SBI INFRA MANAGEMENT SOLUTIONS PVT.LTD.

STATE BANK OF INDIA.
LOCAL HEAD OFFICE, 3rdFLOOR, C-6, G- BLOCK,
SYNERGY BUILDING, BANDRA-KURLA COMPLEX,
BANDRA (EAST), MUMBAI-400 051.

PART – A: TECHNICAL BID

TENDER ID: **MUM201906004**

PROPOSED AIRCONDITIONING WORKS AT ASWALI BRANCH NASHIK

TENDER SUBMITTED BY :

NAME : _____

ADDRESS : _____

_____

_____

DATE : _____

ARCHITECT :

M/s. VASTU DESIGN
11, ZARINA SOCIETY,
59-A, S.V.ROAD,
BANDRA (W), MUMBAI- 400050
Telfax:- 02226450557,26512268
Mobile:- 9324150557.
E- mail:-vastudesign@hotmail.com / vastudesign.arch@gmail.com

NOTICE INVITING TENDERS

SBIIMS on behalf of SBI through its Architect **M/s. VASTU DESIGN, Mumbai** invites "online item rate E-tender" from the SBIIMS Empanelled contractors OEM's & their authorized dealers under appropriate category for the captioned work.

The details of tender are as under:

S.No.	Description	
1.	Name of work	Proposed air-conditioning Works at SBI Aswali Branch Nashik
2.	Nature of Work	Air-Conditioning
3.	Time allowed for completion	**2 (Two) months**
4.	Cost of Tender Documents	Rs. 1000/- **(Rs. One Thousand Only)** to be paid through State Bank Collect **ONLY** as detailed under; 1) login https://www.onlinesbi.com 2) Select SB Collect from Top Menu, click the check box and "Proceed" 3) Select "All India" in "State of Corporate/Institution" & Select "Commercial Services" in "Type of Corporate/Institution" then "Go" 4) Select "SBI Infra Management Solutions pvt. Ltd" in Commercial Services Name and "Submit" 5) Select "Tender Application Fee" in "Payment Category" and enter the "Tender ID" exactly as given in first page top of this tender(characters in uppercase Only). 6) Fill up all fields such as email, GST No., Mobile No, Vendor/Firm Name etc and make payment. 7) Enclose payment receipt having unique reference No. along with EMD
5.	Earnest Money Deposit	**Rs. 6000/- (Six Thousand only) by means of Demand Draft / Pay Order** from any scheduled Nationalized Bank drawn **in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.**
6.	Initial Security Deposit	2% of contract amount in favour of SBI (EMD will be returned)
7.	Date of issue of tender documents form Bank's website	25-06-2019 to 01-07-2019 www.sbi.co.in under <Link>procurement news.
8.	Last date & time for submission of Technical bid, EMD and cost of tender document	01-07-2019 by 3.00 PM

9.	Address at which Technical bid (hard copy) along with EMD & Cost of tender document has to be submitted.	Vice President & Circle Head, SBI Infra Management Solutions Pvt. Ltd. SBI, Local Head Office,3rd floor,C-6,G-Block Synergy Building, Bandra- Kurla Complex, Bandra (East), Mumbai-400 051..
10.	Last date & time for submission of online price bid.	03-07-2019 at 3.00 PM At: - https://etender/SBI
11.	Last date & time for opening of online price bid.	03-07-2019 at 3.30 PM At: https://etender/SBI
12.	Place of opening tenders	Vice President & Circle Head, SBI Infra Management Solutions Pvt. Ltd. SBI, Local Head Office,3rd floor,C-6,G-Block Synergy Building, Bandra- Kurla Complex, Bandra (East), Mumbai-400 051..
13.	Liquidated Damages	0.50% of contract amount per weeks subject to max. 5% of contract value or final bill value.
14.	Defects liability period	12 Months from the date of Virtual Completion
15.	Validity of offer	90 days from the date of opening of Price-bid
16.	Value of Interim Certificate	**Rs. 2 Lakhs**. No advance on materials / plant / machinery or mobilization advance shall be paid under any circumstances

16. Tenders can be downloaded from the bank's website **www.sbi.co.in** (link) <Procurement News>.It shall be responsibility of the contractor to arrange and ensure that all pages of technical and financial bid are properly bound separately. Tenders in loose pages may be disqualified.

17. The contractor shall sign and stamp each page of the tender document thereby ensuring the number and sequence of all pages.

18. No conditions other than mentioned in the tender will be considered, and if given they will have to be withdrawn before opening of the price-bid.

19. The SBIIMS Pvt. Ltd. reserve their rights to accept or reject any or all the tenders, either in whole or in part without assigning any reason(s) for doing so and no claim / correspondence shall be entertained in this regard.

20. Tenders received without EMD and Cost of Tender Documents shall be summarily rejected and such tenders shall not be allowed to participate in the online price bidding process.

21. In case the date of opening of tenders is declared as a holiday, the tenders will be opened on the next working day at the same time.

22. SBIIMS Pvt. Ltd. has the right to accept / reject any / all tenders without assigning any reasons and no correspondence shall be entertained in this regard.

Yours Faithfully,

For & On-behalf of SBI Infra Management Solutions Pvt. Ltd.

FORM TENDER

To,
Vice President & Circle Head,
SBI Infra Management Solutions Pvt. Ltd.
SBI, Local Head Office,3rd floor,C-6,G-Block
Synergy Building,
Bandra- Kurla Complex, Bandra (East),
Mumbai-400 051..

Dear Sir,

Having examined the drawings, specification, design and schedule of quantities relating to the works specified in the memorandum hereinafter set out and having visited and examined the site of the works specified in the said memorandum and having acquired the requisite information relating thereto as affecting the tender, I/We hereby offer to execute the works specified in the said memorandum at the rates mentioned in the attached Schedule of Quantities and in accordance in all respects with the specifications, design, drawings and instructions in writing referred to in conditions of tender, the Articles of Agreement, Special Conditions, Schedule of Quantities and Conditions of Contract and with such materials as are provided for by, and in all other respects in accordance with such conditions so far as they may be applicable.

MEMORANDUM

Description of work	Proposed Air-Conditioning Works at Aswali branch, Nashik
Earnest Money	**Rs. 6,000/- (Six Thousand only)** by means of Demand Draft / Pay Order from any scheduled Nationalized Bank drawn in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.
Percentage, if any, to be deducted from Bills and total amount to be retained	10 % from Running Bills, subject to maximum Total 5% of contract amount or actual Final Bill value including EMD& Initial Security Deposit.
Time allowed for completion of the Works from fourteenth day after the date of written order or date of handing over of the site (whichever is later) to commence the work	2 (Two) months

I / We have deposited a sum of **Rs. 6,000/- (Six Thousand only)** of the total tender amount as Earnest Money with the SBI Infra Management Solutions Pvt. Ltd. which amount is not to bear any interest. Should I / We fail to execute the Contract when called upon to do so I / We do hereby agree that this sum shall be forfeited by me/us to SBI Infra Management Solutions Pvt. Ltd.

1) Our Bankers are:

   i)

   ii)

   The names of partners of our firm are:

   i)

ii)

Name of the partner of the firm

Authorised to sign

Or

(Name of person having Power of
Attorney to sign the Contract.
(Certified true copy of the Power
of Attorney should be attached)

Yours faithfully,

Signature of Contractors.

Signature and addresses of Witnesses

i)

ii)

SAMPLE BUISNESS RULE DOCUMENT

ONLINE E-TENDERING FOR PROPOSED AC WORKS FOR STATE BANK OF INDIA, ASWALI BRANCH, NASHIK.

(A) Business rules for E-tendering:

1. Only **empaneled** contractors with SBIIMS PVT. LTD. under appropriate category who are invited by the project Architect/SBIIMS shall only be eligible to participate.

2. SBIIMS PVT.LTD. will engage the services of and E-tendering service provider who will provide necessary training and assistance before commencement of online bidding on Internet.

3. In case of e-tendering, SBIIMS will inform the vendor in writing, the details of service provider to enable them to contact and get trained.

4. Business rules like event date, closing and opening time etc. also will be communicated through service provider for compliance.

5. Contractors have to send by email, the compliance form in the prescribed format (provided by service provider),before start of E-tendering. Without this the vendor will not be eligible to participate in the event.

6. The Contractors will be required to submit the various documents in sealed Envelope to the office of SBI Infra Solutions Pvt. Ltd. at the address mentioned hereinbefore by the stipulated date i.e. (1) Hard Copy of Technical Bid duly signed and stamped on each page (2) Demand Draft of specified amount of EMD (3) Demand Draft of Cost of Tender documents (4) Certified copy of A-Class Electrical License). Contractors not submitting any one or more documents shall not be eligible to participate in the on line price bidding.

7. E-tendering will be conducted on schedule date & time.

8. **The e-tendering will be treated as closed only when the bidding process gets closed in all respects for the item listed in the tender.**

(B) Terms & conditions of E-tendering:

SBIIMS PVT. LTD. shall finalize the Tender through e-tendering mode for which **E-Procurement Technologies Ltd** has been engaged by SBIIMS an authorized service provider. Please go through the guidelines given below and submit your acceptance to the same along with your Commercial Bid.

1. E-tendering shall be conducted by SBIIMS through **E- Procurement Technologies Ltd**, on pre-specified date. While the Contractors shall be quoting from their own offices/ place of their choice, Internet connectivity and other paraphernalia requirements shall have to be ensured by Contractors themselves. In the event of failure of their Internet connectivity, (due to any reason whatsoever it may be) SBIIMS shall not be held responsible & no-further request by the bidder/ tenderer shall be entitled. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives such as back–up power supply whatever required so that they are able to circumvent such situation and still be able to participate in the E-tendering successfully. Failure of power at the premises of Contractors during the E-tendering cannot be the cause for not

participating in the E-tendering. On account of this the time for the E-tendering cannot be extended and SBIIMS Pvt. Ltd. is not responsible for such eventualities.

2. E- Procurement Technologies Ltd,shall arrange to train your nominated person(s), without any cost to you. They shall also explain you all the Rules related to the E-tendering. You are required to give your compliance on it before start of bid process.

3. BIDDING CURRENCY AND UNIT OF MEASUREMENT: Bidding will be conducted in Indian currency & Unit of Measurement will be displayed in Online E-tendering.

