calibrated. The temperature gauges shall be mercury-in glass thermometers. Computed results shall conform to the specified capacities and quoted ratings. Power consumption shall be computed from measurements of incoming voltage and input current.
Sheet metal ducting required for air distribution system is shown in drawings forming part of these specifications. These drawing indicate the duct sizes and configuration required to meet design air distribution requirements and also to provide the Contractor with necessary data for bidding; they are not meant to serve as working drawings which will have to be prepared by the successful contractor, giving due attention to the structural features of the building and to other site requirements, as well as partition layouts, lighting and false ceiling patterns etc, and for which approval has to be obtained from the Architects/Owners.

1. GSS sheets shall be used for ducting. Only new, fresh, clean (unsoiled) and bring sheets shall be used.

2. The thickness of the sheets to be used shall be as shown in the table below:

### 2.2 RECTANGULAR DUCT

<table>
<thead>
<tr>
<th>Dimensions of Ducts (mm)</th>
<th>Guage - G. I.</th>
<th>Guage - Aluminum.</th>
<th>Type of Joints.</th>
<th>Type of Bracings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 600</td>
<td>24</td>
<td>22</td>
<td>G. I. Flange at 2.5 Center.</td>
<td>Cross Bracings.</td>
</tr>
<tr>
<td>601 to 750</td>
<td>24</td>
<td>22</td>
<td>22 x 225 x 3 mm angle frame with 6mm dia nuts and bolts.</td>
<td>25 x 25 x 3 mm MS angles bracing at 1500mm from joints.</td>
</tr>
<tr>
<td>750 to 1000</td>
<td>22</td>
<td>20</td>
<td>25 x 25 x 3 mm angle frame with 6mm dia nuts and bolts.</td>
<td>25 x 25 x 3 mm MS angles bracing at 1500mm from joints.</td>
</tr>
<tr>
<td>1001 to 1500</td>
<td>22</td>
<td>20</td>
<td>40 x 40 x 5 mm angle frame with 8mm dia nuts and bolts.</td>
<td>40 x 40 x 3 mm MS angles bracing at 1500mm from joints.</td>
</tr>
<tr>
<td>1501 to 2250</td>
<td>20</td>
<td>16</td>
<td>50 x 50 x 3 mm angle to be cross braced diagonally with 10mm dia nuts and bolts at 125 center.</td>
<td>40 x 40 x 3 mm MS angle bracing at 1200mm from joints or 40 x 40 x 3 mm MS angle diagonal bracing.</td>
</tr>
</tbody>
</table>

Sheet metal ducts shall be fabricated as per ISI Standards/SMACNA out of galvanized steel sheets. Sheets used shall be produced by hot dip process and galvanizing shall be Class VI - Light Coating of zinc nominal 185 gm/sq. m.

### 2.3 HANGERS FOR DUCT

<table>
<thead>
<tr>
<th>Duct Size (mm)</th>
<th>Spacing (M)</th>
<th>Size of MS angle (mm x mm)</th>
<th>Size of rod - dia (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 750</td>
<td>2.5</td>
<td>40 x 3</td>
<td>10</td>
</tr>
<tr>
<td>751 to 1500</td>
<td>2.0</td>
<td>40 x 3</td>
<td>12</td>
</tr>
<tr>
<td>1501 to 2250</td>
<td>2.0</td>
<td>50 x 3</td>
<td>15</td>
</tr>
<tr>
<td>2251 &amp; above</td>
<td>2.0</td>
<td>50 x 3</td>
<td>15</td>
</tr>
</tbody>
</table>
The fabrication of the ducting including details of transverse joint connections, bracing, scams, etc., for longitudinal joints etc., will be generally as per ISS-655-1963, the intent being to obtain duct pieces that are robust and rigid enough to preclude flutter, buckling etc., and to avoid air leakage’s

Angle iron flanges shall be used

All supports for ducting shall be provided by the successful contractor, MS angles, rods and other sections shall be used as required for the purpose. The supports shall be taken independently to the building structure, in other words they should not be tied on to supports for light fixtures.

All bolts, nuts, rivets, washers, etc., sued for duct joints shall be of GI and not MS.

All duct joints shall be made tight and the interior surfaces shall be smooth. Necessary gaskets of rubber or similar material shall be used to secure tightness of joints.

ALL MS angles, flats, etc., used for flanges, stiffening etc., shall be finished with two coats of Red Oxide and one coat of Black paint. These requirements shall apply to supporting arrangements / members also.

Minimum thickness of structural members employed for supports shall be as per IS 800.

Where ducting is supported from ceiling/roof slab, Anchor grip bolts shall be used to fasten the suspension rods (for duct supports) to the ceiling/roof slab.

All civil works involved including the drilling of holes for fixing the grip bolts and any chipping and finishing of the ceiling/roof slab, if found unavoidable, shall be carried out by the successful contractor at no extra cost.

Elbows, bends, offsets, etc. should be fabricated with a width to radius ratio of not less than 1.0 to 1.5. Alternately, turning vanes should be provided at intervals so chosen that the aspect ratio of the various sections so formed by the vanes will be atleast five.

Turning vanes shall be provided at branch take-offs and collars wherever possible. Similarly, straightening vanes shall be provided in all the collars unless and except in case where conditions at site do not permit their installation.

All supply air diffusers shall be of powder coated extruded aluminum sections and removable core type. Volume control dampers shall be provided for all diffusers.

Return air diffusers shall be identical to supply air diffusers except that they do not incorporate volume control dampers.

Supply air grilles shall be doubt deflection type & powder coated extruded aluminum construction. They shall be complete with volume control dampers of aluminum mounted on grilles. The vanes at the front shall be horizontal while those the rear shall be vertical. The width of the perimeter flanges shall be 32 mm. The vanes shall be 3 mm thick and 25 mm deep.

Return air grills shall also be Powder coated extruded aluminum construction. They shall incorporate (only) horizontal vanes, which shall be fixed. The perimeter flanges shall be 32 mm width. The vanes shall be 3 mm thick and 25 mm deep. The pitch of vanes shall be 20 mm.
All dampers shall be louvered dampers (of GI) of robust construction and tightly fitted in epoxy painted MS angle iron frame. They shall be provided with suitable links, levers and quadrants as required for their proper operation, control or setting in any desired position.

Dampers and their operating devices shall be made robust, easily operable and accessible through suitable access doors in the ducts/ false ceiling. Where required, dampers shall have an indicating device, clearly showing the damper position at all times.

Dampers shall be placed in ducts and at every branch (whether or not indicated on the drawings) for the proper volume control and for balancing the system.

All sheet metal connections, partitions and plenums required to confine the flow of air to and through the filters, fans, etc., shall be constructed of 18 G GI Sheets, thoroughly stiffened with 25 mm x 25 mm angle iron braces and fitted with all necessary doors as required to give access to all parts or apparatus. Doors shall not be less than 450 mm x 600 mm in size.

Where sheet metal ducts sleeves terminate in woodwork, brick or masonry openings, tight joints shall be made by means of closely fitted heavy flanged collars. Connection of ducts to fans shall be of suitable flexible synthetic material.

On completing the erection, the system shall be pressure tested with dry nitrogen or carbon Dioxide. The test pressures shall be as under for R-22

High pressure side

- kg/sqcm (psi) - 28.5 (420)

Low pressure side

- kg/sqcm (psi) - 10.0 (150)

The systems shall hold the pressure for a minimum period of 24 hours without revealing any leaks. After the leak test has been completed successfully, the pressure due to the nitrogen gas/carbon-di-oxide in the system shall be used to blow-out the system.

The system shall then be dehydrated by drawing a vacuum. The vacuum achieved shall be at least as deep as 500 microns and shall be maintained for a period of at least 24 hours after the vacuum pump has been shut off.
INSULATION & ACOUSTIC LINING

THERMAL INSULATION

The scope of this Section comprises the supply and application of insulation to condensate drain piping, refrigerant piping, sheet metal ducting.

The materials used shall be rigid poly urethane foam, suction lines, condensate drain pipes and equipments, while for sheet metal ducting, resin bonded fibre glass in mat form shall be used.

The RPUF used shall conform to the following requirements:

A) Density : Not less than 24 kg/ cum

b) Compressive strength: Not less than 1.73

c) ‘K’ valve : Not greater than 0.019

w/m deg C at 10 Deg. C

d) Water vapour : Not more than 13 mg/Nh.

The fiber glass used for insulation of sheet metal ducts & for acoustic lining shall have a density of not less than 24 kg/cum & ‘K’ value of not less than 0.033 w/m2 Deg C at a mean temperature of 10 dfeg C

The owners / consultants also reserve the right to require that the weights dimensions, etc., of the materials supplied be measured and shown to conform to values specified.

The insulation material used for insulting equipment shall be in the form of panels while for piping the RPUF shall be in the form of pre-formed cylindrical sections

Notwithstanding the above specifications, however, the final choice of the material rests on the owners whose approval shall be obtained before the AC contractor place his order or brings material to site.

Samples of all insulation material specified in various forms i.e. panels, pipe sections, mats, etc., shall be submitted by the successful contractor and approval obtained therefore. The owners/ consultants shall have the right to reject all supplies, which do not conform to the samples so approved.

All insulation on equipment, piping etc. shall be applied only after they have been pressure tested satisfactorily.

Where stipulated, supply and return air ducts running in unconditioned spaces shall be insulated with 50 mm thick fiber glas mats. The fiber glass mats shall conform to the specifications contained in clause 2.2.2. It shall be in the form of blankets incorporating factory laminated 0.009 mm thick aluminium foil. The material shall be as manufactured by KIMMCO – Kuwait / UP TWIGA, the contractor shall submit a sample of the material before placing his order for total requirements.

The blanket shall be so applied that the face incorporating the aluminium foil is in contact with ambient air while the fiber glass material shall be applied directly on to the external surface of the sheet metal ducting.

The insulation shall be applied as under:

Wire brush the surfaces of the ducts to remove dirt and rust.

Apply a thick coat of bituminous primer.
When the primer is still tacky, apply the slabs of insulation material, so that, it hugs the duct/equipment casing snugly. Seal all joints using 75 mm wide self adhesive PVC tape, taking care a minimum overlap of 50mm for all joints.

**ACOUSTIC LINING**

1. Where stipulated the supply air ducts – whether of masonary or sheet metal – shall be lined acoustically using 25 mm thick rigid fiber glass boards with 28 gauge aluminum perforated facing on one side. The density of the material used shall be 48 kg/ cum

The rigid fiber glass boards shall be fixed to the inner surface of the ducts so that the plain fiber glass finish facing will be in contact with sheet metal ducting while the face with RP tissue facing will be in contact with air. The boards shall be fixed using GI bolts, nuts, & washers.

The joints between the boards be sealed using PVC adhesive tapes.

The joints between the boards be sealed using PVC adhesive tapes.

**REFRIGERANT PIPING INSULATION**

Insulation of refrigerant piping shall be carried out with Nitrile Rubber material. The Nitrile Rubber shall be closed cell structure of minimum 13mm thickness.

**Application**

- Clean the surface of the pipe which is to be insulated.
- Select the size of the section and cut the section longitudinally along with length. The cut shall be straight throughout the length.
- Apply a thin layer of Adhesive on the surface of the Pipe and leave it to dry for 2-3 minutes.
- Fix the insulation material after drying and both the surfaces shall be matched properly.
- Apply self adhesive black cotton tape on both the longitudinal and circumferential joints.

4. **FUSIBLE LINK FIRE DAMPERS**

All supply / return air ducts of air handling units and return air openings shall be provided with approved fire dampers of at-least 1/2 hour fire rating. These shall be of approved make. The damper shall be fabricated of 16gauge GSS housing with blades formed out of 1.6 mm sheets. The damper shall be pivoted on both ends using chrome plated spindles in bronze bushes. The stop seals shall be provided on top and bottom of the damper housing. The damper blades shall be held in horizontal position using spring actuator bimetallic fusible link. the damper blades shall close in the event of fire by motor actuation capable of taking signal from the controller.

5. **SUPPLY AND RETURN AIR GRILLS**

Supply and return air grilles shall be of anodized extruded Aluminium construction with adjustable bars. Supply air grills shall be generally double deflection type backed with GI damper. The supply/return air grills being provided with removable key operated volume control dampers. Aluminium supply and return grills shall be powder coated and should have the color of client’s choice as per bill of quantities.

6. **SUPPLY AND RETURN AIR DIFFUSERS**

The supply air diffuser shall be provided with removable key operative volume control dampers. Aluminium supply and return air diffusers shall be powder coated and should have the colour of client’s choice or shall be extruded Aluminium. Supply/return air linear diffuser shall be Extruded Aluminium construction, square, rectangular, or round diffusers with flush fixed pattern or adjustable flow pattern. Diffusers for different spaces shall be selected in consultation...
with the Client/Consultants. Supply air diffusers may be equipped with fixed air-distribution grids, removable key-operated volume control dampers, and anti-smudge rings as per requirements of schedule of quantities.

7 FRESH AIR INTAKE AND EXTRACT LOUVERS
All the louvers shall be rain protection type and shall be fabricated from extruded aluminum section. The louvers shall additionally be provided with heavy duty expanded metal bird screen and Cowl. They shall be factory made with powder coating finish. The louvers shall be provided with control damper with lever for operation and control of fresh air.