4. BID PRICE: The Bidder has to quote the rate as per the Tender Document provided by SBIIMS Pvt. Ltd. their appointed Architects.

5. VALIDITY OF BIDS: The Bid price shall be firm for a period specified in the tender document and shall not be subjected to any change whatsoever.

6. Procedure of E-tendering:
   i. **Online E-tendering** :

   (a)The hard copy of the Technical as well as Price Bid Document are available on the Bank's website during the period specified in the Notice Inviting Tender (NIT).
   (b)Online e-tendering is open to the empaneled bidders who receive NIT from the Architect and qualified for participating in the price bidding as provisions mentioned hereinabove through SBIIMS approved Service Provider.
   (c)The Price-Bid shall be made available online by the Service Provider wherein the contractors will be required to fill-in their Item-wise rates for each item.
   (d)The Contractors are advised not to wait till the last minute to submit their online item-wise quote in the price bid to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.
   (e)It is mandatory to all the bidders participating in the price bid to quote their rates for each and every item.
   (f) In case, contractor fails to quote their rates for any one or more tender items, their tender shall be treated as ***"Incomplete Tender***" and shall be liable for rejection.

7. LOG IN NAME & PASSWORD: Each Bidder is assigned a Unique User Name & Password by E- Procurement Technologies Ltd The Bidders are requested to change the Password after the receipt of initial Password from E- Procurement Technologies Ltd All bids made from the Login ID given to the bidder will be deemed to have been made by the bidder.

8. BIDS PLACED BY BIDDER: Bids will be taken as an offer to execute the work as specified. Bids once made, cannot be cancelled / withdrawn and the Bidder shall be bound to execute the work at the quoted bid price. In case the L-1 Bidder backs out or fail to complete the work as per the rates quoted, SBIIMS shall at liberty to take action as deemed necessary including depaneling such contractors and forfeiting their EMD.

9. At the end of the E-tendering, SBIIMS Pvt. Ltd. will decide upon the winner. SBIIMS Pvt. Ltd. decision on award of Contract shall be final and binding on all the Bidders.

10. SBIIMS shall be at liberty to cancel the E-tendering process / tender at any time, before ordering, without assigning any reason.

11. SBIIMS shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.

12. Other terms and conditions shall be as per your techno-commercial offers and other correspondences till date.

13. OTHER TERMS & CONDITIONS:

- The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.

- The Bidder shall not divulge either his Bids or any other exclusive details of SBIIMS Pvt. Ltd. to any other party.

- SBIIMS Pvt. Ltd. decision on award of Contract shall be final and binding on all the Bidders.

- SBIIMS Pvt. Ltd. reserve their rights to extend, reschedule or cancel any E-tendering within its sole discretion.

- SBIIMS or its authorized service provider M/s. Antares Systems Limitedshall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.

- SBIIMS or its authorized service providerM/s. Antares Systems Limited is not responsible for any damages, including damages that result from, but are not limited to negligence.

- SBIIMS or its authorized service M/s. Antares Systems Limited will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

N.B.

- All the Bidders are required to submit the Process Compliance Statement (Annexure II) duly signed to E- Procurement Technologies Ltd

- **All the bidders are requested to ensure that they have a valid digital signature certificate well in advance to participate in the online event.**

PROCESS COMPLIANCE STATEMENT (ANNEXURE II)

(The bidders are required to print this on their company's letter head and sign, stamp before emailing)

To,
E- Procurement Technologies Ltd,
B-704 Wall Street –II,,
Opp. Orient Club,
Nr. Gujarat College
Ahmedabad- 380 006.
Tel: 079-40270506/07940016800
Email: sujith@eptl.in

AGREEMENT TO THE PROCESS RELATED TERMS AND CONDITIONS FOR THE ONLINE E-TENDERING FORPROPOSED AC WORKS AT AT ASWALI BRANCH NASHIK

Dear Sir,

This has reference to the Terms & Conditions for the E-tendering mentioned in the Tender document
This letter is to confirm that:

1) The undersigned is authorized representative of the company.

2) We have studied the Commercial Terms and the Business rules governing the E-tendering as mentioned in RFP of SBIIMS Pvt. Ltd. as well as this document and confirm our agreement to them.

3) We also confirm that we have taken the training on the E-tendering tool and have understood the functionality of the same thoroughly.

4) We confirm that SBIIMS Pvt. Ltd. and M/s. E-tendering Technologies Limited shall not be liable & responsible in any manner whatsoever for my/our failure to access & bid on the e-E-tendering platform due to loss of internet connectivity, electricity failure, virus attack, problems with the PC, any other unforeseen circumstances etc. before or during the E-tendering event.
5) We confirm that we have a valid digital signature certificate issued by a valid Certifying Authority.
6) We, hereby confirm that we will honor the Bids placed by us during the E-tendering process.

With regards,
Date:

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:
Scan it and send to this Document on ----------

ARTICLES OF AGREEMENT

(On non-judicial Stamp Paper of Rs. 500/- or as per latest Govt. Rules)

ARTICLES OF AGREEMENT made the _____ date of _____ between SBIIMS PVT.LTD., on behalf of SBI, having its office at Mumbai hereinafter called "the Service Provider" of the One Part and _____ _____ _____

WHEREAS the SBIIMS PVT.LTD. is desirous of _____ _____ _____and has caused drawings and specifications describing the work to be done to be prepared by **M/s. . VASTU DESIGN**,, its Architects.

AND WHEREAS the said Drawings numbered _____ to_____ inclusive, the Specifications and the Schedule of Quantities 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 herein and to the Conditions set forth herein in the Special Conditions and in the Schedule of Quantities and Conditions of Contract (all of which are collectively hereinafter referred to as “the said conditions”) the works shown upon the said Drawings and / or described in the said Specifications and included in the Schedule of Quantities at the respective rates therein set forth amounting to the sum as therein arrived at our such other sum as shall become payable there under (hereinafter referred to as “the said Contract Amount.)

NOW IT IS HEREBY AGREED AS FOLLOWS:

1) In consideration of the said Contract Amount to be paid at the times and 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 upon the said Drawings and described in the said Specifications and the priced Schedule of Quantities.

2) The Employer shall pay to the Contractor the said Contract Amount, or such other sum as shall become payable, at the times and in the manner specified in the said Conditions.

3) The term “the Architects” in the said Conditions shall mean the said **M/s. . VASTU DESIGN**,**,** or in the event of their ceasing to be the Architects for the purpose of this Contract for whatever reason, such other person or persons as shall be nominated for that purpose by the Employer, not being a person to whom the Contractor shall object for reasons considered to be sufficient by the Employer, PROVIDED ALWAYS that no person or persons subsequently appointed to be Architects under this Contract shall be entitled to disregard or overrule any previous decisions or approval or direction given or expressed in writing by the outgoing Architects for the time being.

4) The said Conditions and Appendix thereto shall be read and construed as forming part of this Agreement, and the parties hereto shall respectively abide by submit themselves to the said Conditions and perform the Agreements on their part respectively in the said Conditions contained.

5) The Plans, Agreements and Documents mentioned herein shall form the basis of this Contract.
6) This Contract is neither a fixed lump-sum contract nor a piece work contract but a contract to carry out the work in respect of the entire building complex to be paid for according to actual measured quantities at the rates contained in the Schedule of Quantities and Rates or as provided in the said Conditions.

7) The Contractor shall afford every reasonable facility for the carrying out of all works relating to civil works, installation of lifts, Telephone, electrical installations, fittings air-conditioning and other ancillary works in the manner laid down in the said Conditions, and shall make good any damages done to walls, floors, etc. after the completion of his work.
8) The SBIIMS Pvt. Ltd. reserves to itself the right of altering the drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this Contract.

9) Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work soon after the Site is handed over to him or from 14th day after the date of issue of formal work order as provided for in the said Conditions whichever is later and to complete the entire work within **2 (Two) months** subject to nevertheless the provisions for extension of time.

10)All payments by the SBI under this Contract will be made only at Mumbai.

11)All disputes arising out of or in any way connected with this Agreement shall be deemed to have arisen at Mumbai and only the Courts in Mumbai shall have jurisdiction to determine the same.

12)That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor.

IN WITNESS WHEREOF THE SBIIMS PVT. LTD. and the Contractor have set their respective hands to these presents and two duplicates hereof the day and year first hereinabove written.

SIGNATURE CLAUSE

SIGNED AND DELIVERED by the

_____ By the
(Employer)

hand of Shri _____

_____ (Signature of Employer)
(Name and Designation)

In the presence of :

1) Shri / Smt. _____ (Signature of Witness)

Address _____

_____
(Witness)

SIGNED AND DELIVERED by the

_____ by the
(Contractor) (Signature of Contractors)

in the presence of :

Shri / Smt. _____ (Signature of Witness)

Address _____

_____
(Witness)

SECTION – 1

INSTRUCTIONS TO THE TENDERERS

1.0 Scope of work

Sealed Tenders are invited by **M/s. . VASTU DESIGN,, Architects, & Interior Designers,** for &on behalf of SBIIMS PVT.LTD. for **Proposed AC Works For Aswali Branch, Nashik**

The proposed work is to be carried out at **State Bank of India, Aswali Branch, Nashik.**

2.0 Tender documents

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

Instructions to tenderers

General conditions of Contract

Special conditions of Contract

Additional specifications

Drawings

Priced Bid A

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

a) Price Bid

b) Additional Specifications

c) Technical specifications

d) Drawings

e) Special conditions of contract

f) General conditions of contract

g) Instructions to Tenderers

2.3 Complete set of tender documents including relative drawings can be downloaded from the website www.sbi.co.in

2.4 The tender documents are not transferable.

3.0 **Site Visit**

3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and data that may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions, local authorities requirement, traffic regulations etc;

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

4.0 **Earnest Money**

4.1 The tenderers are requested to submit the Earnest Money of **Rs. 6,000/- (Six Thousand only) by means of Demand Draft / Pay Order** from any scheduled Nationalized Bank drawn **in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.**

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

4.3 No interest will be paid on the EMD.

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

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

5.0 **Initial/ Security Deposit**

The successful tenderer will have to submit a sum equivalent to 2% of accepted tender value less EMD by means of DD drawn in favour of SBIIMS Pvt. Ltd. within a period of 15 days of acceptance of tender.

6.0 **Security Deposit**

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

6.2 **Additional Security Deposit**

In case L-1 bidder quotes abnormally low rates (i.e. 10% or more, below estimated project cost), the bank may ask such bidder to deposit additional security deposit

(ASD) equivalent to difference of estimated cost vis-à-vis L-1 quoted amount for due fulfillment of contract. Such ASD could be in the form of FDR / Bank's guarantee in the Bank's name as per format approved by the Bank. On successful completion of work ASD will be returned to the contractor. In case contractor fails to complete the work in time or as per tender specification or leave the job incomplete, the bank will be at liberty to recover the dues from ASD or to forfeit such ASD as the case may be within its sole discretion.

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

7.0 **Signing of contract Documents**

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 30 days from the receipt of intimation of acceptance of the tender by the Bank. However, the written acceptance of the tenders by the Bank will constitute a binding agreement between the Bank and successful tenderer whether such formal agreement is subsequently entered into or not.

8.0 **Completion Period**

Time is essence of the contract. The work should be completed in all respect accordance with the terms of contract within a period of **2 (Two) months** from the date of award of work.

9.0 **Validity of tender**

Tenders shall remain valid and open for acceptance for a period of 90 days from the date of opening price bid. If the tenderer withdraws his/her offer during the value period or makes modifications in his/her original offer which are not acceptable to Bank without prejudice to any other right or remedy the Bank shall be at liberty forfeit the EMD.

10.0 **Liquidated Damages**

The liquidated damages in case of breach of any terms of this RFP & delay in completion of the work within stipulated time shall be 0.50% per week subject to a maximum of 5% of contract value. In the event of liquidated damages exceeding the cap of 5% the award of contract shall be cancelled.

11.0 **Rate and prices:**

11.1 **In case of item rate tender**

11.1.1 The tenderers shall quote their rates for individual items both in words and figure. In case of discrepancy between the rate quoted in words and figures, the unit rate quantity in words will prevail. If no rate is quoted for a particular item the contractor shall not be paid for that item when it is executed. The amount of each item shall be calculated and the requisite total is given. In case of discrepancy between the unit rate and the total amount calculated from multiplication of unit rate and the quantity the unit rate quoted will govern and the amount will be corrected.

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

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

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

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

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

11.1.6 The rate quoted shall be firm and shall include all costs, allowances, taxes, levies.

11.1.7 The SBIIMS Pvt. Ltd. reserve their rights to accept any tenders, either in whole or in part or may entrust the work in phases or may drop the part scope of work at any stage of the project within its sole discretion without assigning any reason(s) for doing so and no claim / correspondence shall be entertained in this regard.

11.1.8 In case it is decided by the SBIIMS Pvt. Ltd. to drop one or more buildings from the scope of work at any stage of the project, the contractor shall not be entitled to raise any claim / compensation for such deleted scope of work. Also, the SBIIMS Pvt. Ltd. may consider issuing work order for various buildings in phases but within a reasonable time interval and the contractor shall be bound to execute the same within the stipulated time period and as per rates quoted by them in this tender without any claim for price escalation.

SIGNATURE OF THE CONTRACTOR

WITH SEAL

GENERAL CONDITIONS OF CONTRACT

1.0 **Definitions**: -

"Contract means the documents forming the tender and the acceptance thereof and the formal agreement executed between SBI Infra Management Solutions Pvt. Ltd. (client) and the contractor, together with the documents referred there in including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Architects/ Bank and all these documents taken together shall be deemed to form one contract and shall be complementary to one another.

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

1.1.1 'SBIIMS' shall mean SBI Infra Management Solutions Pvt. Ltd. (Service Provider) having its Head Office, Ground Floor, Raheja Chambers, Free Press Marg, Nariman Point, Mumbai- 400 021 and includes the client's representatives, successors and assigns.

1.1.2 'Architects/ Consultants' shall mean M/s VASTU DESIGN, Architects &Interior Designers, Mumbai.

1.1.3 'Site Engineer' shall mean an Engineer appointed by the SBIIMS at site as their representative for day-to-day supervision of work and to give instructions to the contractors.

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

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

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

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

1.1.7 Specifications' shall mean the specifications referred to in the tender and modifications thereof as may time to time be furnished or approved by the Architect/ Consultant.

1.1.8 "Month" means calendar month.

1.1.9 "Week" means seven consecutive days.

1 .1.10"Day" means a calendar day beginning and ending at 00 Hrs and 24 Hrs respectively.

1.1.11 "SBIIMS's Engineer" shall mean The Civil / Electrical Engineer in - charge of the Project, as nominated by the M.D.& CEO, SBI Infra Management Solutions Pvt. Ltd.

1.1.12 The following shall constitute the Joint Project Committee (herein under referred to as JPC) for assessing and reviewing the progress of the work on the project and to issue instructions or directions from time to time for being observed and followed by the Architects Site Engineer /PMC and other consultants / contractors engaged in the execution of the project.

i) Vice President – Circle Head of SBIIMS Pvt. Ltd.
ii) SBIIMS Engineer (Civil and Electrical) in-charge of the Project, as may be nominated by the M.D. & CEO, SBI Infra Management Solutions Pvt. Ltd…..Members.
iii) Concerned partner of the Architects and their Resident Architect…. Member.

CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of

Earnest Money Deposit

Initial security deposit

Retention Money

a) **Earnest Money Deposit -**

The tenderer shall furnish EMD of **Rs.6,000/-(Six Thousand only)** in the form of Demand draft or bankers cheque drawn in favour of SBIIMS PVT. LTD., on any Scheduled Bank. No tender shall be considered unless the EMD is so deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time the period when he is required to keep his tender open acceptance by the SBIIMS Pvt. Ltd. or after it is accepted by the SBIIMS Pvt. Ltd. the contractor fails to enter into a formal agreement or fails to pay the initial security deposit as stipulated or fails to commence the commence the work within the stipulated time.

b) **Initial Security Deposit (ISD)**

The amount of ISD shall be 2% of accepted value of tender including the EMD in the form of DD/FDR drawn on any scheduled Bank and shall be deposited within 15 days from the date of acceptance of tender.

ADDITIONAL SECURITY DEPOSIT / PERFORMANCE GUARANTEE

In case L-1 bidder quotes abnormally low rates (i.e. 10% or more, below estimated project cost), the bank may ask such bidder to deposit additional security deposit (ASD) equivalent to difference of estimated cost vis-à-vis L-1 quoted amount for due fulfillment of contract as performance guarantee. Such ASD could be in the form of FDR / Bank's guarantee in the Bank's name as per format approved by the Bank. On successful completion of work ASD will be returned to the contractor. In case contractor fails to complete the work in time or as per tender specification or leave the job incomplete, the bank will be at liberty to recover the dues from ASD or to forfeit such ASD as the case may be within its sole discretion.

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

c) **Retention Money: -**

Besides the SD as deposited by the contractor in the above said manner, the Retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total security deposit i.e. ISD plus EMD plus Retention Money shall both together not exceed 5% of the contract value.The50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

2.0 **Language**

The language in which the contract documents shall be drawn shall be in English.

3.0 **Errors, omissions and discrepancies**

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

i) Between scaled and written dimension (or description) on a drawing, the latter shall be adopted.

ii) Between the written or shown description or dimensions in the drawings and the corresponding one in the specification the former shall be taken as correct.

iii) Between written description of the item in the specifications and descriptions in bills of quantities of the same item, the former shall be adopted:

a) In case of difference between rates written in figures and words, the rate in words shall prevail.

b) Between the duplicate / subsequent copies of the tender, the original tender shall be taken as correct.

4.0 **Scope of Work:**

The contractor shall carryout complete and maintain the said work in every respect strictly accordance with this contract and with the directions of and to the satisfaction Bank to be communicated through the architect/consultant. The architect/consultant at the directions of the SBIIMS from time to time issue further drawings and / or write instructions, details directions and explanations which are here after collectively references to as Architect's /consultant's instructions in regard to the variation or modification of the design, quality or quantity of any work or the addition or omission or substitution work. Any discrepancy in the drawings or between BOQ and / or drawings and / or specifications. The removal from the site of any material brought thereon by the Contractor and any substitution of any other materials therefore the removal and / or re-executed of any work executed by him. The dismissal from the work of any person engaged thereupon.

5.0 i) **Letter of Acceptance:**

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

ii) **Contract Agreement:**

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

6.0 **Ownership of drawings**:

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

7.0 **Detailed drawings and instructions:**

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

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

7.0 **Copies of agreement**

Two copies of agreement duly signed by both the parties with the drawings shall be handed over to the contractors.

8.0 **Liquidated damages:**

If the contractor fails to maintain the required progress in terms of clause 6. 0 of GOC or to complete the work and clear the site including vacating their office on or before the contracted or extended date or completion, without justification in support of the cause of delay, he may be called upon without prejudice to any other right of remedy available under the law to the SBIIMS Pvt. Ltd. on account of such breach to pay a liquidated damages at the rate of 0.50% of the contract value which subject to a maximum of 5% of the contract value.

9.0 **Materials, Appliances and Employees**

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

10.0 **Permits, Laws and Regulations:**

Permits and licenses required for the execution of the work shall be obtained by the contractor at his own expenses. The contractor shall give notices and comply with the regulations, laws, and ordinances rules, applicable to the contract. If the contractor observes any discrepancy between the drawings and specifications, he shall promptly notify the SBIIMS Pvt. Ltd. in writing under intimation of the Architect/ Consultant. If the contractor performs any act, which is against the law, rules and regulations he shall meet all the costs arising there from and shall indemnify the SBIIMS Pvt. Ltd. any legal actions arising there from.

11.0 **Setting out Work:**

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

12.0 **Protection of works and property:**

The contractor shall continuously maintain adequate protection. of all his work from damage and shall protect the SBI's properties from injury or loss arising in

connection with contract. He shall make good any such damage, injury, loss, except due to causes beyond his control and due to his fault or negligence.

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

13.0 **Inspection of work:**

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

14.0 **Assignment and subletting**

The whole of work included in the contract shall be executed the contractor and he shall not directly entrust and engage or indirectly transfer, assign or underlet the contract or any part or share there of or interest therein without the written consent of the SBIIMS Pvt. Ltd. through the Architect and no undertaking shall relieve the contractor from the responsibility of the contractor from active & superintendence of the work during its progress.