TECHNICAL DATA TO BE FURNISHED WITH TENDER

DUCTABLE UNITS

<table>
<thead>
<tr>
<th>Make</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>:</td>
</tr>
<tr>
<td>Capacity (TR)</td>
<td>:</td>
</tr>
<tr>
<td>Actual Capacity at design Conditions (TR)</td>
<td>:</td>
</tr>
<tr>
<td>Refrigerant evaporating temp in Foreinheat</td>
<td>:</td>
</tr>
</tbody>
</table>

1.1 COMPRESSORS

<table>
<thead>
<tr>
<th>Make</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>:</td>
</tr>
<tr>
<td>Compressor type</td>
<td>:</td>
</tr>
<tr>
<td>Speed (Operating) (RPM)</td>
<td>:</td>
</tr>
<tr>
<td>Speed (Maximum) (RPM)</td>
<td>:</td>
</tr>
<tr>
<td>Capacity at 44º F</td>
<td>:</td>
</tr>
<tr>
<td>Suction and 130ºF</td>
<td>:</td>
</tr>
<tr>
<td>Condensation at specified operating speed (TR)</td>
<td>:</td>
</tr>
<tr>
<td>Design suction temp. (Deg. F)</td>
<td>:</td>
</tr>
<tr>
<td>Capacity at design temp. (TR)</td>
<td>:</td>
</tr>
<tr>
<td>BHP consumed at operating conditions</td>
<td>:</td>
</tr>
<tr>
<td>Refrigerant used</td>
<td>:</td>
</tr>
<tr>
<td>Number of compressors</td>
<td>:</td>
</tr>
</tbody>
</table>

1.2 COMPRESSOR - MOTOR:

| Manufacturer | :   |
| Type of motor | :   |
| Rated output (HP) | :   |
| Starting current Amps. | :   |
| Performance characteristics | :   |
| c) Permitted No of Starts per Hour | :   |
| d) Type of Cooling | :   |
| No. of motors (No.) | :   |

1.3 STARTER FOR COMPRESSOR MOTOR:

| Manufacturer | :   |
| Type of starter | :   |
| Max starting current | :   |
| Motor protection incorporated | :   |

1.4 CONDENSER:

| Manufacturer | :   |
| Condenser face area (mm) | :   |
**Thickne of tubes (mm)**

**Material of tubes**: 

**Dia. of tubes (mm)**: 

**Fin material**: 

**Fin thickness**: 

**No. of fins/inch**: 

**Tube surface area (refrigerant side) (Sq. ft)**: 

**Fin surface area (air side) (Sq. ft)**: 

**No. of rows (No.)**: 

**Pressure drop (Ft)**: 

**No. of condensers (each unit) (No.)**: 

**No. of circuits (No.)**: 

### 1.5 **CONDENSER FANS**

**Manufacturer**: 

**Air Quantity (CFM)**: 

**Motor rating (IKW/BKW)**: 

**Fan dia. (mm)**: 

**No. of Fans (Nos)**: 

**Fan material**: 

**Noise Level (DB)**: 

**No. of blades (Nos)**: 

### 1.6 **EVAPORATOR**

**Manufacturer**: 

**Model No.**: 

**Evaporator face area (mm)**: 

**Thickness of tubes (mm)**: 

**Material of tubes**: 

**Dia. of tubes (mm)**: 

**Fin material**: 

**Fin thickness**: 

**No. of fins/inch**: 

**Tube surface area (refrigerant side) (Sq. ft)**: 

**Fin surface area (air side) (Sq. ft)**: 

**No. of rows (No.)**: 

**Pressure drop (Ft)**: 

**No. of Evaporators (each unit) (No.)**: 

**No. of circuits (No.)**: 

### 1.7 **EVAPORATOR FANS**

**Manufacturer**: 

**Air Quantity (CFM)**: 

**Motor rating (IKW/BKW)**: 

**Fan dia. (mm)**: 

**No. of Fans (Nos)**: 

**Fan material**: 

**Motor RPM**: 

**Noise Level (DB)**: 

### 1.8 **REFRIGERANT PIPING**

**Material for pipes**: 

**Thickness of pipe (mm)**: 

**Material of fittings**: 

---

SBI, SME Balanagar Branch, Interior, Electrical & HVAC Tender.
Make of expansion valve if provided : 

1.9 GENERAL:
Over all Dimension (M) :
Length (mm) :
Width (mm) :
Height (mm) :
Operating Weight (Kg) :
Service Clearance Required (mm) :
Noise Level of one Machine (db) :
Noise Level (All Machine Working) :
With Acoustical enclosure (db) :
With out Acoustical enclosure (db) :
Acoustical Enclosure (Give details) :

2.0 INSULATION:
Manufacturer :
Materials :
Density :
Mean ‘K’ value at 50 deg C :

3.0 THERMOSTATS:
Manufacturer/Model :
Type (Snap acting, etc..) :
Electrical Characteristics :
Range :
Differential/throttling range :

4.0 FILTERS:
Manufacturer & Model :
Air Quantity (CFM) :
Filter material :
Filter Area (Sq.Mt.) :
No. of pleats (No.) :
Flange material & thickness :
Filtration level :
Initial & Final pressure drop (mm) :
Filters dimensions :
Efficiency :

5.0 DAMPERS: (Make, Material & Gauge)
Fire Dampers :
Volume Control Dampers :

6.0 GRILLES/DIFFUSERS: (Make, Material & Gauge)
Louver :
Grill’s :
Diffusers :
1. **SCOPE:**
   The scope of this section comprises the supply, installation, testing and commissioning of Double skin Ceiling Suspended Type air handling units of the size and capacity set forth in the Schedule of Equipment.

2.0 **CABINET TYPE:**
2.1 The unit shall be of sectionalized construction consisting of Fan section, coil section, Filter section and drain pan.

2.2 Metallic casing shall be fabricated from 16 Gauge galvanized sheet steel ribbed and reinforced for structural strength and rigidity. 16 Gauge hot section channels shall be used for reinforcing. It shall be sectionalized construction with proper sealing at the joints to make the joints air tight. Fan section and panels with bearing supports shall be reinforced with heavy gauge channels. For CSU/AHU supported on floor, leg packages shall be provided for attachment to the Fan and Filter sections. All edges shall be formed inter locking to stiffen and support the weight and shall be secured with galvanized nuts and bolts.

2.3 Fan impeller shall be of forward curved blade centrifugal type. Impeller shall be of double width double inlet type. Two or three wheels shall be provided for each CSU/AHU. Blower section (includes Scroll, impeller blades, etc.) shall be fabricated from 16/18 gauge galvanized sheet steel. Fan housing shall be made of die formed side sheets with stream lined inlet and guide vanes to ensure smooth air flow into the fans. Fan shaft shall be of solid cold rolled carbon steel, ground and polished. The whole assembly shall be statically and dynamically balanced for smooth operation. Fan shaft bearing shall be of heavy-duty type selected for an average operating life of 100,000 hours. Bearing shall be self-aligning type. They shall be permanently lubricated. Bearing housing shall be fabricated from malleable iron and suitably supported from outside.

   Fan motor shall be mounted on an adjustable sound isolating base located on the top surface above the CSU/AHU.

2.4 Cooling Coils shall be of the fin and tube having Aluminum fins firmly bonded to Copper tube (Seamless solid drain). Capacity of the coil shall be as required under the Schedule of Equipment. Velocity of air across coil face shall not exceed 500 CFM. Tube shall be of 5/8” O.D. and with 10-12 fins per inch. Coils shall be tested at 300 psig Nitrogen pressure in presence of our engineers. Shut off valve (Butterfly type) at the inlet and outlet of coil to be provided. Proper purging and drain arrangement to be made on header of coil. **Copper tube gauge**

   Thickness shall not be less than 20 SWG. Aluminum fins gauge shall not be less than 32 G. Fin punching profile must follow full length air of contact with tube and must be turned at edges to increase rigidity and contact.
**Drain pan shall be constructed of 18 G stainless steel** with sandwich type insulation in-between bottom plates. Necessary support shall be provided to slide the coil in the drain pan. Outlet shall be provided on both the side of drain pan. An extension drip pan shall be provided at proper location outside the casing to catch all drip from external coil connections and valves.

End panel of the coil section casing shall be removable for withdraw of the coil and shall be provided with opening for coil connections.

2.5 Filters shall be cleanable viscous metal AL box type and shall be 50 mm thick. The filter shall be hold with stiffeners in-between made out of hollow SS material.

2.6 **Suitable, easily openable service door (for Internal Maintenance) between coil section and fan section to be provided to enable a person to enter inside**

2.7 **Unit shall be thermally and sound insulated as in section “Insulation”**

2.8 Spring type Anti Vibration Mounting of approved make shall be provided as vibration isolators.

2.9 Sheet metal fresh air louvers with frame, damper, etc. shall be provided in the clear opening in masonry made by the owner.

2.10 The Unit cost shall be complete with all accessories, including the following:
1] Manual air vents at high point and drain at low point. 2] Water Thermometers at Inlet & Outlet.3] Pressure gauges with siphon cocks at Inlet & Outlet. 4) Canvass Connection

3.0 **INSTALLATION:**
The installation of the machine shall be carried out with proper foundation, ant vibration mounts (as recommended by manufacturer), and proper supporting. The contractor shall prepare all the necessary drawings with norms, design, specification given by consultants and shall be approved by the consultant before carrying out the installation work.

4.0 **PERFORMANCE DATA & TESTING:**
Air handling units shall be selected for the lowest operating noise level of the equipment for performance rating and power consumption data with operating points(On Fan Curve) clearly indicated shall be submitted with the tenders and verified at the time of testing and commissioning. The following test result shall be furnished during commissioning in the presence of department’s Engineer;

a) Air Side
- Air Flow Rate in CFM or Cub.M per hour
- Static pressure in mm wg
• Entering Dry bulb & Wet bulb temperature
• Leaving Dry bulb & Wet bulb temperature

b) Water Side
• Inlet temperature in degree C
• Outlet temperature in degree C
• Pressure drop in psig

5.0 PAINTING:
Unit shall be painted with approved type of Epoxy paint (minimum two coats)

6.0 CODES & STANDARDS FOR AIR HANDLING UNIT:
The design, manufacture and performance of AHU shall comply all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed. The equipment shall also conform to the requirements of the latest editions of applicable Indian/U.S.A. standards. Nothing in this specification shall be construed to relieve the vendor of this responsibility. In particular the equipment shall conform to the latest editions of the following standards:

a) ANSI 89.1 Safety code for mechanical refrigeration.
b) IS:659 Safety code for air-conditioning.
c) IS:660 Safety code for mechanical refrigeration.
d) AHRAE Standard-33 methods of testing for rating forced
   Circulation air-cooling and air heating coils.
e) ARI-410 Standard for forced circulation air cooling and air
   Heating coils.

G.I. insulated condensate drain piping with drain valve, upto sump or floor drain within the air handling unit room. The drain shall be provided with proper ‘U’ loop. Only piping and valve shall be measured and paid at unit rate.

7.0 PERFORMANCE DATA:
Air handling units shall be selected for the lowest operating noise level of the equipment. Fan performance rating and power consumption data with operating points clearly indicated shall be submitted with the tenders and verified at the time of testing and commissioning of CSU/AHU.

8.0 DUCTING: AS PER SMACNA (FACTORY FABRICATED)

Ducting shall be fabricated from Galvanised Sheet Class VIII. 24 gauge sheets shall be used for fabrication of duct from 0mm to 750mm, 22 gauge sheets shall be used for 750mm to 1500mm, 20 gauge sheets shall be used for 1500mm to 2250mm, and 18 gauge shall be used for 2251 mm and above. Where ever site made pieces of higher sizes is required IS655 shall be followed up to 90” duct size, and above that 18 gauge shall be used. All ducts should be
supported using 8mm, 10mm, 12mm GI Threaded Rods and GI Slotted Channels duly fixed to the slab using anchor fastener. The plenum shall be provided with MS angle bracing duly painted with red oxide paint and black enamel paint. All duct connections shall have neoprene gasket properly stuck with resin-based adhesive. The joining of two ducts shall be carried out using GI nut bolts only. The ducting joints shall be sealed using silicon sealant, wherever specified in the drawings for clean rooms.

9.0 LAG COATING WITH ALUMINIUM CLADDING FOR EXPOSED DUCT-

Lag coating a Synthetic Rubber based, Low VOC product specially developed for various applications. It is an excellent adhesive to bond Nitrile Rubber to Galvanized Iron or Aluminium duct surface.

The advantages are listed below,
1. Fungal Resistance.
2. Non-flammable in wet state.
3. Fire resistance after drying.
4. Contain no solvents to attack insulating material.
5. High bond strength & low permeability.
6. UV Protection.

10.0 DUCT TYPE DAMPERS:

Duct damper shall be of GI in construction, with opposed blade construction, and with flanged ends. The damper shall be painted properly with proper on–off indication. The dampers shall have phosphor bronze bearing and geared mechanism. The Dampers shall be LOW LEAKAGE TYPE with Neoprene Gaskets

11.0 GRILLES / DIFFUSERS / SUPPLY AIR DAMPERS:

All linear continuous Grilles, Diffusers, Box Type Dampers etc., shall be fabricated out of Extrude Aluminium sections and shall be powder coated with approved colour by client / consultant an necessary fixing arrangement shall be carried out using GI Screws and GI Fixing strips. The diffusers shall be of removable core type. All supply air diffusers shall have dampers and return air diffusers without dampers. The damper shall be opposed blade and aluminum in construction.

12.0 FRESH AIR COWL WITH DAMPER, BIRD SCREEN & FILTER:

Fresh air cowl shall be constructed of either GI Sheet or FRP as specified in the Bill of Quantity, complete with GI Volume Control Damper as mentioned above, GI Bird screen and a washable 20 micron filter shall be provided as per the requirements specified on drawing/BOQ.

13.0 HANGERS FOR DUCT:
### Duct Size, Spacing, Size of MS equal angle, Size of rod dia

<table>
<thead>
<tr>
<th>Duct Size [mm]</th>
<th>Spacing [M]</th>
<th>Size of MS equal angle [mm x mm]</th>
<th>Size of rod dia [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 750</td>
<td>2.5</td>
<td>40 x 3</td>
<td>10</td>
</tr>
<tr>
<td>751 to 1500</td>
<td>2.0</td>
<td>40 x 3</td>
<td>12</td>
</tr>
<tr>
<td>1501 to 2250</td>
<td>2.0</td>
<td>50 x 3</td>
<td>15</td>
</tr>
<tr>
<td>2251 to above</td>
<td>2.0</td>
<td>50 x 3</td>
<td>15</td>
</tr>
</tbody>
</table>

**All the MS angle, use for duct support & brazing etc, shall be hot dip galvanized**

### COLD INSULATION:

14.0 **COLD INSULATION:**

14.1 All pipes, ducts & equipments operating at temperature lower than the ambient shall be insulated in the manner specified hereinafter.

14.2 The insulating material shall be as follows:

a) Pipes:
   - Rigid preformed sections of expanded polystyrene of uniform density of 24 Kgs./m$^3$ with a ‘K’ value of not more than 0.23 B.T.U/ Hr./In/Sq.ft./$^\circ$F at 50$^\circ$F mean temperature.

14.3 No insulation shall be applied on pipes until the pipes are satisfactorily tested.

**Thickness of pipe insulation shall be 50mm.**

14.4 Pipe insulation shall be applied as follows:

a) Pipes shall be thoroughly cleaned with wire brush and rendered free from all rust and grease.

b) Two coats of bitumen shall be applied on the cleaned pipe surface.

c) Rigid pipe sections of insulation shall be fixed tightly to the surface taking care to seal all joints and covered with Polythene sheet.

d) 24 G x 20 mm mesh wire netting shall be applied, butting all joints and shall be laced down with G.I. wire.

e) Insulated surface shall be finished with two layers of sand cement plaster. Each layer shall be not less than 7 mm thick.

14.5 All valves, fittings, strainers etc. in chilled water piping shall be insulated to the same thickness as specified for the main run of piping. Valve bonnets, yokes and spindles shall
be insulated in such a manner as not to cause damage to insulation when the valve is used or serviced.

14.6 Cabinet air handling units shall be insulated as follows. Fans & coil section panels shall be internally lined with fire retardant quality 25 mm thick, 24 Kgs./m³ density thermocole slab (with black pigmented neoprene coating).

The insulation should be stuck to the body of AHU without making any hole in the body.