15.0 **Quality of materials, workmanship & Test**

All materials and workmanship shall be best of the respective kinds described in the contract and in accordance with Architect/consultant instructions and shall be subject from time to time to such tests as the architect/consultant may direct at the place of manufacture or fabrication or on the site or an approved testing laboratory. The contractor shall provide such assistance, instruments, machinery, labor, and materials as are normally required for examining measuring sampling and testing any material or part of work before incorporation in the work for testing as may be selected and required by the architect/consultant.

ii) **Samples**

All samples of adequate numbers, size, shades & pattern as per specifications shall be supplied by the contractor without any extra charges. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site detailed literature / test certificate of the same shall be provided to the satisfaction of the Architect/consultant. Before submitting the sample / literature the contractor shall satisfy himself that the material / equipment for which he is submitting the sample / literature meet with the requirement of tender specification. Only when the samples are approved in writing by the architect / consultant the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall by the signed by the Architect / Consultant for identification and shall be kept on record at site office until the completion of the work for inspection / comparison at any time. The

Architect/Consultant shall take reasonable time to approve the sample. Any delay that might occur in approving the samples for reasons of its not meeting the specifications or other discrepancies inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment etc. shall be to the account of the contractor.

iii) **Cost of tests**
The cost of making any test shall be borne by the contractor if such test is intended by or provided for in the specification or BOQ.

iv) **Costs of tests not provided for**
If any test is ordered by the Architect/ Consultant which is either

a) If so intended by or provided for or (in the cases above mentioned) is not so particularized, or though so intended or provided for but ordered by the Architect / Consultant to be carried out by an independent person at any place other than the

site or the place of manufacture or fabrication of the materials tested or any Government / approved laboratory, then the cost of such test shall be borne by the contractor.

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

17.0 **Contractor's superintendence**

The contractor shall give necessary personal superintendence during the execution the works and as long, thereafter, as the Architect / Consultant may consider necessary until the expiry of the defects liability period, stated here to.

18.0 **Quantities**

i) The bill of quantities (BOQ) unless or otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurements and quantities. The rate quoted shall remain valid for variation of quantity against individual item to any extent. The entire amount paid under Clause 19, 20 hereof as well as amounts of prime cost and provision sums, if any, shall be excluded.

19.0 **Works to be measured**

The Architect/Consultant may from time to time intimate to the contractor that he require the work to be measured and the contractor shall forthwith attend or send a quantity representative to assist the Architect in taking such measurements and calculation and to furnish all particulars or to give all assistance required by any of them. Such measurements shall be taken in accordance with the Mode of measurements detail in the specifications. The representative of the Architect / Consultant shall take measurements with the contractor's representative and the measurements shall be entered in the measurement book. The contractor or his authorised representative shall sign all the pages of the measurement book in which the measurements have been recorded in token of his acceptance. All the corrections shall be duly attested by both representatives. No over writings shall be

made in the M book should the contractor not attend or neglect or omit to depute his representative to take measurements the measurements recorded by the representative of the Architect / consultant shall be final. All authorized extra work, omissions and all variations made shall be included such measurement.

20.0 **Variations**

No alteration, omission or variation ordered in writing by the Architect / consultant vitiates the contract. In case the SBIIMS Pvt. Ltd. / Architect / Consultant thinks proper at any during the progress of works to make any alteration in, or additions to or omission from the works or any. alteration in the kind or quality of the materials to be used therein, the Architect / Consultant shall give notice thereof in writing to the contractor shall confirm in writing within seven days of giving such oral instructions the contract shall alter to, add to, or omit from as the case may be in accordance with such but the contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the contract, stipulations, specifications or contract drawings without previous consent in writing of the Architect/ Consultant and the value of such extras, alterations, additions or omissions shall in all cases be determined by the Architect / Consultant and the same shall be added to or deducted from the contract value, as the case may be.

21.0 **Valuation of Variations**

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

a) (i) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein.

(ii) Rates for all items, wherever possible should be derived out of the rates given in the priced BOQ.

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

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

d) Where extra work cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender, of the BOQ or, if not, so stated then in accordance with the local day work rates and wages for the

district; provided that in either case, vouchers specifying the daily time (and if required by the Architect/Consultant) the workman's name and materials employed be delivered for verifications to the Architect /consultant at or before the end of the week following that in which the work has been executed.

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

22.0 **Final measurement**

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

23.0 **Post Completion requirements** & **Virtual Completion Certificate (VCC)**

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

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

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

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

d) Shall put the SBIIMS Pvt. Ltd. in undisputed custody and possession of the site and all land allot by the SBIIMS Pvt. Ltd.

e) Shall hand over the work in a peaceful manner to the SBIIMS Pvt. Ltd.

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

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

This issuance of a VCC shall not be without prejudice to the SBIIMS's rights and contractor liabilities under the contract including the contractor's liability for defects liability nor shall the issuance of VCC in respect of the works or work at any site be construction as a waiver of any right or claim of the SBIIMS Pvt. Ltd. against the contractor in respect of or work at the site and in respect of which the VCC has been issued.

24.0 **Work by other agencies**

The SBIIMS Pvt. Ltd. / Architect / consultant reserves the rights to use premises and any portion the site for execution of any work not included in the scope of this contract with may desire to have carried out by other persons simultaneously and the contractor shall not only allow but also extend reasonable facilities for the execution of such work. The contractor however shall not be required to provide any plant or material for the execution of such work except by special arrangement with the SBI. Such work shall be carried out in such manner as not to impede the progress of the works included in the contract.

25.0 **Insurance of works**

25.1 Without limiting his obligations and responsibilities under the contract the contractor shall insure in the joint names of the SBIIMS Pvt. Ltd. and the contractor against all loss of damages from whatever cause arising other than the excepted risks, for which he is responsible under the terms of contract and in such a manner that the SBIIMS Pvt. Ltd. and contractor are covered for the period stipulated I clause of GCC and are also covered during the period of maintenance for loss or damage

arising from a cause, occurring prior to the commencement of the period of maintenance and for any loss or damage occasioned by the contractor in the course of any operations carried out by him for the purpose of complying with his obligations under clause.

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

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

c) Such insurance shall be effected with an insurer and in terms approved by the SBIIMS Pvt. Ltd. which approval shall not be unreasonably withheld and the contractor shall whenever required produce to the Architect / consultant the policy if insurance and the receipts for payment of the current premiums.

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

a) The permanent use or occupation of land by or any part thereof.

b) The right of SBIIMS Pvt. Ltd. to execute the works or any part thereof on, over, under, in or through any lands.

c) Injuries or damages to persons or properties which are unavoidable result of the execution or maintenance of the works in accordance with the contract

d) Injuries or damage to persons or property resulting from any act or neglect of the SBIIMS Pvt. Ltd. their agents, employees or other contractors not being employed by the contractor or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the SBIIMS Pvt. Ltd., their employees, or agents or other employees, or agents or other contractors for the damage or injury.

25.3 **Contractor to indemnify SBIIMS Pvt. Ltd**.

The contractor shall indemnify the SBIIMS Pvt. Ltd. against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the provision sub-clause 25.2 of this clause.

25.4 **Contractor's superintendence**

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

25.5 **Third Party Insurance**

25.5.1 Before commencing the execution of the work the contractor but without limiting his obligations and responsibilities under clause 24.0 of GCC shall insure against his liability for any material or physical damage, loss, or injury which may occur to any property including that of SBIIMS Pvt. Ltd., or to any person, including any employee of the SBIIMS Pvt. Ltd., by or arising out of the execution of the works or in the carrying out of the contract, otherwise than due to the matters referred to in the provision to clause 24.0 thereof.

25.5.2 **Minimum amount of Third Party Insurance**
Such insurance shall be affected with an insurer and in terms approved by the SBIIMS Pvt. Ltd. which approval shall not be reasonably withheld and for at least the amount stated below. The contractor shall, whenever required, produce to the. Architect / consultant the policy or policies of insurance cover and receipts for payment of the current premiums.

25.6 The minimum insurance cover for physical property, injury, and death is Rs.5 Lakh per occurrence with the number of occurrences limited to four. After each occurrence contractor will pay additional premium necessary to make insurance valid for four occurrences always.

25.7 **Accident or Injury to workman:**

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

25.7.2 **Insurance against accidents etc. to workmen**

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

25.7.3 **Remedy on contractor's failure to insure**

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

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

26.0 **Commencement of Works:**

The date of commencement of the work will be reckoned as the date, fifteen days from the date of award of letter by the SBIIMS Pvt. Ltd.

27.0 **Time for completion**

Time is essence of the contract and shall be strictly observed by the contractor. The entire work shall be completed within a period of **6 calendar Weeks** from the date of commencement. If required in the contract or as directed by the Architect / consultant. The contractor shall complete certain portions of work before

completion of the entire work. However, the completion date shall be reckoned as the date by which the whole work is completed as per the terms of the contract.

28.0 **Extension of time**

If, in the opinion of the Architect/consultant, the work be delayed for reasons beyond the control of the contractor, the Architect/consultant may submit a recommendation to the SBIIMS Pvt. Ltd. to grant a fair and reasonable extension of time for completion of work as per the terms of contract. If the contractor needs an extension of time for the completion of work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion as stipulated in the contract, the contractor shall apply to the SBIIMS Pvt. Ltd. through the Architect' Consultant in writing at least 30 Days before the expiry of the scheduled time and while applying for extension of time he shall furnish the reason in detail and his justification if an', for the delays. The architect/consultant shall submit their recommendations to the SBIIMS Pvt. Ltd. in the prescribed format for granting extension of time. While granting extension of time the contractor shall be informed the period extended time which will qualify for levy of liquidated damages. For the balance period in excess of original stipulated period and duly sanctioned extension of time by the provision of liquidated damages as stated under clause 10.0 shall become applicable. Further the contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

29.0 **Rate of progress**

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

30.0 **Work during nights and holidays**

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

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

31.0 **No compensation or restrictions of work**

If at any time after acceptance of the tender SBIIMS Pvt. Ltd. shall decide to abandon or reduce the scope of work for any reason whatsoever and hence not required the whole or any part of the work to be carried out. The Architect / consultant shall give notice in writing o that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise what so ever on account of any profit or advantage which he might have derived from the execution of the Work fully but which he did not derive in consequence of the foreclosure of the whole or part of the work.

Provided that the contractor shall be paid the charges on the cartage only of materials actually and bonafide brought to the site of the work by the contractor and rendered surplus as a result of the abandonment, curtailment of the work or any portion thereof and then taken back by the contractor, provided however that the Architect / Consultant shall have in such cases the option of taking over all or any such materials at their purchase price or a local current rate whichever is less.

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

32.0 **Suspension of work**

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

a) On account any default on the part of the contractor, or

b) For proper execution of the works or part thereof for reasons other than the default the contractor, or

c) For safety of the works or part thereof.

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

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

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

33 **Action when the whole security deposit is forfeited**

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

a) To rescind the contract (of which rescission notice in writing to the contractor by - Architect / consultant shall be conclusive evidence) and in which case the security,

deposit of the contractor shall be forfeited and be absolutely at the disposal of SBIIMS Pvt. Ltd..

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

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

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

34.0 **Owner's right to terminate the contract**

If the contractor being an individual or a firm commit any 'Act of insolvency' or shall be adjusted an insolvent or being an incorporated company shall have an order for compulsory winding up voluntarily or subject to the supervision of Govt. and of the Official Assignee of the liquidator in such acts of insolvency or winding up shall be

unable within seven days after notice to him to do so, to show to the reasonable satisfaction of the Architect / Consultant that he is able to carry out and fulfill the contract, and to dye security therefore if so required by the Architect / Consultant.

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

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

a) has abandoned the contract; or

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

c) has failed to proceed with the works with such diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
has failed to remove the materials from the site or to pull down and replace work within seven days after written notice from the SBIIMS Pvt. Ltd. through the Architect / Consultant that the said materials were condemned and rejected by the Architect/consultant under these conditions; or has neglected or failed persistently to observe and perform all or any of the acts matters or things by this contract to be

observed and performed by the contactor for seven days after written notice shall have been given to the contractor to observe or perform the same or has to the detriment of good workmanship or in defiance of the SBIIMS Pvt. Ltd. or Architect's / consultant's instructions to the contrary subject any part of the contract. Then and in any of said cases the SBIIMS Pvt. Ltd. and or the Architect / consultant, may not withstanding any previous waiver, after giving seven days' notice in writing to the contractor, determine the contract, but without thereby affecting the powers of the SBIIMS Pvt. Ltd. or the Architect / consultant or the obligation and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been determined and as if the works subsequently had been executed by or on behalf of the contractor. And, further the SBIIMS Pvt. Ltd. through the Architect / consultant their agents or employees may enter upon and take possession of the work and all plants, took scaffoldings, materials, sheds, machineries lying upon the premises or on the adjoining lands or roads use the same by means of their own employees or workmen in carrying on and completing the work or by engaging any other contractors or persons to the work and the contractor shall not in any was interrupt or do any act, matter or thing to prevent or hinder such other contractor or other persons employed for complement and finishing or using the materials and plant for the works.

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

35.0 **Certificate of payment**

The contractor shall be entitled under the certificates to be issued by the Architect / consultant to the contractor within 10 working days from the date of certificate to payment from SBIIMS Pvt. Ltd. from time to time. The SBIIMS Pvt. Ltd. shall recover the statutory recovering other dues including the retention amount from the certificate of payment.

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

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

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

The SBIIMS Pvt. Ltd. shall modify the certificate of payment as issued by the architect / consultant from time to time while making the payment

The contractor shall submit interim bills only after taking actual measurements and properly recorded in the M books

The Contractor shall not submit interim bills when the approximate value of work done by him is less than Rs.3.75 Lakh.

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

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

36.0 **A. Settlement of Disputes and Arbitration**

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

i) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to The M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office, Raheja Chambers, Free Press Journal Marg, Mumbai 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 SBIIMS Pvt. Ltd be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office in the manner and within the time as aforesaid. The Contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office in writing in the manner and within the time aforesaid.

B. Settlement of Disputes and Arbitration

The M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office shall give his decision in writing on the claims notified by the receipt of the contractor may within 30 days of the receipt of the decision of the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office/ Submit his claims to the conciliating authority namely the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office, Raheja Chambers, Free Press Journal Marg, Mumbai. For conciliation along with all details and copies of correspondence exchanged between him and the SBIIMS Pvt. Ltd.

iii) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned M.D. & C.E.O. of the SBIIMS Pvt. Ltd. for appointment of an arbitrator to adjudicate the notified claims falling which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.

iv) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the contractor as aforesaid and all claims of the SBIIMS Pvt. Ltd shall be referred for adjudication through arbitration by the Sole Arbitrator appointed by the M.D. & C.E.O. and who will be of Deputy General Manager rank. It will also be no objection to any such appointment that the Arbitrator so appointed is a SBIIMS Pvt. Ltd., Officer and that he had to deal with the matters to which the Contract relates in the course of his duties as SBIIMS Pvt. Ltd., 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 M.D. & C.E.O. of the SBIIMS Pvt. Ltd. Such person shall be entitled to proceed with the reference from the stage at which it was let by his predecessor.

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

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

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

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 SBIIMS Pvt. Ltd. Officer.

It is also a term of the contract that the Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any of the arbitrators 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 din what manner, such costs or any part thereof, shall be paid and fix or settle the amount of costs to be so paid.

37.0 **Water supply**

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

i) That the water used by the contractor shall be fit for construction purposes to the satisfaction of the Architect / consultant's.

ii) The contractor shall make alternative arrangements for the supply of water if the arrangement made by the contractor for procurement of water in the opinion of the Architect / consultant is unsatisfactory.

iii) In case contractor is permitted to use SBIIMS's source of water i.e. Municipal connection, Bore well (existing or new) etc., the SBIIMS Pvt. Ltd may consider recovering @1% of contract amount form the final bill of contractor.

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

38.0 **Power supply**

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

39.0 **Treasure trove etc.**

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

40.0 **Method of measurement**

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

41.0 **Maintenance of registers**

The contractor shall maintain the following registers as per the enclosed perform at site of work and should produce the same for inspection of SBIIMS Pvt. Ltd/Architect / consultant whenever desired by them. The contractor shall also

maintain the records / registers as required by the local authorities / Govt. from time to time.

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

42.0 **Force Majeure**

42.1 Neither contractor nor SBIIMS Pvt. Ltd. shall be considered in default in performance of the obligations if such performance is prevented or delayed by events such as but not war, hostilities revolution, riots, civil commotion, strikes, lockout, conflagrations, epidemics, accidents, fire, storms, floods, droughts, earthquakes or ordinances or any act of or for any other cause beyond the reasonable control of the party affected or prevents or delayed. However a notice is required to be given within 30 days from the happening of the event with complete details, to the other party to the contract, if it is not possible to serve a notice, within the shortest possible period without delay.

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

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

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

43.0 **Local laws, Acts Regulations:**

The contractor shall strictly adhere to all prevailing labour laws inclusive at contract labour (regulation and abolition act of 1970) and other safety regulations. The contractors should comply with the provision of all labour legislation including the latest requirements of the Acts, laws, any other regulations that are applicable to the execution of the project.

i) Minimum wages Act 1948 (Amended)
ii) Payment of wages Act 1936 (Amended)
iii) Workmen's compensation Act 1923 (Amended)
iv) Contract labour regulation and abolition act 1970 and central rules 1971 (Amended)
v) Apprentice act 1961 (amended)
vi) Industrial employment (standing order) Act 1946 (Amended)

vii) Personal injuries (Compensation insurance) act 1 963 and any other modifications
viii) Employees' provident fund and miscellaneous provisions Act 1952 and amendment thereof
ix) Shop and establishment act

x) Any other act or enactment relating thereto and rules framed there under from time to time.

xi) Prevailing Indian Electricity rules & act.

44.0 **Accidents**

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

SPECIAL CONDITION OF CONTRACT

Scope of work

1.0 The scope of work is to carry out for the Proposed AC Works For **Aswali Branch at Nashik**

2.0 **Address of site**

The site is located at **Aswali Gaon at Nashik**

3.0 **Dimensions and levels**

All dimensions and levels shown on the drawings shall be verified by the contractor and the site and he will be held responsible for the accuracy and maintenance of. All the dimensions and the levels. Figured dimensions are in all cases to be accepted and dimension shall be scaled. Large scale details shall take precedence over small scale drawings. In case of discrepancy the contractor shall ask for clarification from the Architect / consultant before proceeding with the work.

04 **Notice of operation**

The contractor shall not carry out any important operation without the Consent in with from the Architect / consultant:

5.0 **Construction records**

The contractor shall keep and provide to the Architect / consultant full and accurate records of the dimensions and positions of all new work and any other information necessary to prepare complete drawings recording details of the work as construction.

6.0 **Safety of adjacent structures and trees**

The contractor shall provide and erect to the approval of the Architect / consultant supports as may be required to protect effectively all structures and protective give to trees, which may be endangered by the execution of the works or otherwise such permanent measures as may be required by the Architect to protect the tree structures.

7.0 **Temporary works.**

Before any temporary works are commenced the contractor shall submit at least in advance to the architect / consultant for approval complete drawings of all temporary works he may require for the execution of the works. The contractor shall carry out the modifications relating to strength, if required by the architect / consultant may require in accordance with the conditions of contract at his own cost The contractor shall be solely responsible for the stability and safety of all temporary works and unfinished works and for the quality of the permanent works resulting from the arrangement eventually adopted for their execution.

8.0 **Water power and other facilities**

a) The rate quoted by the contractor shall include all expenses that are required for providing all the water required for the work and the contractor shall make his own arrangements for the supply of good quality water suitable for the construction and good quality drinking water for their workers If necessary the contractor has to sink a tube well / open well and bring water by means of tankers at his own cost for the purpose The SBIIMS Pvt. Ltd. will not be liable to pay any charges in connection with the above

b) The rate quoted in the tender shall include the expenses for obtaining and maintaining power connections and shall pay for the consumption charges

c) The contractors for other trades directly appointed by the SBIIMS Pvt. Ltd. shall be entitled to take power and water connections from the temporary water and power supply obtained by the contractor However, the concerned contractor shall make their own arrangements to draw the supply and pay directly the actual consumption charges at mutually agreed rates between them. All municipal charges for drainage and water connection for Construction purposes shall be borne by the contactor and charges payable for permanent connections, if any, shall be initially paid by the contactor and the SBIIMS Pvt. Ltd. will reimburse the amount on production of receipts

d) The SBIIMS Pvt. Ltd. as well as the Architect / consultant shall give all possible assistance to the Contractor's to obtain the requisite Permission from the various authorities, but the responsibility for obtaining the same in time shall be of the contractor

9.0 **Facilities for contractor's employees**

The contractor shall make his own arrangement for the housing and welfare of his staff and workmen including adequate drinking water facilities. The contractor shall also make the arrangements at his own cost for transport where necessary for his staff and workmen to and from site of work at his own cost.