14.7 Ducts shall be insulated as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Supply duct</td>
<td>unconditioned space</td>
<td>50 mm, 24 kg/m³ density TF quality, thermocole slab.</td>
</tr>
<tr>
<td>b) Supply duct</td>
<td>conditioned space</td>
<td>25 mm, 24 kg/m³ density TF quality, thermocole Slab.</td>
</tr>
<tr>
<td>c) Return duct or plenum</td>
<td>unconditioned space</td>
<td>25 mm, 24 kg/m³ density TF quality, thermocole slab.</td>
</tr>
</tbody>
</table>

Contractor shall submit the Insulation material test certificate clearly showing density, K value, lot, etc. of material.

14.8 Duct insulation shall be applied as follows:
   a) Black bitumen paint shall be applied over the surface after cleaning the ducts.
   b) 24 kg/m³ density thermocole slab insulation of specified thickness shall be put by using Bitumen uniformly over Insulation surface.
   c) The Thermocol Insulation shall be covered with 40 G AL foil. AL foil should be wrapped on Thermocol uniformly, using Bitumen.
   d) The Joints of AL foil shall be overlapped at least 75mm covered with AL tape. Stripping should be done at distance of 1 meter to hold the insulation, wherever required.
   e) Wherever necessary and particularly in larger duct, strapping with PVC material should be done after thermocol insulation and before putting AL foil.

15.0 **ACOUSTIC INSULATION OF DUCT:**

The acoustic Insulation shall be done with 48 Kg/cu.m.Density, 25mm thick Resin bonded Fibre Glass.

The duct surface shall be cleaned and hot bitumen applied in patches and resin bonded glass wool cut to appropriate sizes and stuck to the
duct wall. The insulated face shall be covered with RP tissue papers & perforated AL sheet of 28 Gage thickness having 3mm perforations at 5mm staggered centre and held in position with rivets or galvanized steel bolt with counter sunk heads & 50 x 50 x 2 mm plate washers at not more than 600mm centers.

16.0 PIPING

1. SCOPE:
The scope of this section comprises the supply & laying of all pipes required for this project. On the award of the contract, the tenderer shall prepare his own detailed working drawings.

2.0 CHILLED WATER PIPING:

2.1 All chilled water piping and fittings shall be of M.S. Class ‘C’ (heavy class) of TATA/Jindal make only. The pipe confirming to BIS 1239 for pipe size upto 150 mm dia. and for pipe size 200 mm dia. and above shall be as per BIS 3589 having minimum 6 mm thickness. All joining in piping shall generally be by welding unless otherwise mentioned or as directed at site. All welding shall be done by qualified welders and shall strictly confirm to Indian Standard code of procedure for manual metallic welding of mild steel as per BIS 823.

2.2 The piping shall be so designed that the water velocity through the piping shall not exceeds maximum 8 fps and also the piping friction drop shall be limited to 4 m per hundred meter of pipe length. Pipe threads shall be of I.S. 554/1955 and flanges of I.S. 1536/1960. Pipes shall be sloping towards drain points.

2.3 Fittings shall be new and from standard manufacturers. Fittings shall be malleable casting of pressure ratings suitable for the piping system. Fittings used on welded piping shall be of the weld able type. Flanges shall be new and from standard manufacturers. Supply of flanges shall include bolts, washers etc. as required.

2.4 Tee-off connections shall be through reducing tees, wherever possible. Otherwise ferrules welded to the main pipe shall be used.

2.5 All equipment and valve connections or connections to any other mating pipes, shall be through unions/screwed flanges up to 50 mm dia. And flanges (welded or screwed for G.S.) for larger diameters or as required for the mating connection.

2.6 All welded piping is subject to the approval of the Engineer and sufficient number of flanges and unions shall be provided as required under.

2.7 All the drain piping shall be insulated GI medium class condensate drain water piping with bends reducers tees, supports etc. The insulation shall be with pipe sections of nitrile rubber as per specifications and drawings.(Make Suprem / Astral)
2.8 Gate valves shall be provided conforming to the following specifications.

<table>
<thead>
<tr>
<th>Size</th>
<th>Construction</th>
<th>Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 65 mm</td>
<td>Gun metal</td>
<td>Screwed female</td>
</tr>
<tr>
<td>65 mm &amp; over</td>
<td>a) Body - Cast Iron</td>
<td>Flanged</td>
</tr>
<tr>
<td></td>
<td>b) Spindle, valves seat, Wedge, nut etc. -</td>
<td>Bronze or Gun Metal</td>
</tr>
</tbody>
</table>

Valves shall conform to I.S. 780/1963 & flanges to I.S. 1536/1960 or as required. Valves shall have non rising spindles unless otherwise specified and shall be suitable for 300 psig test pressure. The valve shall be of Leader make. Tail pieces shall be used wherever required.

2.9 Butterfly valves shall perform the function of isolating valves. Butterfly valves shall have cast iron body with Nitrile rubber bonded bakelite hard back seat. Disc shall be of high duty iron with epoxy coating on nickel plating. All butterfly valves shall be provided with locking devices. The shaft shall be stainless steel AISI 410. The valve shall be Audco/Advance / Donfoce.

17.0 PIPING INSTALLATION:

17.1 Pipe runs and sizes should to meet the site conditions. The contractor on the award of the work shall prepare detailed working drawings, showing the cross section, longitudinal sections, details of fittings, locations of isolating, drain and air valves etc. They must keep in view the specific openings in buildings and other structures through which the pipes are designed to pass.

17.2 Piping shall be properly supported on or suspended from strands, clamps, hangers etc. as specified and as required. The tenderer shall adequately design all the brackets, saddles, clamps, hangers etc. and be responsible for their structural integrity.

17.3 Pipe supports shall be of steel, adjustable for height and prime coated with rust preventive paint and finish coated black. Where pipe and clamp are of dissimilar material, a gasket shall be provided in between.

Spacing of pipe supports shall not exceed the following:

<table>
<thead>
<tr>
<th>Pipe (mm)</th>
<th>Spacing (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 12</td>
<td>1.22</td>
</tr>
<tr>
<td>19 to 25</td>
<td>1.83</td>
</tr>
<tr>
<td>32 to 150</td>
<td>2.44</td>
</tr>
<tr>
<td>150 and above</td>
<td>3.05</td>
</tr>
</tbody>
</table>
Pipe hangers shall be fixed on walls and ceilings by means of metallic rawl plugs or approved shear fasteners.

17.4 Vertical risers shall be parallel to wall and column lines and shall be straight and plump. Risers passing from floor to floor shall be supported at each floor by clamps or collars attached to pipe and with a 12 mm thick rubber pad or any resilient material. Where pipes pass through the terrace floor, suitable flashing shall be provided to prevent water leakage. Risers shall also have a suitable elbow or concrete pipe support at the lowest point.

17.5 Pipe sleeves of 50 mm diameter shall be provided wherever pipes pass through walls and the annular space filled with felt and finished with retaining rings.

17.6 Insulated piping shall be supported in such a manner as not to put undue pressure on the insulation.

17.7 Cut-outs required in the floor slabs for taking the various pipes are provided. Tenderers shall carefully examine the cutouts provided and clearly point out wherever the cutouts do not meet with the requirements.

17.8 Piping work shall be carried out with minimum disturbance to the other work on the site. A program of work shall be chalked out in consultation with the Engineer.

17.9 All pipes using screwed fittings shall be accurately cut to the required sizes and threaded in accordance with I.S. 554/1955 and burrs removed before laying. Open ends of the piping shall be blocked as the pipe is installed to avoid entrance of foreign matter. Wherever reducers are to be made in horizontal runs, eccentric reducers shall be used if the piping is to drain freely; in other locations, concentric reducers may be used.

17.10 Drains shall be provided at all low points in the piping system and shall be of the following sizes:

<table>
<thead>
<tr>
<th>Mains</th>
<th>Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 300 mm</td>
<td>25 mm</td>
</tr>
<tr>
<td>Over 300 mm</td>
<td>40 mm</td>
</tr>
</tbody>
</table>

Drains shall be provided with gate valves of equal size with rising spindle. Drains shall be piped through equal size G.I. pipe to the nearest drain or floor waste. Piping shall be pitched towards drain points.

18.0 PRESSURE GAUGES:

18.1 The pressure gauges shall be Bourbon tube type confirming to IS : 3624 and shall be with siphon cock and angle valve. Pressure gauges shall be not less than 150 mm dia. and of
appropriate range etc. duly calibrated before installation. The Pressure gauges shall be of H.GURU/equ. make.

18.2 Care shall be taken to protect pressure gauges during pressure testing.

19.0 THERMOMETERS:

19.1 Thermometers shall be either 150 mm dia. dial or direct reading industrial type, of appropriate range, duly calibrated before installation. Thermometers shall be installed in separable wells.

20.0 INSULATION:

20.1 Pipes shall be insulated in accordance with specifications in section `INSULATION’.

21.0 VIBRATION ELIMINATION:

21.1 Piping installation shall be carried out with vibration elimination fittings wherever required.

22.0 TESTING:

22.1 All piping shall be tested to hydrostatic test pressure of at least 1½ times the maximum operating pressure, but not less that 7 Kgs/Sq.Cm. for a period of not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified to the satisfaction of the Engineer.

22.2 Piping repaired subsequent to the above pressure test shall be retested in the same manner.

22.3 System may be tested in sections and such sections shall be securely capped.

22.4 The owner shall be notified well in advance by the Contractor of his intention to test a section or sections of piping and all testing shall be witnessed by the Engineer or his authorized representative.

22.5 The contractor shall provide all materials, tools, equipment, instruments, services and labour required to perform the test and to remove water resulting from cleaning and/or testing.

22.6 The contractor shall make sure that proper noiseless circulation of fluid is achieved through all coils and other heat exchanger in the system concerned. If proper circulation is not achieved due to air bound connections, the Contractor shall rectify the defective connections. He shall bear all the expenses for carrying out the above rectifications, including the tearing up and re-finishing of floors, walls, etc. as required.

22.6 No insulation shall be applied to piping until after the completion of the pressure testing to the satisfaction of the Engineer.

23.0 PAINTING:
23.1 After all the piping has been installed, tested and run for at least 10 days of eight hours each, the piping shall be given two finish coats, as follows:

<table>
<thead>
<tr>
<th>Service</th>
<th>Flow</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chilled water</td>
<td>supply return</td>
<td>as approved by the Engineer</td>
</tr>
</tbody>
</table>

23.2 The direction of flow of fluid in the pipe shall be visibly marked in White arrows.

24.0 RATINGS & STANDARDS:

21.1 Rating of the motors shall be as indicated by you in the data sheets and as per the requirements of the airflow and static pressure. Ratings shall be on the basis of the specified ambient temperature and without exceeding the maximum temperature limits set by IS 325/1961.

22.2 Unless otherwise stated, Indian Standard Specifications shall apply. Where I.S. specifications are not available, the relevant British Standard Specifications shall be followed.

25.0 SQUIRREL CAGE INDUCTION MOTORS:

25.1 All motors shall be screen protected drip proof type TEFC with Class-C insulation, conforming to I.S. 325/1961 unless otherwise specified.

25.2 The motor shall be statically and dynamically balanced.

25.3 Bearings shall be combination ball and roller type with limit lubricators.

25.4 Termination shall be of ample size housed in a termination box. The terminal box shall be suitable for cable entry. Two earth terminals shall be provided.

25.5 The starting torque shall match with the load torque and the starting current shall not exceed 6 times the full load current.

26.0 INSTALLATION:

26.1 All motors shall be mounted on a common foundation with the driven equipment coupled through flexible couplings or through belt drive. Installation shall be in accordance with I.S. 900/1956.

26.2 Flexible connections shall be provided to all motors terminals wherever the motor is mounted on guide rails and belt drive is adopted. Even in the case of direct drive motors, the connections shall be flexible enough to prevent transmission of vibration.
26.3 All drive arrangements and couplings shall be provided with a safety guard.

27.0 TESTING:

27.1 Motors shall be tested in accordance with the relevant Indian Standard Specifications and test certificates furnished for routine type and high voltage tests.
Schedule of Technical Data for each Air Handling Unit  
(To be submitted for each AHU separately)

Technical data shall be furnished as below:

I) General:  
1) Make:-  
2) Air Discharge Direction:- Horizontal or Vertical  
3) Overall Dimensions:-  
4) Weight (including water):-  
5) Type of Vibration Isolators:-  
6) Approx. noise level (db):-  
7) Drive belts & size (Flat, Belt, V-Belt):-  
8) G.I. Casing Gauge:-  
9) AHU body insulation material & thickness:-  
10) Density of insulation material :-  
11) Drain Tray Material :-  
12) Drain tray insulating material & thickness:-  
13) Whether inspection door provided for AHU body:-

II) Fan Section:  
1) Air handling capacity (CFM/CMH):-  
2) Total static press (mm WG):-  
3) Fan speed (r.p.m.):-  
4) Nos. of Fan outlet & area:-  
5) Fan diameter:-  
6) Balance (Static and/or Dynamic):-  
7) Bearings:-  
8) Make & Mode of Fan.
III) Filter Section:
1) Type:-
2) Gross filter area:-
3) Velocity through filter (F.P.M.):-
4) Press drop through filter when new (mm, W.G.):-
5) Efficiency:-
6) Filter material:-
7) Filter Casing Material & Gauge

IV) Cooling Coil:
1) Coil fin material & thickness:-
2) Copper tube diameter & thickness:-
3) Water through coil (F.P.M.):-
4) No. of fins per inch:-
5) Water press drop in the coil (psig):-
6) coil Face area :-
7) Nos. of coils:-
8) No. of rows of each coil:-

V) Drive Motor for AHU:
1) Make:-
2) Frame size:-
3) Insulation Class:-
4) HP/KW rating:-
5) Type

VI) VALVES
1. Butterfly Valve
   1] Make :-
   2] Model :-
2. Gate Valve
   1] Make :-
   2] Model :-
VII) Gauges

1. Pressure Gauge
   1) Make:-
   2) Type:-

2. Thermometers
   1) Make:-
   2) Type:-

VIII) Miscellaneous

1. Insulation (Duct/Piping)
   1) Make:-
   2) Thickness & Density:-

2. Piping
   1) Make
   2) Class of Pipe

3. Ducting Sheet
   1) Make of Sheet

4. Anti Vibration Mounting
   1) Type
   2) Make

Note: Any other additional technical details may be included by the tenderer.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>MATERIAL NAME</th>
<th>BRAND/MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>FLEXI PLYWOOD – BWP (Boiling Water Resistant, Termite Resistant &amp; Borer Resistant) – CONFIRMING TO IS: 303.</td>
<td>GOLDENPLY / SARDAPLY / ARCHID / GREENPLY / CENTURY / UNIPLY / RAMA PLY / MAYUR / NATIONAL PLYWOOD.</td>
</tr>
<tr>
<td>5.</td>
<td>LAMINATE – CONFIRMING TO IS : 2046-1995.</td>
<td>GREENLAM/ MERINO/ VIR/ CENTURY/ BRAVIA/ ARCHID/ FORMICA.</td>
</tr>
<tr>
<td>6.</td>
<td>GLASS.</td>
<td>SAINT GOBAIN / GUJRAT GUARDIAN / TRIVENI / MODIFLOAT / ASAHI FLOAT.</td>
</tr>
<tr>
<td>7.</td>
<td>HARDWARE.</td>
<td>EFFICIENT GADGETS / EARL BEHARI (EBCO) / HARDWIN / ETALICA.</td>
</tr>
<tr>
<td>8.</td>
<td>BEECH WOOD.</td>
<td>AS APPROVED BY SBIIMS / ARCHITECT.</td>
</tr>
<tr>
<td>9.</td>
<td>SCREWS.</td>
<td>GKW NETTLEFOLD OR AS APPROVED.</td>
</tr>
<tr>
<td>10.</td>
<td>ADHESIVES.</td>
<td>MOVICOL / FEVICOL SH / ARALDITE.</td>
</tr>
<tr>
<td>11.</td>
<td>PAINT.</td>
<td>ASIAN / NIPPON / BERGER / KANSAI NEROLAC.</td>
</tr>
<tr>
<td>12.</td>
<td>FLOOR SPRING / DOOR CLOSER.</td>
<td>DOORSET / STERLING / DORMA / OZONE.</td>
</tr>
<tr>
<td>13.</td>
<td>LOCKS.</td>
<td>DOORSET / GODREJ.</td>
</tr>
<tr>
<td>14.</td>
<td>GI SUPPORT SYSTEM FOR PLAIN FALSE CEILING.</td>
<td>GYPSTEEL ULTRA / US BORAL.</td>
</tr>
<tr>
<td>15.</td>
<td>GI DRY WALL PARTITION SYSTEM.</td>
<td>GYPSTEEL / US BORAL / FRAME WORK / RONDO / BMS.</td>
</tr>
<tr>
<td>16.</td>
<td>GYPSUM / PLASTER BOARDS.</td>
<td>GYPBOARD / LAGYP.</td>
</tr>
<tr>
<td>17.</td>
<td>GI SUPPORT SYSTEM FOR GRID CEILING.</td>
<td>ARMSTRONG / GYPSTEEL ULTRA / US BORAL.</td>
</tr>
<tr>
<td>18.</td>
<td>CEILING TILES.</td>
<td>ARMSTRONG (DUNE SPREME OR DUNE) / GYPROC (CELOTEX PIN) / US BORAL (RADAR CLIMAPLUS OR PIN PERF CLIMAPLUS).</td>
</tr>
<tr>
<td>19.</td>
<td>ACRYLIC SOLID SURFACE.</td>
<td>LG Hausys, HI - MACS / DUPONT - MONTELLI / MERINO – HANEX / LOTTE - STARON.</td>
</tr>
<tr>
<td>20.</td>
<td>TEXTURED PAINT.</td>
<td>TERRACO / SPECTRUM.</td>
</tr>
<tr>
<td>21.</td>
<td>ENGINEERED WOOD FLOORING.</td>
<td>JUNCKERS / ERGO / UNITEX.</td>
</tr>
<tr>
<td>22.</td>
<td>WRITING BOARD.</td>
<td>WHITE MARK OR APPROVED.</td>
</tr>
<tr>
<td>23.</td>
<td>VITRIFIED, CERAMIC AND GLAZED TILES.</td>
<td>JOHNSON / SIMPOLO / KAJARIA / RAK.</td>
</tr>
<tr>
<td>24.</td>
<td>SANITARY FAUCETS AND FIXTURES.</td>
<td>JAGUAR / HINDWARE / KOHLER.</td>
</tr>
<tr>
<td>25.</td>
<td>ALUMINIUM COMPOSITE PANELS.</td>
<td>ALSTRONG / EUROBOND / ALUDECOR.</td>
</tr>
<tr>
<td>26.</td>
<td>CARPET TILES FLOORING.</td>
<td>FLOREX / GODREJ / ELEMENT / UNITEX.</td>
</tr>
<tr>
<td>27.</td>
<td>CEMENT FIBER / CALCIUM SILICATE / REINFORCED MAGNESIUM SILICATE BOARD.</td>
<td>VISAKA / TRILITE / SHERA / BISON.</td>
</tr>
</tbody>
</table>

**NOTE:** The Contractor shall use only above mentioned material. All other materials shall confirm to the specifications laid down. The Contractor shall take this into account while tendering rates / prices. All materials and sections used should adhere to the manufacturer’s guidelines and the contractor has to submit certificate from the manufacturer on usage of their specified product / sections.
STATE BANK OF INDIA
LIST OF APPROVED MANUFACTURERS OF MATERIALS TO BE USED IN THE ELECTRICAL WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY THE CONSULTANT/ ENGINEER

<table>
<thead>
<tr>
<th>S.No</th>
<th>Material Name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Switches/Sockets</strong> : Legrand - Mosaic / MK-wrap around / Anchor - Woods / Schneider- Clipsal / Crabtree-Thames / Athena / Wipro (North west) - Stylus / Convex / GM Four-Five</td>
</tr>
<tr>
<td>2</td>
<td><strong>Copper Conductor wires</strong> : Finolex / RR Cable / Havells / Poly Cab / KEI</td>
</tr>
<tr>
<td>3</td>
<td><strong>PVC conduits, Casing, Capping &amp; Accessories</strong> : Precision / Sudhakar / Avon plast / FINOLEX</td>
</tr>
<tr>
<td>4</td>
<td><strong>Metal clad Sockets</strong> : Legrand / L&amp;T- Hager / ABB / SIEMENS / Schneider / Inodo- Asian</td>
</tr>
<tr>
<td>5</td>
<td><strong>MCBs/MCB Distribution boards(Powder coated Only)</strong> : ABB / Siemens / Legrand / Schneider / L&amp;T / Hager / Havells</td>
</tr>
<tr>
<td>6</td>
<td><strong>MCCBs/Switchgear</strong> : GE Power / Hager (Compact) / L&amp;T / ABB / Schneider / Legrand / Siemens</td>
</tr>
<tr>
<td>7</td>
<td><strong>Underground Cables</strong> : CCI / Nicco / Havells / Universal / Poly Cab / Gloster</td>
</tr>
<tr>
<td>8</td>
<td><strong>Cable Glands</strong> : HMI / Comet / Cosmo/ Dowells (Biller India) / Hax Brass</td>
</tr>
<tr>
<td>9</td>
<td><strong>Capacitor Bank</strong> : Epcos / Neptune / Tibcon</td>
</tr>
<tr>
<td>10</td>
<td><strong>Cable Lugs</strong> : Dowell's / 3D</td>
</tr>
<tr>
<td>11</td>
<td><strong>MV Panels (PCCs)</strong> : Manufacturers with CPRI Test Certificate</td>
</tr>
<tr>
<td>12</td>
<td><strong>Measuring Instruments</strong> : Conzerv / CMS / El measure / IME / L&amp;T / Nippen / Schneider Electric</td>
</tr>
<tr>
<td>13</td>
<td><strong>Selector Switches</strong> : Vaishno / Salzer / Kaycee</td>
</tr>
<tr>
<td>14</td>
<td><strong>Indication Lamps LED</strong> : Schneider / Vaishno / Binay</td>
</tr>
<tr>
<td>15</td>
<td><strong>Resign cast CTs</strong> : AE / Kappa</td>
</tr>
<tr>
<td>16</td>
<td><strong>Telephone Wires</strong> : Lapp / Delton / Polycab / Finolex</td>
</tr>
<tr>
<td>17</td>
<td><strong>LAN Cables</strong> : D LINK, Finolex, Ploycab, Legrand</td>
</tr>
<tr>
<td>18</td>
<td><strong>Light Fixtures (LED)</strong> : Philips / GE / Havells / CG / Wipro / Bajaj</td>
</tr>
<tr>
<td>19</td>
<td><strong>Ceiling Fans, Wall mounted fans &amp; Exhaust Fans</strong> : Havells / Bajaj / CG / Orient / USHA / Almonard</td>
</tr>
</tbody>
</table>

**Note:** All Items Materials Used on site shall be ISI Mark only & Materials will be selected by bank only
LIST OF APPROVED MANUFACTURERS/NATURAL SOURCES OF MATERIALS TO BE USED IN THE HVAC (AIR CONDITIONING) WORKS SUBJECT TO THE APPROVAL OF SAMPLES BY SBIIMS/CONSULTANT.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Material Name</th>
<th>Brand / Manufacturer / Recommended Make</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CASSETTE AND HI WALL UNITS.</td>
<td>Blue Star / LG / Voltas / Carrier / Toshiba / Daikin / Mitsubishi / Panasonic / O-General / Hitachi.</td>
</tr>
<tr>
<td>2.</td>
<td>GI Sheets</td>
<td>TATA / HSL / SAIL / NIPPN DENRO or approved equivalent.</td>
</tr>
<tr>
<td>3.</td>
<td>Fire Damper</td>
<td>Caryaire / AirMaster / Air Breeze / Ravistar or approved equivalent.</td>
</tr>
<tr>
<td>4.</td>
<td>Vibration Isolators / FlexibleConnectors</td>
<td>Resistoflex / Dunlop or approved equivalent.</td>
</tr>
<tr>
<td>5.</td>
<td>INSULATION / Fibre glass.</td>
<td>UP Twiga / Kimmco / Owens corning or approved equivalent.</td>
</tr>
<tr>
<td>6.</td>
<td>Power Cables</td>
<td>CCI / ICC / Gloster / UCL or approved equivalent.</td>
</tr>
<tr>
<td>7.</td>
<td>Control Cables</td>
<td>Finolex / Delton or approved equivalent.</td>
</tr>
<tr>
<td>8.</td>
<td>Aluminum Grilles Diffusers /Linear Grilles</td>
<td>Caryaire / Air Master / Air Breeze/SRIFABS or approved equivalent.</td>
</tr>
<tr>
<td>9.</td>
<td>Filters</td>
<td>Klenzaids / Airtech / Aerosol / Anfilco or approved equivalent.</td>
</tr>
<tr>
<td>11.</td>
<td>Nitrile rubber</td>
<td>Armaflex / vedoflex / AERO FLEX/ARMACELL or approved equivalent.</td>
</tr>
</tbody>
</table>

NOTE: The contractor shall use only above mentioned material or equivalent make to be approved by SBIIMS / Consultant. All other materials shall confirm to the specifications laid down. The tenderer shall take this into account while tendering rates/prices.
PROPOSED INTERIORS, ELECTRICAL AND HVAC WORKS FOR STATE BANK OF INDIA,
SME BALANAGAR BRANCH AO SECUNDERABAD.

SCHEDULE OF QUANTITIES AND SPECIFICATIONS.

1) Arrangements of temporary power, Lighting, UPS wiring etc without effecting the operation of the branch working hours. Liaisoning with the supply authorities and other Government bodies for enhancement of power load is within the scope of the contractor.
2) Ferruling for all cables/wires including phase, neutral, earth etc are required.
3) Cable tags for AL/CU armoured cables are required.
4) Crimp the suitable lugs for all multi strand cables
5) Labeling for AL/CU armoured cables/DB/Switch Board/ MCB are required (radium illuminated labels).
6) All wires/ cables to be used at site should be FRLS
7) All PVC pipes to be used at site should be FRLS
8) Control supply, neutral and earth has to be run separately from individual DB to load on resective DB for smooth functioning of RCCB. In case of tripping of RCCB during liability period, Contractor has to rectify the fault with his cost.
9) Terminations other than double compression glands will not be counted for bill.
10) Contractor has to maintain minimum 10 feet distance from earth pit to earth pit.
11) we advise not to use PVC flexible pipes for branches/ offices, Use metal flexible hose for light point droppings, other than light points, for usage of flexible metal hose, contractor has to take prior approval from engineer incharge.
12) We advise not to install any switch boards/ DBS in the rear side of the SW counters.
13) Contractor has to visit the site before quoting. Only ISI marked material has to be used. During inspection Contractor has to furnish catalogues, Warranty certificates of all the items used. 
14) Preparing single line diagram for power & LAN (from source to end point), lamination it & installation on wall and submit the soft copy of autocad & PDF formats.". The scope of work includes showing of cable size and length in the SLD.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Item / Particulars</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>INTERIOR WORKS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>FIXED FURNITURE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FULL HEIGHT PARTITIONS:</td>
<td>Sq.M.</td>
<td>250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Providing and fixing metal stud dry wall partition with following specifications:

(a) Supporting system comprising of 51mm / 50mm x 35mm / 34mm x 0.5mm metal studs at 600mm c/c and 51mm / 50mm x 32mm x 0.5mm metal tracks at floor, middle, door and ceiling level with joints staggered to avoid through joints. The vertical members should touch the ceiling with horizontal ceiling channel at slab / beam bottom. The rate should also include necessary strengthening with studs / tracks or channels at doors and other openings.

(b) 12mm MDF Exterior Grade Board fixed on both sides with 25mm dry wall screws for the entire height of the partition.
(c) Partition from floor level upto 2100 mm level to have 100mm silver laminate Skirting, + from 100mm to 300mm level to have 1mm Glossy Laminate (blue color) + from 300mm level to 1050mm level to have 1mm Glossy Laminate (white color) + from 1050mm level to 1200mm level 1mm Glossy Laminate (blue color) + from 1200mm level to 2100mm level to have 1mm Textured Glossy Laminate (white color) OR 8mm clear float glass as detailed in (d) below + from 2100mm level to 2200mm level 1mm Glossy Laminate (blue color) on both sides as shown in drawing.

(d) Partition to have 8mm clear float glass instead of 1mm Textured Glossy Laminate fixed with 85mm x 18mm around MDF Exterior Grade jamb and 12mm x 12mm MDF Exterior Grade button beading on both sides of the glass, to a neat finish as per drawings and directions etc., complete.

(e) Partition above 2200mm level to have 1mm Laminate (White Color - Matt Finish) finish on both sides as shown in drawing.

(f) All exposed surfaces of MDF Exterior Grade members to have minimum two coats of LOW VOC or NO VOC duco paint finish.

(g) All sections used should adhere to the manufacturers guidelines and the contractor has to submit certificate from the manufacturer on usage of their specified sections.

2 **HALF HEIGHT PARTITIONS:**

<table>
<thead>
<tr>
<th>Sq.M.</th>
<th>105</th>
</tr>
</thead>
</table>

Same as item 1 (Full height partition) above, but for height of 1200mm from finished floor level, to a neat finish as per drawings and directions etc., complete and the following:

(a) 12mm Beachwood or MDF top beading with White duco painting on top with covered edges

(b) Partition from floor level upto 1200mm level on both sides to have 100mm silver laminate at bottom + from 100mm to 300mm level to have 1mm Glossy Laminate (blue color) + from 300mm level to 1050mm level to have 1mm Glossy Laminate (white color) + from 1050mm level to 1150mm level 1mm Glossy Laminate (blue color) + from 1150mm level to 1200mm level

(c) The partition to have 12mm Clear Float Glass fixed with SS "D" brackets, from 900mm level to 1200mm level as shown in the drawing.