10.0 **Lighting of works**

The contractor shall at all times provide adequate and approved lighting as required for the proper execution and supervision and inspection of work.

11.0 **Firefighting arrangements**

i) The contractor shall provide suitable arrangement for firefighting at his own cost. This purpose he shall provide requisite number of fire extinguishers and adequate number of buckets, some of which are to be always kept filled with sand and some with water these equipment shall be provided at suitable prominent and easily accessible place and shall be properly maintained.

ii) Any deficiency in the fire safety or unsafe conditions shall be correctedby the contractor at his own cost and, to the approval of the relevant authorities. The contractor make the following arrangements at his own cost but not limited the following:

a) Proper handling, storage and disposal of combustible materials and waste.
b) Work operations which can create fire hazards.
c) Access for fire-fighting equipments.
d) Type, number and location of containers for the removal of surplus materials and rubbish.
e) Type, size, number and location of fire extinguishers or other tire fighting equipment.
f) General house keeping

12.0 **Site order book**

A site order book shall be maintained at site for the purpose of quick communication between the Architect / Consultant. Any communication relating to the work may be conveyed through records in the site order book. Such a communication from one party to the other shall be deemed to have been adequately served in terms of contract Each site order book shall have machine numbered pages in triplicate and shall carefully maintained and preserved by the contractor and shall be made available to the architect / consultant as and when demanded- Any instruction which the architect /consultant may like to issue to the contractor or the contractor may like to bring to the architect / consultant two copies of such instructions shall be taken from the site order book and one copy will be handed over to the party against proper acknowledgment and the second copy will be retained for their record.

13.0 **Temporary fencing/ barricading**

The contractor shall provide and maintain a suitable temporary fencing / barricading and gates at his cost to adequately enclose all boundaries of the site for the protection of the public and for the proper execution and security of the work and in accordance with the requirement of the architect I consultant and regulations of local authorities. These shall be altered, relocated and adopted from time to time as necessary and removed on completion of the work.

14.0 **Site meetings**

Site meetings will be held to review the progress and quality evaluation. The contractor shall depute a senior representative along with the site representative and other staff of approved sub-contractors and suppliers as required to the site meetings and ensure all follow up actions. Any additional review meetings shall he held if required by the architect/ consultant. -

15.0 **Disposal of refuse**

The contractor shall cart away all debris, refuse etc. arising from the work from the site and deposit the same as directed by the architect / consultant at his own cost. It is the responsibility of the contractor to obtain from the local authorities concerned to the effect that all rubbish arising out of contractor’s activities at the

construction site or any other off-site activities borrow pits has been properly disposed off.

6.0 **Contractor to verify site measurement**

The contractor shall check and verify all site measurements whenever requested other specialists contractors or other sub-contractors to enable them to prepare the own shop drawing and pass on the information with sufficient promptness as will in any way delay the works.

17.0 **Displaying the name of the work**

The contractor shall put up a name board of suitable size as directed by the architect/ consultant indicating therein the name of the project and other details as given by the architect/consultant at his own cost and remove the same on completion of work.

18.0 **As built drawings**

i) For the drawings issued to the contractor by the Architect / Consultant. The architect Consultant will issue two sets of drawings to the Contractor for the items for some changes have been made. From the approved drawings as instructed by the SBIIMS Pvt. Ltd. / Architect / Consultant. The contractor will make the changes made on these copies and return these copies to the architect / Consultant for their approval. In cases revision is required or the corrections are not properly marked the architect / Consultant will point out the discrepancies to the contractor. The contractor will have to incorporated these corrections and / or attend to discrepancies either on copies as directed by the architect / consultant and resubmit to him for approval. The architect / consultant will return one copy duly approved by him.

ii) For the drawings prepared by the contractor

The contractor will modify the drawing prepared by him wherever the changes made by the SBIIMS Pvt. Ltd. / architect / consultant. And submit two copies of such modified drawings to the architect/ consultant for approval. The architect / consultant will return one copy of the approved drawing to the contractor.

19.0 Approved make

The contractor shall provide all materials from the list of approved makes at his own cost and also appoint the specialized agency for the waterproofing anti-termite, aluminum doors and windows and any other item as specified in the tender. The architect/consultant may approve any make / agency within the approved list as given in the tender after inspection of the sample/mock up.

20.0 **Procurement of materials**

The contractor shall make his own arrangements to procure all the required materials for the work .All wastages and losses in weight shall be to the contractors account

21.0 **Excise duty, taxes, levies etc.;**

The contractor shall pay and be responsible for payment of all taxes, duties, levies, royalties, fees, cess or charges in respect of the works including but not limited to sales tax, tax on works contract excise duty, and octroi, payable in respect of materials, equipment plant and other things required for the contact. All of the aforesaid taxes, duties, levies, fees and charges shall be to the contractor's account and the SBIIMS Pvt. Ltd. shall not be required to pay any additional or

extra amount on this account. Variation of taxes, duties, fees, levies etc. if any, till completion of work shall be deemed to be included in the quoted rates and no extra amount on this account. Variation of taxes, duties, fees, levies etc. if any, till completion of work shall be deemed to be included in the quoted rates and no extra claim on this account will in any case be entertained. If a new tax or duty or levy or cess or royalty or octroi is imposed under as statutory law during the currency of contract the same shall be borne by the contractor.

22.0 **Acceptance of tender**

The SBIIMS Pvt. Ltd. shall have the right to reject any or all tenders without assigning any reason. They are not to bind to accept the lowest or any tender and the tenderer or tenderers shall have no right to question the acts of the SBIIMS Pvt. Ltd. However adequate transparency would be maintained by the SBIIMS Pvt. Ltd.

23.0**Photographs:**

- The Contractor shall at his own expense supply to the Architects with duplicate hard copies of large photographs not less than 25 cm. x 20 cm. (10" x 8") of the works, taken from two approved portions of each building, at intervals of not more than one months during the progress of the work or at every important stage of construction.

- In addition to above, the contractor shall be bound to submit adequate no. of site photographs along with their each Running Bill for the project clearing showing major progress of work measured and claimed therein failing which the Architect/ SBIIMS Pvt. Ltd. may consider returning the Bill to the contractor and no claim for delay on this account will be entertained.

SAFETY CODE

1. First aid appliances including adequate supply of sterilized dressing and cotton wool shall be kept in a readily accessible place.

2. An injured person shall be taken to a public hospital without loss of time, in cases when the injury necessitates hospitalization.

3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground.

4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm. (clear) and the distance between two adjacent runnings shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding ladder.

5. The excavated material shall not be placed within 1.5 meters of the edge of the trench half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.

6. 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 one meter.

7. No floor, roof or other part of the structure shall be so overloaded with debris or material as to render it unsafe.

8. Workers employed on mixing and handling material such as asphalt, cement,mortar, concrete and lime shall be provided with protective footwear and rubber hand gloves.

9 Those engaged in welding works shall be provided with welders' protective eye shield and gloves.

10. (i) No paint containing lead or lead products shall be used except in the form of paste readymade paint.
(ii) Suitable facemasks should be supplied for use by the workers when the paint applied in the form of spray or surface having lead paint dry rubbed and scrapped.

11. Overalls shall be supplied by the contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during cessation of work.

12 Hoisting machines and tackle used in the works including their attachments anchor and supports shall be in perfect condition.

13. The ropes used in hoisting or lowering material or as a means of suspension shall be durable quality and adequate strength and free form defects.

APPENDIX HEREINBEFORE REFERRED TO

1)	Name of the organization Offering Contract	:	Vice President & Circle Head, SBI Infra Management Solutions Pvt. Ltd. SBI, Local Head Office,3rd floor,C-6,G-Block Synergy Building, Bandra- Kurla Complex, Bandra (East), Mumbai-400 051.
2)	Consultants	:	M/s. Vastu Design 11, Zarina Society, 59-A, S.V.Road, Bandra (W), Mumbai- 400050 TEL: (022)-26450557 / 26512268 CELL: - 9324150557 E-Mail:vastudesign@hotmail.com/ vastudesign.arch@gmail.com
3)	Site Address	:	Aswali Gaon at Nashik.
4)	Scope of Work	:	Proposed Air-conditioning Work
5)	Name of the Contractor	:	---------- ---------- ----------
6)	Address of the Contractor	:	---------- ---------- ----------
7)	Period of Completion	:	2(Two) months from the dated of Commencement
8)	Earnest Money Deposit	:	**Rs. 6,000/- (Six Thousand only) by means of Demand Draft / Pay Order** (Valid for a period of 180 Days from the last date of submission of the tender) from any scheduled Nationalized Bank drawn **in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.**
9)	Retention Money	:	As per clause no. 11(a) of general Conditions
10)	Defects Liability Period	:	Twelve Months from the date of Virtual Completion.
11)	Insurance to be undertaken by the Contractor at his cost	:	125% of Contract Value (Contractor's all risk policy)
12)	Liquidated damages	:	0.5% of the Contract amount shown in the tender per week subject to max. 5% of the contract value or actual final bill value.

13)	Value of Interim Bill (Min.)	:	Rs. 2 Lakhs.
14)	Date of Commencement letter	:	15 days from the date of acceptance is issued to the Contractor/ or the day on which the Contractor is instructed to take possession of the site whichever is earlier.
15)	Period of Final Measurement	:	3 Months from the date of Virtual Completion.
16)	Initial Security Deposit Tender. (Clause No. 22)	:	2% of the Accepted Value of the
17)	Total Security Deposit	:	As per clause No. 11 a
18)	Refund of initial Security Deposit Comprising of EMD and ISD.	:	50% of the Security Deposit shall be refunded to the Contractor oncompletion of the work and balance refunded only after the Defect Liability Period is over.
19)	Period for Honoring Certificate	:	1. One Month for R.A. Bills 2. The final bill will be submitted by the Contractor within one monthof the date fixedfor completionwork and the Bill shall be Certified within 3 months from the date of receipt of final bill provided the bills are submitted with all pre-requisite documents/test reports etc. prescribed in the tender.