(d) The cost to include all materials and hardware required etc., as per site conditions. The rate is for a finished item of work etc., complete as directed.

3 **DOORS IN PARTITIONS:**

3.1 **35MM DOORS IN PARTITIONS:**

<table>
<thead>
<tr>
<th>Sq.M.</th>
<th>21</th>
</tr>
</thead>
</table>

Providing and fixing 35mm thick solid core flush shutter with 85mm x 18mm MDF Exterior Grade jamb around and 12mm x 12mm MDF Exterior Grade button beading fixed 1mm Laminate as specified on both sides and 8mm clear float glass with 3M privacy film fixed as per drawing with 50mm x 18mm MDF Exterior Grade jamb around the glass opening and 12mm x 12mm MDF Exterior Grade beading for fixing of glass on both sides.
The rate to include necessary hardware viz., door stopper, door buffer, pair of "H" type handles, Mortise Dead Lock and Euro Profile Cylinder - Key and Knob 70mm SS, 4 Nos. SS 2 ball-bearing hinges - (127mm x 76mm x 2.5mm), door closer (all of approved make and quality), ZERO VOC or NO VOC duco paint finish for all exposed surfaces of MDF Exterior Grade members, etc., complete as directed.

<table>
<thead>
<tr>
<th>4</th>
<th>FIXED GLASS WORKS: (12MM TOUGHENED GLASS WORK AT MAIN ENTRANCE DOOR AND GLASS PARTITION DOORS)</th>
<th>Sq.M.</th>
<th>46</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Providing, making and fixing in position Fixed 12mm toughened glass as fixed glass from Floor to available Ceiling level along with Main Entrance Door and for Partitions. The glass is to be fixed with patch fittings and all the edges of the glass have to be polished for a smooth finish. The work includes cost of all materials, approved hardware, making necessary template before toughening of glass and fixing the same as per site conditions to a neat finished work as per drawings and directions etc., complete.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>12MM TOUGHENED GLASS MAIN ENTRANCE DOOR AND PARTITION DOORS:</th>
<th>Sq.M.</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Providing, making and fixing in position Fixed 12mm toughened glass openable shutters work as per specifications given below and for the openings mentioned. Main Entrance Glass Work comprising of Door opening of approximate size 1800mm x 2250mm - 2400mm in two pieces, and Partition Doors of approximate size 900 - 1000mm x 2250mm - 2400mm. The entire work to be done as per site conditions with following specifications etc., complete as directed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Entrance door - Providing, fixing in position glazed entrance Double door and Single door with patch fitting or approved make (Double Door approx. Size: 1800mm - 1500mm x 2400mm - 2250mm and Single Door approx. Size: 900mm - 1200mm x 2400mm - 2250mm) using 12mm toughened glass edge polished. The Door to consist of Heavy Duty Floor spring, Upper Patch, Bottom Patch, Lock Keeper Plate, Euro Profile Cylinder (EPC), &quot;H&quot; Type Handle 32 x 600mm, Corner Lock and the side fixed glass to have 2 Nos. Bottom Patch and 2 Nos. Upper Patch for each door to a neat finish etc., complete as per drawing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) The work includes cost of all materials, approved hardware, making necessary template before toughening of glass and fixing the same as per site conditions to a neat finished work as per drawings and directions etc., complete.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>WALL PANELLING:</th>
<th>Sq.M.</th>
<th>110</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>WALL PANELLING IN BANKING HALL:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same as item (full height partition) above, but for Wall Panelling. The basic frame work to comprise all cladding specified only from one side to a neat job as per drawings and directions etc., complete.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Providing 18mm thick MDF Exterior Grade jamb for door and window openings of suitable depth as per site conditions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) All exposed surfaces of MDF Exterior Grade members to have NO VOC or LOW VOC duco paint finish.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 6.2 WALL PANELLING WITH SPECIAL HIGH GLOSS LAMINATE FOR E-LOBBY:

<table>
<thead>
<tr>
<th>Description</th>
<th>Sq.M.</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same as item wall panelling above to be cladded with 1mm High Gloss Laminate from one side to a neat finish as per drawings and directions etc., complete. (Wall Panelling back of Machines to be with Blue color and other walls to have White color 1mm Special High Gloss Laminate)</td>
<td></td>
<td>25</td>
</tr>
</tbody>
</table>

### 7 COLUMN PANELLING:

<table>
<thead>
<tr>
<th>Description</th>
<th>Sq.M.</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing and fixing metal stud column panelling with following specifications:</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

(a) Supporting system comprising of 51mm / 50mm x 35mm / 34mm x 0.5mm metal studs at 600mm c/c and 51mm / 50mm x 32mm x 0.5mm metal tracks at floor, middle, lintel level and ceiling level with joints staggered to avoid through joints. The vertical members should touch the ceiling with horizontal ceiling channel at slab / beam bottom. The rate should also include necessary strengthening with studs / tracks or channels at doors and other openings.

(b) 12mm MDF Exterior Grade Board fixed on all four sides with 25mm dry wall screws for the entire height of the partition.

(c) Column Panelling from floor level upto ceiling level to have 100mm silver laminate at bottom + from 100mm to 450mm below ceiling level to have 1mm Laminate (Beech Wood color) on two longer sides of the column as shown in drawing.

(d) Column Panelling to have 8mm Blue Lacquered glass fixed with 12mm x 12mm MDF Exterior Grade button top 450mm tobe covered beading on two shorter sides of the column, to a neat finish as per drawings and directions etc., complete.

(e) Column Panelling above 2350mm level to have 1mm Laminate (White Color - Matt Finish) / NO VOC or LOW VOC plastic emulsion paint finish on all four sides as shown in drawing.

(f) All exposed surfaces of MDF Exterior Grade members to have minimum two coats of LOW VOC or NO VOC duco paint finish.

(g) All sections used should adhere to the manufacturers guidelines and the contractor has to submit certificate from the manufacturer on usage of their specified sections.

### 9 FALSE CEILING:

<table>
<thead>
<tr>
<th>Description</th>
<th>Sq.M.</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing, making and fixing in position the following types of different false ceilings with different materials as specified below for a finished item of work as per drawings and directions etc., complete.</td>
<td></td>
<td>615</td>
</tr>
</tbody>
</table>

#### 9.1 GRID FALSE CEILING:

Providing & Fixing of Mineral Fibre Acoustical Suspended Ceiling System with 15mm Tiles and Exposed GRID. The tiles should have Humidity Resistance (RH) of 90% - 99%, NRC 0.5, Light Reflectance ≥87%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Colour White, Fire Performance UK Class 0 / Class 1 (BS 476 pt - 6 &7) in module size of 600 x 600 x 16mm, suitable for Green Building application, with Recycled content of 30% - 45%. (DUNE SUPREME / DUNE OF ARMSTRONG MAKE - RADAR CLIMAPLUS / PIN PERF CLIMAPLUS OF USG BORAL / CELOTEX PIN / CELOTEX FINE FISSURED OF GYPROC)
The tile shall be laid on Silhouette / Microline / Omega DXM profile grid system with 15mm - 16mm white flanges incorporating a 6mm central reveal in white/black colour and with a web height of 38mm and a load carrying capacity of minimum 8 Kgs/M2 & minimum pull out strength of 100 Kgs. Microline / Silhouette, Main Runners & Cross Tees to have mitred ends & “birdsmouth” notches to provide mitred cruciform junctions. The T Sections have a Galvanizing of 90 grams per M2 and need to be installed with Suspension system as per manufacturers details.

The Installation to comprise main runner spaced at 1200mm centres securely fixed to the structural soffit using US Boral / Gyproc / Armstrong suspension system (specifications below) at 1200mm maximum centre. The First/Last suspension system at the end of each main runner should not be greater than 450mm from the adjacent wall.

Flush fitting 1200mm long cross tees to be interlocked between main runners at 600mm centre to form 1200 x 600 mm module. Cut cross tees longer than 600mm require independent support. 600 x 600mm module to be formed by fitting 600mm long flush fitting cross tees centrally between the 1200 mm cross tees. Perimeter trim to be Wall angles of size 3000mm x 19mm x 19mm, secured to walls at 450 mm maximum centres.

9.2 PLAIN FALSE CEILING (including vertical faces and Painting):

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sq.M.</td>
<td>150</td>
</tr>
</tbody>
</table>

Note: (No separate measurements will be considered for the vertical surfaces and cove lighting areas only plan are will be considered for the measurements)

Providing and fixing Concealed Grid suspended ceiling system of 12.5mm Gypsum Boards / Standard Plaster Boards fixed to ceiling Frame Work as per manufacturers instructions and details for a concealed grid key lock suspended ceiling system consisting of following:

(a) 27 x 37 x 1.6mm Soffit Clip, 5mm suspension rod / 25 x 10 x 0.5mm Ceiling Angle, adjustable spring loaded suspension clip / 2.64mm dia Connecting Clip, 20 x 28 x 30 x 0.5mm Perimeter Channel, Top Cross Rail of 3000mm long of 0.55BMT Furring Channel / 15 x 45 x 15 x 0.9mm Intermediate Channel and 4000mm long made of 0.5mm BMT the Top Cross Rail / 80 x 26 x 0.5mm Ceiling Section to be suspended from ceiling at every 1200mm and Furring / Intermediate Channel to be fixed to Top Cross Rail / Ceiling Section at every 600mm to make a grid of 1200 x 600mm.

(b) All sections used should adhere to the manufacturers guidelines and the contractor has to submit certificate from the manufacturer on usage of their specified sections.

(c) Further the rates to include cutouts for lighting fixtures / AC grilles / Fire Alarm Detectors etc., along with necessary strengthening and supports for fixing of these. The board joints are to be flush finished with jointing compound and paper tape etc., complete as directed. The cost including 2 coats of wall care putty and one coat of primer and two coats of emulsion paint.

10 Work Table

10.2 WORK TABLE: (WITHOUT 6MM ACRYLIC SOLD SURFACE TOP)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sq.M.</td>
<td>7</td>
</tr>
</tbody>
</table>
Providing, making and placing in position worktables made in 18mm MDF Exterior Grade Board for all members except table top and 25mm block board for table top and Ready Made Foot Rest, Key Board Tray and vertical supports at approximately every 1350mm length. The Table top of 25mm Block Board to have extra thickening with 2 x 12mm x 50mm MDF Exterior Grade Board and front vertical facia to have 12mm x 49mm MDF Exterior Grade Board lipping cladded with 1mm thick Laminate for the entire table top and the front facia to have NO VOC or LOW VOC duco paint finish. The unexposed surfaces of MDF Exterior Grade members to have 0.8mm Laminate, complete as directed. The table to have a three drawer unit for every 1350mm length as per drawing. All faces of MDF Exterior Grade Board to have 12mm MDF Exterior Grade lipping. The cost to include all materials, labour, necessary hardware viz., drawer channels, SS handles, set locks etc., to a neat job as per directions and directions etc., complete.

**11.00 STORAGE UNITS:**

<table>
<thead>
<tr>
<th>Sq.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
</tr>
</tbody>
</table>

Providing, making and placing in position Storage Units with horizontal partitions of 1200mm high abutting wall and 750mm high as back credenza or abutting partition made in 18mm MDF Exterior Grade Board to all members except table top and 25mm block board for table top. The Table top of 25mm Block Board to have extra thickening with 18mm x 50mm MDF Exterior Grade Board and front vertical facia to have 12mm x 43mm MDF Exterior Grade Board lipping cladded with 6mm thick acrylic solid surface for the entire table top and the front facia and remaining all exposed faces to have 1mm Glossy Laminate as specified. All other exposed faces of the unit to have 1mm Glossy Laminate as specified and all unexposed faces to have 0.8mm Laminate including NO VOC or NO VOC duco paint finish for all other exposed surfaces of MDF Exterior Grade members and all necessary hardware viz., 'W' or wing hinges, locks, handles, tower bolts etc., and MDF Exterior Grade beading 36mm x 36mm at top and MDF Exterior Grade edge lipping 18mm x 12mm etc., as per drawings and directions etc., complete.

**B 1 LOOSE FURNITURE:**

**BRANCH HEAD TABLE:**

Providing, making and placing in position Executive Table and Side Table of approximate size 2400mm - 2100mm x 900mm x 750mm + 1200mm - 1050mm x 450mm x 750mm with following specifications.

(a) Main Table and side Table top and to be made in 25mm block board with 6mm thick acrylic solid surface. The front side of the table to have a " C " made with 2 x 18mm thick MDF Exterior Grade Board cladded with 6mm acrylic solid surface on the front and the verticals towards the modesty panel. The modesty panel to have 18mm MDF Exterior Grade Board cladded with 1mm glossy Laminate (blue color) + 8mm clear float glass + 1mm Laminate (blue color) as specified.

(b) The " L " shaped table top of 25mm Block Board to have extra thickening with 18mm x 50mm MDF Exterior Grade Board and front vertical facia to have 12mm x 43mm MDF Exterior Grade Board lipping cladded with 6mm thick acrylic solid surface for the entire table top and the front facia and remaining all exposed faces to have 1mm Glossy Laminate as specified.

(c) All other members to be with 18mm MDF Exterior Grade Board and all exposed faces of the table to have 6mm acrylic solid
<table>
<thead>
<tr>
<th><strong>OFFICER'S AND SIDE EXECUTIVE TABLES:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing, making and placing in position Executive Table and Side Table of approximate size 1650mm - 1550mm x 750mm x 750mm + 1050mm x 450mm x 750mm with following specifications.</td>
<td></td>
</tr>
<tr>
<td>(a) Main Table and side Table top and to be made in 25mm block board with 6mm thick acrylic solid surface. The front side of the table to have a inverted &quot; U &quot; made with 2 x 18mm thick MDF Exterior Grade Board cladded with 6mm acrylic solid surface on the front and the verticals towards the modesty panel. The modesty panel to have 18mm MDF Exterior Grade Board cladded with 1mm Glossy Laminate and 1mm Laminate as specified.</td>
<td></td>
</tr>
<tr>
<td>(b) The &quot; L &quot; shaped table top of 25mm Block Board to have extra thickening with 18mm x 50mm MDF Exterior Grade Board and front vertical facia to have 12mm x 43mm MDF Exterior Grade Board lipping cladded with 6mm thick acrylic solid surface for the entire table top and the front facia and remaining all exposed faces to have 1mm Glossy Laminate as specified.</td>
<td>Each. 17</td>
</tr>
<tr>
<td>(c) All other members to be with 18mm MDF Exterior Grade Board and all exposed faces of the table to have 6mm acrylic solid surface OR 1mm Glossy Laminate as specified above to be used.</td>
<td></td>
</tr>
<tr>
<td>(d) All the edges of 18mm MDF Exterior Grade Board to have 18mm x 12mm MDF Exterior Grade edge lipping.</td>
<td></td>
</tr>
<tr>
<td>(e) One readymade CPU mobile pedestal.</td>
<td></td>
</tr>
<tr>
<td>(f) One Molded Key Board Tray with channels etc.,</td>
<td></td>
</tr>
<tr>
<td>(g) One Three Drawer Unit made with 18mm MDF Exterior Grade Board and 12mm MDF Exterior Grade Board. The unit to have one vertical filing drawer at bottom and two equal drawers on top. The rate to include all necessary hardware viz., telescopic drawer channels, handles, locks, etc., and 18mm x 12mm MDF Exterior Grade edge lipping etc.,</td>
<td></td>
</tr>
<tr>
<td>(h) One Side Table with shutter unit of 600mm, with 2 drawers and two openable shutters made with 18mm MDF Exterior Grade Board with necessary hardware viz., ' W ' hinges, handles, locks, tower bolts, etc., and 18mm x 12mm MDF Exterior Grade edge lipping etc.,</td>
<td></td>
</tr>
<tr>
<td>(i) All the unexposed faces to have 0.8mm Laminate.</td>
<td></td>
</tr>
<tr>
<td>(j) Ready Made Modular Foot Rest - 400mm x 350mm x 65mm.</td>
<td></td>
</tr>
<tr>
<td>The cost to include all materials, labour etc., for a finished item of work as per drawings and directions etc., complete.</td>
<td></td>
</tr>
</tbody>
</table>

SBI, SME Balanagar Branch, Interior, Electrical & HVAC Tender.
(i) All the unexposed faces to have 0.8mm Laminate

(j) Ready Made Modular Foot Rest - 400mm x 350mm x 65mm.

The cost to include all materials, labour etc., for a finished item of work as per drawings and directions etc., complete.

**GRAHAH MITRA TABLE:**

Providing, making and placing in position Grahak Mitra Table of approximate size 1500mm x 800mm - 900mm x 750mm with following specifications.

(a) Main Table Top to have 25mm block board with 1mm thick Laminate. The vertical supports of the table is to be made with two side boxing of 75mm x 800mm x 750mm made with 18mm MDF Exterior Grade Board and the front side boxing to 200mm x 450mm x 750mm on either sides and central boxing of 250mm x 600mm x 750mm, all made with 18mm MDF Exterior Grade Board cladded with 1mm Laminate.

(b) The front of the table to have a 600mm x 1050mm proud portion with provision for cove lighting at bottom and this central portion to be cladded with 6mm thick blue colored lacquered glass.

(c) All other members to be with 18mm MDF Exterior Grade Board and all exposed faces of the table to have 1mm Laminate or horizontal and 1mm glossy Laminate for verticals and the drawer unit to have 1mm Glossy Laminate as specified to be used.

(d) All the edges of 18mm MDF Exterior Grade Board to have 18mm x 12mm MDF Exterior Grade edge lipping.

(e) One readymade CPU mobile pedestal.

(f) One Molded Key Board Tray with channels etc.,

(g) One Three Drawer Unit made with 18mm MDF Exterior Grade Board and 12mm MDF Exterior Grade Board. The unit to have one vertical filing drawer at bottom and two equal drawers on top. The rate to include all necessary hardware viz., telescopic drawer channels, handles, locks, etc., and 18mm x 12m MDF Exterior Grade edge lipping etc.,

(i) All the unexposed faces to have 0.8mm Laminate.

(j) Ready Made Modular Foot Rest - 400mm x 350mm x 65mm.

The cost to include all materials, labour etc., for a finished item of work as per drawings and directions etc., complete.

**SINGLE WINDOW COUNTERS:**

Providing, making and placing in position Single Window Counters along with necessary partitions as per item half height partition above (The partitions will be measured and paid as per item Half Height Partitions) with following specifications and per dimensions specified. The front side of the Single Window Counter to have 100mm silver laminate at bottom.

(a) The overall size of each Single Window Counter to be 1650mm - 1500mm x 900mm - 975mm x 750mm + 1050mm x 450mm x 750mm.
(b) Tabletop of main table and side table to have 25mm Block Board to have extra thickening with 18mm x 50mm MDF Exterior Grade Board and front vertical facia to have 12mm x 43mm MDF Exterior Grade Board lipping cladded with 6mm thick acrylic solid surface for the entire table top and the front facia and remaining all exposed faces to have 1mm Glossy Laminate as specified. The acrylic solid surface to continue in the front side with curvature from the front table top to the modesty panel in front with cove lighting provision.

(c) All other members to be with 18mm MDF Exterior Grade Board / 2Nos. of 6mm Flexi Plywood in curvature (which should be achieved with a frame work of 50mm x 50mm sal wood frame to be fixed from the front modesty panel / apron and the bottom of this niche to have provision of cove lighting with LED strips) and all exposed faces of the table to have 6mm thick acrylic solid surface as specified in the drawing to be used.

(d) All the edges of 18mm MDF Exterior Grade Board to have 18mm x 12mm MDF Exterior Grade edge lipping.

(e) One readymade CPU mobile pedestal.

(f) One Molded Key Board Tray with channels etc.

(g) One Three Drawer Unit made with 18mm MDF Exterior Grade Board and 12mm MDF Exterior Grade Board. The unit to have one vertical filing drawer at bottom and two equal drawers on top. The rate to include all necessary hardware viz., telescopic drawer channels, handles, locks, etc., and 18mm x 12mm MDF Exterior Grade edge lipping etc.

(h) One Side Table with shutters made with 25mm block board top and 18mm MDF Exterior Grade Board for all other members with necessary hardware viz., ' W ' hinges, SS handles, locks, SS tower bolts, etc., and 18mm x 12mm beech wood edge lipping etc.

(i) All the unexposed faces to have 0.8mm Laminate

(j) Ready Made Modular Foot Rest - 400mm x 350mm x 65mm.

(k) All wooden members to have minimum two coats of NO VOC or LOW VOC duco paint finish.

The cost to include the " L " shaped Single Window Counter and to include all materials, hardware, labour for a neat and finish job as per drawings and directions etc., complete.

<table>
<thead>
<tr>
<th>5</th>
<th>12MM TOUGHENED GLASS DIVIDERS FOR SINGLE WINDOW COUNTERS:</th>
<th>Each. 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Providing, making and fixing in position 12mm thick toughened clear float glass in the front side of half height partitions of Single Window Counters of approximate size 1250mm x 400mm - 100mm in tapered shape. All the edges of the glass to be polished for a smooth finish and the glass is to be fixed with &quot; D &quot; brackets. The cost to include all materials, labour, hardware etc., for a neat finished job as per drawings and directions etc., complete.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12MM TOUGHENED GLASS ON TRANSACTION SIDE FOR SINGLE WINDOW COUNTERS:</td>
<td>Each. 13</td>
</tr>
<tr>
<td>7.1</td>
<td>Providing, making and fixing in position 12mm thick clear float glass in the front side of approximate size 1650mm x 450mm with a central cut out of 200mm x 175mm. All the edges of the glass to be polished for a smooth finish and the glass is to be fixed with &quot; D &quot; brackets. The cost to include all materials, labour, hardware etc., for a neat finished job as per drawings and directions etc., complete.</td>
<td></td>
</tr>
</tbody>
</table>

**WRITING DESK:**
### FLOOR MOUNTED WRITING DESK:

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing, making and placing in position Wall Mounted Circular Writing Desk 900mm dia x 750mm with following specifications.</td>
</tr>
<tr>
<td>(a) A Octagonal support boxing is to be made 450mm at floor level tapering upwards to 600mm at 900mm from floor made in 12mm MDF Exterior Grade Board cladded with 1mm Glossy Laminate. A top to be provided at 900mm level from floor to be made with 25mm Block Board cladded with 1mm Glossy Laminate which will have verticals made with 12mm MDF Exterior Grade Board cladded with 1mm Glossy Laminate up to the top top level of 1050mm from floor level.</td>
</tr>
<tr>
<td>(b) The Writing Desk Circular Top to have 12mm dia toughened clear float glass with 25mm champered bull nosing around.</td>
</tr>
<tr>
<td>(c) All members to be with 12mm / 18mm MDF Exterior Grade Board and all exposed faces to have 1mm Glossy Laminate as specified.</td>
</tr>
<tr>
<td>(d) All the edges of 12mm / 18mm MDF Exterior Grade Board to have 18mm x 12mm MDF Exterior Grade edge lipping.</td>
</tr>
<tr>
<td>(e) All the unexposed faces to have 0.8mm Laminate</td>
</tr>
<tr>
<td>The cost to include all materials, labour etc., for a finished item of work as per drawings and directions etc., complete.</td>
</tr>
</tbody>
</table>

### WALL MOUNTED WRITING DESK:

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing, making and placing in position Wall Mounted Writing Desk 750mm x 300mm x 450mm with following specifications.</td>
</tr>
<tr>
<td>(a) The entire unit is to be made with 18mm MDF Exterior Grade Board cladded with 1mm Glossy Laminate as per drawing.</td>
</tr>
<tr>
<td>(b) The Writing Desk to have 12mm thick toughened clear float glass with 25mm champered bull nosing around at top fixed with SS supports.</td>
</tr>
<tr>
<td>(c) All members to be with 18mm MDF Exterior Grade Board and all exposed faces to have 1mm Glossy Laminate as specified.</td>
</tr>
<tr>
<td>(d) All the edges of 12mm / 18mm MDF Exterior Grade Board to have 18mm x 12mm MDF Exterior Grade edge lipping.</td>
</tr>
</tbody>
</table>

### OTHER WORKS:

1. **PLASTIC EMULSION PAINTING:**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning the surface of the wall &amp; then applying two coats of wallcare putty followed by one coat of primer exactly in line and level &amp; then finally applying a minimum of two coats of NO VOC or LOW VOC Plastic Emulsion Paint of approved shade to give a neat finish including cost of all materials necessary scaffolding etc., complete for walls &amp; ceiling.</td>
</tr>
</tbody>
</table>

2. **ROLLER BLINDS:**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing and fixing in position of Roller Blinds of approved Fabric (Fabric Cost - RS. 1,000/- per Meter) of Hunter Douglas / Mac / Vista make or approved equivalent of approved shade etc., as directed. Note : Window size will be considered for the measurement</td>
</tr>
</tbody>
</table>

3. **DESIGNER FILM WORK:**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing and fixing in position Designer Film with ellipse design on all glasses as per drawings and heights mentioned. The Designer Film is of Harmony / 3M or equivalent approved make. The rate is for a finished item of work etc., complete as directed.</td>
</tr>
</tbody>
</table>

5. **Cleaning of the premises**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning of the premises</td>
<td>Ls</td>
<td>1</td>
</tr>
</tbody>
</table>
Cleanig of the premises and dispose the debries, the scope includes cleaning of the electrical, civil, AC works debries and fine cleaning of the exsting premises and daily cleaning and maintaining the premises neet and clean

| 6 | ACP CLADDING: | Sq.M. | 20 |

Supplying and fixing aluminium composite cladding with skin material 0.5 mm thick aluminium sheet cover material natural polyethylene aluminium cladding panel fixed with extruded aluminium basis frame (50x25x1.5mm) angle cleats, weather sealants, rivets, GI brackets all as approved, using suitable bolts on structural steel work including necessary accessories complete in all respects including all labour charges etc., complete for finished item of work but excluding cost of structural steel fabrication, scaffolding charges, if any, ACP Cladding - 4 mm thick.

| TOTAL PART A |

**ELECTRICAL WORK**

| 1 | DISTRIBUTION BOARDS:- |  |

Supply, installation and concelling of following size MCB/MCCB/RCBO distribution boards with following combination of C curve-MCBs as required. Vacent slots will be covered with dummy plates. The scope of work extends to double earthing with 8swg copper bear conductor of the DB also.

| 63A MCB |  |
| No 2 |
| 125A,4Pole,25KA MCCB & 1 no of 4 pole  |
| No 2 |
| 63A MCB in a suitable enclosure free standing wall/ floor mounted M.V panel made out of 14SWG MS sheet after seven tank process and painting with epoxy powder coating. The scope of work extends to installation of extendable handle to the MCCB and internal wiring from MCCB input to MCB input. It has to be installed near energy meter and it should be accessible to the operator. |

| PDB:  |

3 phase 4 way Ekinox³ TPN DB-VTPN DPX³ 160 MCCB DB's IP 43 - #IK 09 with metal Double door:-

| 100A,25KA, 4P, MCB-1 no (input) |
| 100A, 4P, MCB-1 no (input) |
| 63A,3P, MCB-01 NO (Spare) |
| 30A,3P, MCB-01 No,( I/p to Capacitors) |
| 40A,3P, MCB-01 No,( I/p to Capacitors) |
| 6-32A SP MCb-6 No (ACs) |
| No 2 |
| 3 phase 6 way Ekinox³ TPN DB-VTPN DB's for DPX³ 160 MCCB DB's IP 43 - #IK 09 with metal Double door:-

<p>| 100A, 4P, MCB-1 no (input) |
| 30A,3P, MCB-01 NO ( cassette Acs) |
| 6-32A SP MCb-3 No (cassette Acs) |
| No 2 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Requirement</th>
<th>Details</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>e</td>
<td>CHANGEOVER SWITCH</td>
<td>SITC of fabricated 100A, 4 pole on load Change over switch of HPL brand in suitable enclosure with provision for the service cable termination as required. Output of COS to be connected to 7 segment display (LDB) and ATS 2nd Input</td>
<td>No</td>
</tr>
<tr>
<td>f</td>
<td>100A 4 pole Auto transfer switch</td>
<td>in a suitable enclosure</td>
<td>No</td>
</tr>
<tr>
<td>g</td>
<td>LDB</td>
<td>Ekinox³ TPN DB - 6way 7 segment DB's for DX³ MCB, Isolator, RCCB and RCBO : With provision for FP MCB/Isolator/RCCB/RCBO as incomer and SP MCB's as (1) 40 A 4 Pole MCB-1no (2) 40A 2P 30mA RCCB-3no (3)6-32A SP MCB-18no</td>
<td>No</td>
</tr>
<tr>
<td>h</td>
<td>OUTPUT OF ATS</td>
<td>Ekinox³ ETPN DB's for DX³ MCB, Isolator, RCCB and RCBO IP 43 - #IK 09 with Double door. (1)63A,4P, MCB-1no(Input) (2)40A, 2P, MCB-1no(Branch UPS I/P) (3) 32A,2P, MCB-2no( ATM UPS I/P &amp; ATM AC) (4)6A,2P, MCB-1no(sign board I/P) (5)16A,2P,MCB-1 No( ATM lighting)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>LIGHT DB</td>
<td>Ekinox³ ETPN DB's for DX³ MCB, Isolator, RCCB and RCBO IP 43 - #IK 09 with Double door. (1)63A,4P, MCB-1no (2)40A, 2P, MCB-1no (3) 32A,2P, MCB-2no (4)6A,2P, MCB-1no (5)16A,2P,MCB-1 No</td>
<td>4</td>
</tr>
</tbody>
</table>
### Capacitor Panel