.

_____

Signature of Tenderer.

Date:

LETTER OF DECLARATION

To,
Vice President & Circle Head,
SBI Infra Management Solutions Pvt. Ltd.
SBI, Local Head Office,3rdfloor,C-6,G-Block
Synergy Building,
Bandra- Kurla Complex, Bandra (East),
Mumbai-400 051.

Dear Sir,

Proposed Electrical Works State Bank Of India, Aswali Branch at Nashik.

Having examined the terms & conditions, drawings, specifications, design relating to the works specified in the memorandum hereinafter set out and having visited and examined the site of the works specified in the said memorandum and having acquired the requisite information relating thereto and affecting the quotation, I/We hereby offer to execute the works specified in the said memorandum within the time specified in the said memorandum on the item rate basis mentioned in the attached schedule and in accordance in all respect with the specifications, design, drawings and instructions in writing referred to in conditions of Tender, the articles of agreement, conditions of contract and with such conditions so far as they may be applicable.

MEMORANDUM

(a)	Description of work	Proposed air-conditioning Works **Aswali Branch Nashik**
(b)	Earnest Money	**Rs.6,000(Six Thousand only)** by means of Demand Draft / Pay Order from any scheduled Nationalized Bank drawn in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.
(c)	Time allowed for completion of work from the date of issue of work order.	2 (Two) months from the date of commencement as per tender.

Should this tender be accepted, I/we hereby agree to abide by and fulfill the terms and provisions of the said conditions of Contract annexed hereto so far as they may be applicable or in default thereof to forfeit and pay to SBIIMS PVT.LTD., the amount mentioned in the said conditions.

I/we have deposited Demand Draft / Banker's Cheque / FDR for a sum of **Rs. 6,000/- (Six Thousand only)** as Earnest money deposit with the SBI Infra Management Solutions Pvt. Ltd. Should I/we do fail to execute the contract when called upon to do so, I/we hereby agree that this sum shall be forfeited by me/us to SBI Infra Management Solutions Pvt. Ltd.

We understand that as per terms of this tender, the SBIIMS Pvt. Ltd. may consider accepting our tender in part or whole or may entrust the work of various buildings proposed (i.e. Institute Building, Staff Qtrs. And Director's Bungalow) in phases. We, therefore, undertake that we shall not raise any claim / compensation in the eventuality of Bank deciding to drop any of the building / buildings from the scope of work of this tender at any stage during the contract period. Further, we also undertake to execute the work entrusted to us in phases on our approved rates and within the stipulated time limit without any extra claim for price escalation as provided for in Clause 11.1.7 and 11.1.8 "Instructions to Tenderers" of this tender.

We, hereby, also undertake that, we will not raise any claim for any escalation in the prices of any of the material during the currency of contract/execution/completion period.

Yours faithfully,

Signature of contractor
With Seal

INDEX

PROFORMAS OF VARIOUS TESTS

TABLE-I

RECORD OF CEMENT RECEIVED / USED / BALANCE

S. No.	Cement in stock Bags	Cement received (Bags)	Total Cement received (Bags)	Source 4 from which received	Description of work where cement is used	Number of cement bags consumed	Balance in stock	Signature of Contractors Bank / Engineer
1	2	3	4	5	6	7	8	9

TABLE-II

RECORD OF PAINT / LEAD / CICO REGISTER

Name of work :

Name of the Contractor :

Agreement No. :

Date of Receipt	Source Receipt with Ref. To S.O./Indent	Qty. Received	Progressive Total	Item of work for which issued with approx qty. work done in case of paint only	Date of issued	Quantity issued	Qty. returned at the end of the day	Total issued	Delay Balance at hand	Contractors initials	Site Engineers initials	Signature of Banks/ Architect
1	2	3	4	5	6	7	8	9	10	11	12	13

Register for bitumen should be maintained. The format will be similar to that for cement.

TABLE-III

BANK FOR REINFORCEMENT BARSRECEIVED

Truck No.	Challan No.	Name of Supplier	Binding Wire	6mm dia	8mm dia	12mm dia	16mm dia	20mm dia	25mm dia	Total Received
1	2	3	4	5	6	7	8	9	10	11

Number of diameters given is only illustrative. Open more columns for other diameters wherever needed.

TABLE-IV

PROFORMA FOR REGISTER OF MATERIAL AT SITE ACCOUNT

Name of Work :

Name of Contractor :

Agreement No. :

Name of Article :

Estimated Requirement :

Issue Rate :

Date of Receipt	Received from/Issued to (with Ret. to So/Indent)	Receipt	Issue	Balance	Initials of Contractor	Initial of Bank's/Architect's representative	Remark
1	2	3	4	5	6	7	8

TABLE-V

PROFORMA FOR REGISTER OF MATERIAL AT SITE ACCOUNT

Name of Work :

Name of Contractor :

Agreement No. :

Description of Material	Qty.outstanding from previous Bill	Deduct Qty.utilised in works measured since previous bill	Qty.outstanding & Qty.brought to site since previous bill	Signature of Site Engineer	Signature of Contractor	Initial of Bank's/ Architect's representative	Remark
1	2	3	4	5	6	7	8

TABLE-VI

PROFORMA FOR BULKAGE TEST OF SAND REGISTER

S.No.	Date of Test	Volume of dust sand in Cylinder inundated & stirred	Volume inundated Sand in Cylinder	Percentage of Bulkage	Signature of Site Engineer	Signature of Contractor	Initial of Bank's Architect's representative (Periodical)
1	2	3	4	5	6	7	8

TABLE-VII

PROFORMA OF SILT TEST REGISTER

S. No.	Date of Test	Height of Sand in Cylinder innundated & stirred	Height of Silt	Max percentage of silt as specified	Percentage of silt obtained	Signature of Site Engineer	Signature of Contractor	Initial ofBank's / Representative (Periodical)
1	2	3	4	5	6	7	8	9

TABLE-VIII

PROFORMA SIEVE ANALYSIS OF FINE AGGREGATE REGISTER

S. No.	Date of Test	Wt. of Material to be tested	Sieve as per I.S. designation	Wt. of Sand retained in sieve	%a retained in each sieve successively	Cumul-ative % retained in each sieve	F. M.	Signature of Site Engineer	Signature of Contractor	Signature of Banks/ Architect's representative & Remarks (Periodical)
1	2	3	4	5				7	8	9

TABLE-IX

PROFORMA OF SIEVE ANALYSIS OF COARSE AGGREGATE REGISTER

S. No.	Date of Testing	Wt. of Material to be tested	Nominal size of Aggregate	I.S. Sieve designation	Standard passing for graded aggregate. of nominal size	Test Result	Obtained passing	Signature of Site Engineer	Signature of Contractor	Signature of Banks/ Architect's representative & Remarks (Periodical)
1	2	3	4	5	6	7	8	9	10	11

TABLE-X

PROFORMA FOR SLUMP TEST REGISTER

S. No.	Date of Testing	Type of work fore which slump taken	Specified slump		Slump Obtained		Signature of Site Engineer	Signature of Contractor	Signature of Banks/ Architect's representative & Remarks (Periodical)
			When Vibrators are u`sed	When Vibrators are not used	When Vibrators are used	When Vibrators are not used			
1	2	3	4	5	6	7	8	9	10

TABLE-XI

PROFORMA OF CUBE TEST REGISTER

Date of taking Cube + Lime	Sample No.	No. of Cubes taken	Specific marking of Cubes	Proportion of mixture	Description of work carried out	Signature of Engineer taking sample	Signature of Contractor	7/28 Days Testing				Permissible Compressive strength of Concrete / 28 Days / 7 days		Remarks on Test Report and No.	Remarks of Banks/ Architects representative Periodicals
								Date of Test	Test Result Kg/ Sq.cm	Av. Strength Kg./ Sq.cm.	Standard strength Kg/ Sq.cm.	7 Days	28 Days		
1	2	3	4	5	6	7	8	9	10	11	12	13		14	15

TABLE-XII

PROFORMA FOR HINDRANCE TO WORK

Name of Work :

Name of Contractor :

Agreement No. :

Date of Start of work :

Period of Completion :

Dt. of Completion of work :

S.No.	Nature of Hindrance	Date of Occurrence of Hindrance	Date of which Hindrance was removed	Period of which Hindrance existed	Signature of Site Engineer	Signature of Bank / Architects Representative
1	2	3	4	5	6	7

TABLE - XIII

PROFORMA FOR RUNNING A/C BILL

i. Name of Contractor / Agency :

ii. Name of Work :

iii. Sl.No. of this Bill :

iv. No. & Date of previous Bill :

v. Reference to Agreement No. :

vi. Date of Written order to commence :

vii. Date of Completion as per Agreement :

S.No.	Item Description	Unit	Rate (Rs.)	As per Tender	
				Quantity	Amount (Rs.)
1	2	3	4	5	

Upto Previous R.A. Bill		Up Date (Gross		Present Bill		Remarks
Quantity	Amount (Rs.)	Quantity	Amount (Rs.)	Quantity	Amount (Rs.)	
6		7		8		9

Note: 1. If part rate is allowed forany items, it should be indicated with reasons for allowing such a rate.
2. If ad-hoc payment is made, it should be mentioned specifically.

Net Value since previous bill

CERTIFICATE

The measurements on the basis of which the above entries for the Running Bill No. ---------- were made have been taken jointly on ---------- and are recorded at pages ---------- to ---------- of measurement book No. ----------.

----------	----------	----------
Signature and date of Contractor	Signature and date of Architects Representative (Seal)	Signature and date of Site Engineer

The work recorded in the above mentioned measurements has been done at the site satisfactorily as per tender drawings, conditions and specifications.

----------	----------
Architect	Signature and date of Site Engineer

TABLE - XIV

ACCOUNT OF SECURED ADVANCE, IF ADMISSIBLE ON MATERIALS HELD AT SITE BY THE CONTRACTOR

S.No.	Item	Quantity	Unit	Amount	Remarks
1	2	3	4	5	6

Total value of materials at Site.

Secured Advance @ ---------- of above value - B

CERTIFIED:

(i) That the materials mentioned above have actually been brought by the Contractor to the site of the work and on advance on any quantity of any of this item is outstanding on their security.

(ii) That the materials (are of imperishable nature) and are all required by the Contractor for use in the work in connection with the items for which rates of finished work have been agreed upon.