Supply, installation, testing and commissioning of 2 nos of 5KVAR heavy duty capacitor box type in a suitable enclosure with proper air circulation IP 41 rated enclosure. The scope of work includes supply & fixing of 1 no of 40A 4P MCB & 2 nos of 16A TP MCB with analog ammeter. And its related work.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>MCB with Enclosure for Cassette AC(1 PH)</strong> SITC of 25A 2 pole MCB in a suitable weather proof metal enclosure for cassette Acs at outdoor units</td>
</tr>
<tr>
<td>3</td>
<td><strong>MCB with Enclosure for Cassette AC(1 PH)</strong> SITC of 25A 2 pole MCB in a suitable metal enclosure for cassette Acs in the Banking hall</td>
</tr>
<tr>
<td>11</td>
<td><strong>MCB with Enclosure for Cassette AC(3 PH)</strong> SITC of 32A 4 pole MCB in a suitable weather proof metal enclosure for cassette Acs</td>
</tr>
<tr>
<td>11</td>
<td><strong>MCB with Enclosure for Cassette AC(1 PH)</strong> SITC of 32A 3 pole MCB in a suitable metal enclosure for cassette Acs in the Banking hall</td>
</tr>
<tr>
<td>2</td>
<td><strong>ATM UPS DB</strong> SPN 8 way IP 43 - #IK 09 with metal Double door DB for UPS sockets. The scope of work includes supply &amp; fixing of following MCBs: (1) 32A DP MCB-1NO, (2)6-32A SP MCB-6NO</td>
</tr>
</tbody>
</table>

### Armoured Cables for DB Input, Cassette ACS & UPS Input DB

Supply, Laying, Testing and commissioning of 1.1 KV grade XLPE insulated armoured aluminium/copper conductor cable of the following size including laying in trenches, cable trays, on wall including claming and including civil works etc complete as per IS 7098 - Part 1 - 1983. The scope of work includes supply & laying of 2 runs of SWG GI wire along with the cable.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Rmt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.5C X 35 SQMM ALU CABLE</td>
<td>280</td>
</tr>
<tr>
<td>2</td>
<td>4C X 16 SQMM CU CABLE</td>
<td>450</td>
</tr>
<tr>
<td>3</td>
<td>4C X 6 SQMM CU CABLE</td>
<td>350</td>
</tr>
<tr>
<td>4</td>
<td>4C X 4 SQMM CU CABLE</td>
<td>650</td>
</tr>
<tr>
<td>5</td>
<td>3C X 4 SQMM CU CABLE</td>
<td>440</td>
</tr>
</tbody>
</table>

### Terminations

Termination of the following cables with **double compression cable glands with canopy** and also with suitable size aluminium/copper lugs including supply and fixing of Lugs. The scope of work extends to **earthing of gland** also.

<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Rmt</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>3.5C X 35 SQMM ALU CABLE</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>4C X 16 SQMM CU CABLE</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>4C X 6 SQMM CU CABLE</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Description</td>
<td>Code</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>g</td>
<td>4C X 4 SQMM CU CABLE</td>
<td>No</td>
</tr>
<tr>
<td>h</td>
<td>3 C X 4 SQMM CU CABLE</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>AC WIRING</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td><strong>SPLIT AC WIRING:</strong> Supply and Fixing of 20 A DP MCB fixed on a suitable module metal box including all interconnections as required. (for High Wall Split ACs) along with wiring of 2 runs of 4.0 sq.mm FRLS multi strand copper conductor and one run of 2.5mm FRLS copper earth wire run in suitable size 2 mm thick 25mm dia PVC conduit (FRLS) run concealed on wall/ Ceiling etc as required. The wires should be conforming to IS 694 (with latest amendments). The scope of work includes wiring from AC DB to DP MCB to AC unit.</td>
<td>No</td>
</tr>
<tr>
<td>b</td>
<td><strong>SPLIT AC WIRING FOR LOCKER ROOM:</strong> Supply and Fixing of 20 A industrial socket with metal clad socket on a suitable module metal box including all interconnections as required near locker room door &amp; one 20A MCB in a suitable enclosure near the AC indoor unit. (for High Wall Split ACs) along with wiring of 2 runs of 4.0 sq.mm FRLS multi strand copper conductor and one run of 2.5mm FRLS copper earth wire run in suitable size 2 mm thick 25mm dia PVC conduit (FRLS) run concealed on wall/ Ceiling etc as required. The wires should be conforming to IS 694 (with latest amendments). The scope of work includes wiring from AC DB to metal clad socket to AC unit Supply and run the 3X4 Sqmm copper flexible from metal clad socket to 2 pole MCB near AC indoor unit, one side to be flexible cable to fitted in above socket for plug-top arrangement and other side should terminate in DP MCB placed inside the locker room.</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td><strong>GLOW SIGN BOARD:</strong> Supply &amp; laying of 3 core 2.5 sqmm Copper flexible Cable in a suitable FRLS PVC pipe for Glow Sign Board including all terminations</td>
<td>Rmt</td>
</tr>
<tr>
<td>6</td>
<td><strong>EMERGENCY LIGHTING (UPS SUPPLY):</strong> Supply &amp; laying of 3 core 1.5 sqmm copper flexible cable in a suitable FRLS PVC pipe for emergency lighting. The scope of work includes supply &amp; fixing of 2A DP MCB in a suitable enclosure. No of points: One primary point &amp; two secondary points. The scope of work extends to supply &amp; fixing of 3 no of square type 15 watts recess mounted LED lights also.</td>
<td>No</td>
</tr>
</tbody>
</table>
### LIGHT & FAN POINT WIRING:

Note: Point wiring rates are inclusive of 2 x 2.5 mm² FRLS PVC insulated stranded copper conductor wires for circuit and + 1 x 1.5 mm² (Earth) mm FRLS PVC insulated copper conductor insulated earth wire. All wire shall be FRLS. Wiring for Light point / socket switch with 3 x 1.5 sqmm copper conductor FRLS insulated 1100V grade multi strand wires (P+N+E) in concealed/ surface using 20/25/32 Medium duty FRLS PVC conduit 16swg thick with all bend, tees, saddle mounting box, cover plate ceiling rose, etc. wherever required etc. & cromium plate brass screw/rawl plug etc. The circuit wiring start from DB to point control box / switch box using 3 x 2.5 sqmm copper conductor FRLS insulated 1100V grade multistrand wire (P+N+E) identification ferrules at both end in FRLS PVC conduit 16 swg thick complete in all respect. The conduit must be fixed with pvc saddle at every 80cm on surface and conduit to be laid in ceiling with proper clamps/wall floor filling the chase with cement mortar and finish the same in original form/wooden partion above false ceiling chesess filled with cement mortar as required at site Each circuit shall have separate earth wire. All switch socket must be for modular type with M.S. Boxes and plate etc. as required Note: - Each circuit shall have independent earth wire each point shall be earthed. Circuit wiring is to be included in point rate wiring. (PLEASE NOTE THAT Colour code - Red- Yellow-Blue wires for phases, Black wire for Neutral and Green wire for Earth must be used).

<p>| | | | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a</strong></td>
<td>Primary points</td>
<td>No</td>
<td>206</td>
</tr>
<tr>
<td><strong>b</strong></td>
<td>same as the above secondary point ( only one secondary point on the primary point)</td>
<td>No</td>
<td>103</td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>same as the above secondary point ( only two secondary points on the primary point)</td>
<td>No</td>
<td>16</td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>one switch controlled by three lights</td>
<td>No</td>
<td>18</td>
</tr>
<tr>
<td><strong>e</strong></td>
<td>Call bell points for the cabins including supply of call bell as required</td>
<td>No</td>
<td>3</td>
</tr>
</tbody>
</table>

### MODULAR SOCKETS:

Supply and fixing of switch(s) & socket(s) fixed on a suitable module metal box(16 guage) and white front plate (Modular type) including all interconnections as required and blank plate has to be provided if necessary. The scope of work extends to Supply and wiring with 2 runs of 4.0 sq.mm & one run of 2.5 sqmm 1100 V grade PVC insulated multi strand FRLS copper conductor wires conforming to IS 694 (with latest amendments) in suitable size FRLS PVC CONDUIT of 2mm thick concealed in the above ducts in the floor and supply.
of all fixing materials and accessories, interconnections complete as required for the UPS/raw power sockets in the single window counters and officer tables. **if these sockets are mounted in SB (along with point wiring) we will treat it as on board socket.**

<table>
<thead>
<tr>
<th></th>
<th>PRIMARY POINT - RAW POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1nos 6/16A Socket and 1nos 16A switch (Rawpower point switch and socket to be installed in a metal box). The scope of work extends supply of 2 meter length of flexible 3core 4sqmm multi core copper cable one end connected to plug top 16A and the other connected to the SB inside and a suitable hook arrangement as required for hanging the cable at <strong>Record rooms &amp; Safe room, ATM, LOCKER room, Strong room, stationary room( Independent Circuits)</strong></td>
</tr>
<tr>
<td></td>
<td>No 11</td>
</tr>
<tr>
<td></td>
<td>PRIMARY POINT: RAW POWER</td>
</tr>
<tr>
<td>2</td>
<td>1 no of 6/16A socket with 1 no of 16A switch For power point in banking hall</td>
</tr>
<tr>
<td></td>
<td>No 8</td>
</tr>
<tr>
<td></td>
<td>PRIMARY POINT: RAW POWER</td>
</tr>
<tr>
<td>3</td>
<td>2 nos of 6/16A socket with 2 no of 16A switch For Kitchen</td>
</tr>
<tr>
<td></td>
<td>No 6</td>
</tr>
</tbody>
</table>

9 Supply and fixing of switch(s) & socket(s) fixed on a suitable module metal box (16 gauge) and white front plate (Modular type) including all interconnections as required and blank plate has to be provided if necessary. The scope of work extends to Supply and wiring with 3 runs of 2.5 sq.mm 1100 V grade PVC insulated multi strand FRLS copper conductor wires conforming to IS 694 (with latest amendments) in suitable size FRLS PVC CONDUIT of 2mm thick concealed in the above ducts in the floor and supply of all fixing materials and accessories, interconnections complete as required for the UPS/raw power sockets in the single window counters and officer tables. **if these sockets are mounted in SB (along with point wiring) we will treat it as on board socket.**
|   | PRIMARY POINT: UPS POWER  
|   | 4nos. 10A sockets with 1 no 16A switch  
|   | (Switch shall be fixed above the table and sockets shall be fixed below the counter OF BM, SWO, field officer, Grahakamitra, Cash officers, gold loan etc) |
|   | No 44 |
| b | PRIMARY POINT: RAW POWER  
|   | 2nos 10A SocketS with 1 No of 10A switch  
|   | (Raw Sockets)- for counters( Switch & Socket should be mounted above the table.) |
|   | No 35 |
| c | SECONDARY POINT: RAW POWER (2 X10A socket & 1 X10A switch)  
|   | same as above but looped from nearest point (Primary point to Secondary point) from counter to counter |
|   | No 18 |
| d | PRIMARY POINT: UPS/ RAW POWER  
|   | 2 nos of 10A socket with 2 no of 10A switch  
|   | for display |
|   | No 6 |
| e | PRIMARY POINT: UPS/RAW POWER  
|   | 1 nos of 10A socket with 1 no of 10A switch  
|   | for coin vending machine, pass book printing |
|   | No 10 |
| 10 | Supply and fixing of switch(s) & socket(s)  
|   | fixed on a suitable module metal box(16 guage)  
|   | and white front plate (Modular type) including all interconnections as required and blank plate has to be provided if necessary. |
| a | 1 no of 6A socket with 1 no of 10A switch and it should be fixed in the switch board -RAW POWER |
|   | No 26 |
| b | 1 no of 6A socket 3" below the false ceiling for wall mounting fan - RAW POWER. |
|   | No 41 |
| 11 | UPS & ITS RELATED WORKS:  
|   | Supply, installation and concelling of following size MCB/MCCB/RCBO distribution boards with following combination of C curve-MCBs as required. Vacent slots will be covered with dummy plates. The scope of work extends to double earthing with 8swg copper bear wire for the DB . |
| a | UPS INPUT DB:  
|   | DP/TP/FP Metal enclosure with 1 no of 32A DP MCB |
|   | No 4 |
| b | UPS OUTPUT DB  
<p>|   | DP/TP/FP Metal enclosure with 1 no of 32A DP MCB |
|   | No 4 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>UPS OUTPUT DISTRIBUTION DB NEAR UPS SPN 8 way IP 43 - #IK 09 with metal Double door DB for UPS sockets. The scope of work includes supply &amp; fixing of following MCBs: (1) 32A DP MCB-1NO, (2)6-32A SP MCB-6NO</td>
<td>NO 4</td>
</tr>
<tr>
<td></td>
<td>U</td>
<td>S</td>
</tr>
<tr>
<td>f</td>
<td>SPN 8 way IP 43 - #IK 09 with metal Double door DB for UPS sockets. The scope of work includes supply &amp; fixing of following MCBs: (1) 32A DP MCB-1NO, (2)6-32A SP MCB-6NO</td>
<td>No 3</td>
</tr>
<tr>
<td>g</td>
<td>SPN 12 way IP 43 - #IK 09 with metal Double door DB for UPS sockets. The scope of work includes supply &amp; fixing of following MCBs: (1) 32A DP MCB-1NO, (2)6-32A SP MCB-10NO</td>
<td>No 6</td>
</tr>
<tr>
<td></td>
<td>UPS DISTRIBUTION BOARD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UPS INTERNAL WIRING</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supply, laying and dressing of following 1.1KV XLPE Insulated, PVC tape/PVC Extruded Innersheathed for Multicore copper flexible Cables, extruded PVC Type ST2 Sheathed, 650/1100 V grade as per IS 7098 (Part 1) 1988. The scope of work includes laying of cable in a suitable metal hose flexible pipe, complete the work as directed by the SBIIMS</td>
<td></td>
</tr>
<tr>
<td>k</td>
<td>3 core X 6sqmm copper flexible cable</td>
<td>Rmt 120</td>
</tr>
<tr>
<td>n</td>
<td>SUPPLY &amp; FIXING OF EXHAUST FANS WITH TIMER</td>
<td>No 2</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; fixing of 2 no of bird cage exhaust fans with timer control for the exhaust fans in the UPS room. The scope of work includes making provision in the wall for installation of exhaust fans.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 NETWORKING</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>POINT Wiring: Supplying, laying, testing and commissioning of four pair CAT 6, UTP cable 23 AWG solid bare copper or better; Insulation - Polyethylene; Jacket - Flame Retardant PVC; Pair Separator - Star Quad Separator or equivalent; 250 MHz; UL Subject 444, EIAITIA-568 B.2.1, ISO/IEC 11801 &amp; IEC61156-5 for LAN in a suitable FRLS PVC conduit of 2mm thick and making connection on both ends complete as required with all accessories including labour charges. The scope of work includes supply &amp; fixing of RJ-45 LAN socket outlet (I/O) in GI</td>
<td>No 81</td>
</tr>
</tbody>
</table>
b | SITC of branded UTP Category 6 four pair, 1 meter Patch Cord with factory crimped boots on RJ 45 plugs at both ends. Should conform or exceed ISO/IEC 11801, EIA/TIA 568, EN50173 and UL, ETL | No | 81 |

c | SITC of branded UTP Category 6 four pair, 2 meter Patch Cord with factory crimped boots on RJ 45 plugs at both ends. Should conform or exceed ISO/IEC 11801, EIA/TIA 568, EN50173 and UL, ETL | No | 81 |

D | Supply of Cat-6 24 port jack panel make-D-link or equalent. | No | 4 |

E | Supply of 12U wall mount rack with all accessories(self, power manager, cable Manager, Fan etc. | No | 4 |

**13** | TELI PHONE WIRING |

**POINT WIRING**
Supply, installation, testing and commissioing of high Conductivity Solid Annealed Bare Copper industrial 0.5mm dia Telephone (Switchboard) Cables with High Density Polyethylene Insulation, Paired, Polyester and Sheathed with High Oxygen Index, Fire Retardant, PVC Compound, Grey Outer Sheath generally conforming ITD Specification. the scope of work inclusive of all fixing accessories & laying in a suitable ISI medium PVC conduit. The scope of work extends to Supply and Fixing of modular type RJ11 Telephone outlet with anodized GI box and front plate complete as required.

A | 2 pair | No | 36 |

**14** | KRONE ENCLOSURE |

Supply, installation, testing & commissioning of Telephone krone in an MS powder coated enclosure for the following sizes..

B | 20 PAIR KRONE | No | 2 |

**15** | PA & MUSIC SYSTEM |

A | S & I of point wiring for music - cum PA system comprising of 2x 1.0 sqmm stranded , copper conductor , flexible PVC insulated and PVC Sheathed wire pulled through 20 mm dia FRLS PVC heavy gauge conduits and looped | Pts. | 32 |
<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>B</strong></td>
<td>S &amp; I of Philips / Bosch/Ahuja make music 6W (101.6mm Diameter) speaker flush mounted on the false ceiling with proper clamping arrangement.</td>
<td>Nos. 32</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>S &amp; I of 100 Watts BOSCH/Ahuja make Central Music System Amplifier and MP3/CD/USB Player with FM facility of make Samsung/Onida/LG.</td>
<td>SET 2</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>S &amp; I of TV socket point flush mounted on wall / partition including cabling till outside the building with connector</td>
<td>Nos. 6</td>
</tr>
<tr>
<td><strong>16 FIXTURES/FANS</strong></td>
<td>Supply &amp; Installation of following type direct/indirect type recess/surface/ wall mounted light fixtures. The fixtures shall be installed including supply and wiring between Ceiling rose to fixture with supply and laying of 3core 1.5Sq.mm copper flexible cable and fixing of Lamp with all required accessories, support chains &amp; interconnections etc. including cost and conveyance of all materials, taxes and all labor charges etc., complete.</td>
<td></td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Supply &amp; Installation of 15W Led down light fixture. (Havells:- Integra neo 15W, 857 CROMPTON: LCDRQ-15-CDL/LCDRO-15-CDL or equivalent) including cost and conveyance of all materials, taxes and all labor charges etc., complete.</td>
<td>No 157</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Supply &amp; Installation of 34W 2X2 LedLight fixtures (Havells -VENUSNEOHE2X2PLR34WLED8XXS or CROMPTON: LCLTRNE-36-FO-CDL or Equi) including cost and conveyance of all materials, taxes and all labor charges etc., complete. Weight of the light should not be on the grid/ Gypsum ceiling. light has to be fixed with the help of GI wires and to the anchored to the ceiling.</td>
<td>No 42</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Supply &amp; Installation of 610x610 LedLight fixtures Frames including cost and conveyance of all materials, taxes and all labor charges etc., complete.</td>
<td>No 42</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Supply &amp; Installation of 9 W T5 led Light fixtures and giving connections and all labour charges etc., complete for erection.</td>
<td>No 5</td>
</tr>
<tr>
<td></td>
<td>Supply and Installation of 18W T5 fixtures SURFACE type with all interconnections and fixing arrangement as required. (LUMILINEBS18WLED857SPCWH - Havels or CROMPTON: LDL-20-CDL or equivalent)</td>
<td>No 48</td>
</tr>
<tr>
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</tr>
<tr>
<td>F</td>
<td>Supply &amp; fixing of 20 watts per meter rope lights baic cost shouldbe Rs.180.00</td>
<td>Rmt 250</td>
</tr>
<tr>
<td>G</td>
<td>Supply and Fixing of metal body wall mounted fans of 400mm Hi flow model.(BM, counters, Server RM, Field Officer,)</td>
<td>No 38</td>
</tr>
<tr>
<td>H</td>
<td>Supply &amp; Installation of fresh air exhaust fan 50W of light duty 300mm size (12”), Metallic body plastic blades, wire mesh, bird louvers etc. including cost and conveyance of all materials, taxes and all labor charges etc., complete for erection</td>
<td>No 8</td>
</tr>
<tr>
<td>I</td>
<td>Supply &amp; Fixing of 1200mm sweep 5 star High speed ceiling fan with electronic step regulator in suitable locations as required. And Supplying of double anchor fastener hooks and down rods . complete in all respects as directed by Bank. CG/ Havells</td>
<td>No 18</td>
</tr>
<tr>
<td></td>
<td><strong>Earthing:</strong></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Providing independent earthing for sophisticated electronic equipment with 600 mm x 600 mm x 3.5 mm thick copper plate rigidly fixed to 40 mm dia G.I. pipe of 3 mtr length connected with reducer providing G.I. funnel with wiremesh as per national electric code including C.C. Chamber of size 400 mm x 400 mm x 400 mm covered with RCC slab filling with salt and charcoal giving earth connection from electrode copper strip 2 runs of 50 mm x 6 mm x 3000 mm length with all accessories and labour charges complete, as per IS specifications 732/1982 (Part II)</td>
<td>No 4</td>
</tr>
<tr>
<td>B</td>
<td>Providing independent earthing for important equipment with 40 mm dia “B” class 2.5m long G.I pipe and 19mm dia “B” class G.I pipe of 0.3 mtr. Long connected with reducer providing G.I. funnel with mesh enclosed in C.C. Chamber of 400mm x 400 mm x 400 mm with RCC slab cover duly providing staggered holes filling with salt and charcoal from the bottom of the pipe giving earth connection from electrode through G.I. strip 2 runs of 50 x 6 mm x 3000 mm length with all accessories and labour charges complete, as per IS specifications 732/1982 (part II)</td>
<td>No 4</td>
</tr>
<tr>
<td>C</td>
<td>Supply and laying of 8SWG Cu insulated Wire in 20mm dia rigid pvc conduit For Body</td>
<td>Rmt 150</td>
</tr>
<tr>
<td>D</td>
<td>Supply and laying of following Copper/ GI flat/strip/unsheathed multistrand cable including</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of all accessories and labour charges etc. complete the work as directed by the SBIIMS</td>
<td></td>
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<td>---</td>
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</tr>
<tr>
<td>E</td>
<td>1 core 6 sqmm unsheathed FRLS multistrand cable in a suitable PVC conduit for neutral</td>
<td>Rmt</td>
</tr>
<tr>
<td>F</td>
<td>Supply &amp; Laying of 100mmX 25mmX 5mm Copper strip with supporting insulator and holes</td>
<td>No</td>
</tr>
<tr>
<td>G</td>
<td>Supply &amp; Laying of 100mmX 25mmX 6mm GI strip with supporting insulator and holes</td>
<td>No</td>
</tr>
<tr>
<td>18</td>
<td>ELECTRICAL SAFETY &amp; INDICATION ITEMS</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Supply &amp; Installation of 3 no of 3watts(R,Y,B) bulbs in a suitable enclosure For indicating the electricity board supply. The scope of work includes wiring from DB.</td>
<td>No</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th></th>
<th>Total amount part B</th>
</tr>
</thead>
</table>

<p>| HVAC WORKS |
|---|---|
| 1 | SITC OF SPLIT AC |
|   | Design, Supply, Installation, testing and commissioning of split wall mounted with cordless remote Air conditioners with Invertor Technology (Rating: 5 star or equivalent) with Green Gas/eco friendly &amp; independent evaporator and compressor(copper) with copper coil &amp; condenser . Nominal cooling capacity more than 18000 BTU/Hr (suitable for operation on single phase 220-240 volts, 50Hz, Ac supply ). The scope of work includes supply of 5 meters cop |
| No |   |
| a | 1.0 TR |
| b | COPPER PIPING WORKS: |
|   | Supply, installation, testing &amp; commissioning of 16 SWG copper Refrigerant Piping for suction &amp; return of suitable dia. The rate shall include Copper pipe and insulation with 19 mm Thick Nitrile rubber tube (i.e. As per Unit Manufacturer recomendation) and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards. The scope of work includes supply of &amp; laying of suitable power &amp; communication cable from indoor to out door |
| Rmt | 45 |
| c | CABLE: |
|   | Supply and laying of suitable electrical flexible cable from out door to indoor |
| Rmt | 45 |</p>
<table>
<thead>
<tr>
<th></th>
<th><strong>DRAIN PIPE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supply &amp; Erection of CPVC pipe Insulated condensate drain pipe of the following size etc., complete as per the specification</td>
<td>Rmt 50</td>
</tr>
<tr>
<td>e</td>
<td><strong>MS STAND:</strong></td>
<td>No 6</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; Fixing of suitable MS Stand for above high-wall Split Acs</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>TIMER:</strong></td>
<td>No 1</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; fixing of suitable Timer for Acs at Server room &amp; ATM</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><strong>STABILIZER:</strong></td>
<td>No 8</td>
</tr>
<tr>
<td></td>
<td>Supply and fixing of 4 KVA stabilizer</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><strong>SITC OF SPLIT AC</strong></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Design, Supply, Installation, testing and commissioning of split wall mounted with cordless remote Air conditioners with Inverter Technology (Rating: 5 star or equivalent) with Green Gas/eco friendly &amp; independent evaporator and compressor(copper) with copper coil &amp; condenser. Nominal cooling capacity more than 18000 BTU/Hr (suitable for operation on single phase 220-240 volts, 50Hz, Ac supply). The scope of work includes supply of 5 meters cop</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>2.0 TR</td>
<td>No 2</td>
</tr>
<tr>
<td>b</td>
<td><strong>COPPER PIPING WORKS:</strong></td>
<td>Rmt 30</td>
</tr>
<tr>
<td></td>
<td>Supply, installation, testing &amp; commissioning of 16 SWG copper Refrigerant Piping for suction &amp; return of suitable dia. The rate shall include Copper pipe and insulation with 19 mm Thick Nitrile rubber tube (i.e. As per Unit Manufacturer recomendation) and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards. The scope of work includes supply of &amp; laying of suitable power &amp; communication cable from indoor to out door</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td><strong>CABLE:</strong></td>
<td>Rmt 30</td>
</tr>
<tr>
<td></td>
<td>Supply and laying of suitable electrical flexible cable from out door to indoor</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td><strong>DRAIN PIPE</strong></td>
<td>Rmt 35</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; Erection of CPVC pipe Insulated condensate drain pipe of the following size etc., complete as per the specification</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>MS STAND:</strong></td>
<td>No 2</td>
</tr>
<tr>
<td></td>
<td>Supply &amp; Fixing of suitable MS Stand for above high-wall Split Acs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SITC OF CASSETTE AC</td>
<td>Supply, Installation, Testing and commissioning of the following capacities of Cassette Units (Gas - R32/ R134A/ R407/ R410-Ozone Friendly and Non CFC Refrigerant) with necessary gas Top Up complete with scroll / Rotary inverter compressor, copper condenser, evaporator, vibration isolators, structural supports with required hard ware, control cable, etc</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>2.0TR</td>
<td>No</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>COPPER PIPING WORKS: Supply, installation, testing &amp; commissioning of SUITABLE SWG copper Refrigerant Piping for suction &amp; return of suitable dia. The rate shall include Copper pipe and insulation with 19 mm Thick Nitrile rubber tube (i.e. As per Unit Manufacturer recommendation) and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards. The scope of work includes supply of &amp; laying of suitable power &amp; communication cable from indoor to out door Rmt 30</td>
<td></td>
</tr>
<tr>
<td><strong>c</strong></td>
<td>CABLE: Supply and laying of suitable electrical flexible cable from out door to indoor Rmt 30</td>
<td></td>
</tr>
<tr>
<td><strong>d</strong></td>
<td>DRAIN PIPE Supply &amp; Erection of CPVC pipe Insulated condensate drain pipe of the following size etc., complete as per the specification Rmt 35</td>
<td></td>
</tr>
<tr>
<td><strong>e</strong></td>
<td>MS STAND: Supply &amp; Fixing of suitable MS Stand for above high-wall Split Acs No 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SITC OF CASSETTE AC</td>
<td>Supply, Installation, Testing and commissioning of the following capacities of Cassette Units (Gas - R32/ R134A/ R407/ R410-Ozone Friendly and Non CFC Refrigerant) with necessary gas Top Up complete with scroll / Rotary inverter compressor, copper condenser, evaporator, vibration isolators, structural supports with required hard ware, control cable, etc</td>
</tr>
<tr>
<td></td>
<td>3.0TR</td>
<td>No</td>
</tr>
<tr>
<td>COPPER PIPING WORKS:</td>
<td>Rmt</td>
<td>165</td>
</tr>
<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td>Supply, installation, testing &amp; commissioning of SUITABLE SWG copper Refrigerant Piping for suction &amp; return of suitable dia. The rate shall include Copper pipe and insulation with 19 mm Thick Nitrile rubber tube (i.e. As per Unit Manufacturer recomendation) and necessary Installation accessories such as supports and clamps. The sizes given shall be verified by Supplier for adequacy and size based on manufacturer standards. The scope of work includes supply of &amp; laying of suitable power &amp; communication cable from indoor to out door</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CABLE:</th>
<th>Rmt</th>
<th>170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply and laying of suitable electrical flexible cable from out door to indoor</td>
<td></td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>DRAIN PIPE</th>
<th>Rmt</th>
<th>200</th>
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<tbody>
<tr>
<td>Supply &amp; Erection of CPVC pipe Insulated condensate drain pipe of the following size etc., complete as per the specification</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>MS STAND:</th>
<th>No</th>
<th>11</th>
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</thead>
<tbody>
<tr>
<td>Supply &amp; Fixing of suitable MS Stand for above high-wall Split Acs</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TOTAL AMOUNT PART C</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>GRAND TOTAL</td>
<td></td>
<td></td>
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