Dated Signature of
Site Engineer
Preparing the bill
Rank ----------

Date signature of
Banks Architects----------
(Name of the Architects)

Dated Signature of
the Contractor

TABLE - XV

MEMORANDUM FOR PAYMENT

R/A BILL NO.

1.	Total value of work done since previous bill (A)	Rs. ----------
2.	Total amount of secured advance due since Previous Bill (B)	Rs. ----------
3.	Total amount due since Previous Bill (C) (A+B)	Rs. ----------
4.	PVA on account of declaration in price of Steel, Cement and other materials and labour as detailed in separate statements enclosed.	Rs. ----------
5.	Total amount due to the Contractor	Rs. ----------

OBJECTIONS:

i)	Secured Advance paid in the previous R/A	Rs. ----------
ii)	Retention money on value of works as per accepted tenders upto date amount Rs.	Rs. ----------
	Less already recovered	Rs. ----------
	Balance to be recovered	Rs. ----------
iii)	Mobilization Advance, if any	
(a)	Outstanding amount (principal + interest) as on date	Rs. ----------
(b)	To be recovered in this bill	Rs. ----------
iii.	Any other Departmental materials cost to be recovered as per contract, if any	Rs. ----------
iv.	Any other Departmental service charges to be recovered if any, as per contract (water, power etc.) enclose statement.	Rs. ----------

	Total Deduction as per contract (F)	Rs. ----------
	Adjustments, if any ---------- Amount less received by Contractor in --------- R/A Bill (as per statement of Contractor)	Rs. ----------
	P.V.A.	Rs. ----------
	Total amount payable as per contract (E+F+G)	Rs. ----------
	(Rupees ---------- in words)	

The bill amount to Rs. ---------- (both figures and words) has been scrutinized by us after due checking of the measurements of work as required and is recommended for payment.

Date: ----------

Signature of Architect
with Seal

The bill amount to Rs. ---------- certified by Consultants has been scrutinized by me after due test checking of measurements of works as required and is recommended for payment for an amount of Rs.....

Date : ----------

Signature of Owners
Engineer

STATUTORY DEDUCTION:

i)	Total Amount due (E)	Rs. ----------
ii)	Less I.T. Payable	Rs. ----------
iii)	Less S.T. Payable	Rs. ----------
	Net Payable	Rs. ----------

This figures given in the Memorandum for payable has been verified and bill passed for payment ---------- (in words and figures)

Date: ----------

Signature of the M.D. & C.E.O.

TECHNICAL SPECIFICATIONS FOR AIR CONDITIONING WORKS

SPECIFICATION OF EQUIPMENT/MATERIAL AND INSTALLATION STANDARDS

GUIDELINES TO TENDERERS
BASIS OF DESIGN

CONDITIONS	DBT-0F	WBT-0F	%RH	GR/LB
OUTSIDE (SUMMER)	100	83	49.5	144
INSIDE	73.4	62.5	55.0	68.00

DAILY RANGE : 12 Deg F
LATITUTE : 18.3 Deg F
INSIDE CONDITIONS TO BE MAINTAINED AT : 73.4 Deg F+/- 1 Deg F.

1.0 Scope of work

1.1 The Contractor's scope of work covers supply, installation, commissioning and testing of the complete HVAC Installation as specified. Annexure 2.1 shows the division of work between the Contractor for above work and others.

2.0 Drawings, Specifications & Deviations

2.1 The drawings and specifications lay down minimum standards of equipment and workmanship. Should the tenderer wish to depart from the provisions of the specifications and drawings either on account of manufacturing practice or for any other reasons, he should clearly draw attention in his tender to the proposed points of departures and submit such complete information, drawings and specifications as will enable the relative merits of the deviations to be fully appreciated. In the absence of any deviations, it will be deemed that the tenderer is fully satisfied with the intents of the specifications and drawings and their compliance with the statutory provisions and local codes. All deviations shall be set down in Annexure

2.2. All deviations or departures from the specifications not indicated in Annexure.

2.3 In case of discrepancy between the drawings and specifications, the tenderer shall assume the more stringent of the two and furnish his rates accordingly.

2.4 The contractor shall prepare shop drawings and all work shall be according to approved working drawings. Shop drawings shall give all dimensions and shall incorporate the requirements for consultants, architects and interior designer. Approval of drawings does not relieve the Contractor of his responsibility to meet with the intents of the specifications. All such drawings for approval shall be in quadruplicate. In addition, the contractor shall submit manufacturers details and get them approved before ordering. This has to be done whether the materials / equipment are one of the approved makes or not . The liability of the material

supplied at basic rate of the owner shall be binding on the contractor and shall be covered under defects liability period.

2.5 Equipment data shall be submitted as per Annexure 2.5. Tenderers not submitting data in full will do so at the risk of their tenders being evaluated with such information as may be available with the Consultants. A list of recommended makes of materials and equipment is shown under Annexure 2.7. It is believed that the said makes meet the intents of the specifications and have sufficient field experience behind. However, the tenderer may propose alternate makes only at the time of tender, furnishing all the technical details, catalogues, usage experience etc. for approval by the Consultants. The client & consultant shall have the ultimate choice of the make of material. Where large differences in basic costs prevail in the basic costs of different makes, the tenderer may indicate decrease in the items as a percentage of the rates quoted on higher basic rates.

2.6 Power will be made available at 415/240V 3 Phase 4 wire 50 Hz earthed neutral system and all equipment shall be suitable for the above power supply with a variations of +/- 10% (Ten percent). All equipment shall operate at these voltages and any equipment /component operating at other than the above power supply shall be provided with necessary transformer.
It shall noted that welding transformer wit rectifier only is permitted for the all welding works inside the building during execution and power supply is free for commissioning & testing But not for construction for construction it shall be chargeable basis. Single point power point for construction shall be arranged at stilt level and extension to be made by respective contractor

3.0 Testing & Handing Over

3.1 The contractor shall carry out tests on different equipment as specified in various sections in the presence of Project Management Consultant / Architects and Consulting Engineers in order to enable them to determine whether the plant, equipment and installation in general comply with the specifications.

3.2 All equipment shall be tested after carrying out the necessary adjustments and balancing to establish equipment ratings and all other design conditions. The test data shall be submitted in the Acceptance Test Forms supplied by the Consultants. At least four sets of readings shall be taken for each item tested and submitted in the form shown in Annexure 2.6 or any other Acceptance Test Forms supplied by the Consultants. Instruments required for testing shall be furnished by the contractor for testing with initial requirements of all consumables.

3.3 The plant shall be handed over after satisfactory testing along with four sets of documentation each consisting of :

3.3.1 Detailed equipment data in the Performa approved by the Consulting Engineers / Employer.

3.3.2 Manufacturer’s maintenance and operating instructions.

i) Set of as-built drawings, showing plant layouts, piping, ducting instrumentation etc.

ii) Approved Test readings for all equipment & installation.

3.3.3 Certificates of approval from Statutory or Local Authorities for the operation and maintenance of the installation and equipment, wherever such approval or certification is required.

3.3.4 List of recommended spares.

3.3.5 Certificate from the contractors that they cleared the site of all debris and litter caused by them during the construction.

I) All tests to be certified by Project Management/Consultant/Engineer-in-charge/Clerk of works

ii) List of all readings etc to be maintained at a regular basis.

3.3.6 Submission of the above documentation shall form a precondition for the final acceptance of the plant and installation and final payment.

3.3.7 .The contractor has to furnish an undertaking that all materials supplied by him at site shall be fully tax paid and shall produce all documents for satisfaction of the owner or taxation authorities. All liabilities of the same shall be of the contractor.

3.3.8 Contractor shall also train and facilitate the facility staff of the building in operation and maintenance of the entire system

4.0 Performance Guarantee:

4.1 This contract is intended to be a performance based contract whereby the contractor will be liable to execute the work on the basis of the plans and designs hereby given and accepted by him. The contractor will have to guarantee for due and proper performance of the work agreed to be so erected and executed by him.

4.2 All equipment and the entire installation shall be guaranteed to yield the specified ratings and design conditions plus/minus 3% tolerance. Any equipment found short of the specified ratings by more than the allowable tolerance as determined by the test readings shall be rejected.

4.3 The performance guarantee shall be valid for a period of 12 months from the date of handling over of the fully installed and tested plant to the client the contractor shall replace all defective equipment/parts with new components including components subject to normal wear & tear and supply of consumable like refrigerant, oil etc. during the guarantee period and bear all incidental expenses for such work.

The AC Vendor to guarantee inside conditions for 5 years from commissioning.

5.0 Force Majeure

5.1 If by reason of war, hostilities, strikes, lockouts, embargoes or any act of god the fulfillment of this contract becomes impossible, the contract will be deemed to be null and void and no liability shall attach to either party. However, we will be paid for whatever work has already been done and equipment ordered or delivered to site.

6.0 Statutory Inspections

6.1 The Contractor shall be fully responsible for meeting all the statutory obligations & local inspectorates wherever applicable to the works carried out by them. The contractor should prepare all working drawings and obtain approval of competent authorities and also have the equipment and installation inspected and got approved. All official fees will be paid by the clients directly against demand in writing from the appropriate authority and all other expenses for submission and approval of the various and relevant statutory / bodies shall be embodied in the tender prices.

6.2 Liability due to malfunctioning of the installation of contractor which may damage any plant machinery of the owner during testing or during defects liability period shall be on account of the contractors.

6.3 Any increase in quantity over and above tender quantity, has to be brought to the notice of the Consultant and upon written confirmation only the contractor shall proceed further. In the absence of obtaining written permission as given above, the owner shall not assume liability for any of the works carried out.

SPECIFICATION OF EQUIPMENT/MATERIAL AND INSTALLATION STANDARDS

1.1 VARIABLE REFRIGERANT VOLUME TYPE SYSTEM (VRV System)

The system selected should be modular system, with number of indoors connected to centrally located outdoor units, as per detail designing given in the tender. The outdoor units for all the system shall be air cooled type and mounted on terrace of the building. Indoor units in various areas shall be as per enclosed drawings/ Bill of Quantities.

All the VRV air conditioners shall be fully factory assembled, wired, internally piped & tested. The outdoor unit shall be pre charged with first charge of R410A refrigerant. Additional charge shall be added as per refrigerant piping at site. All the units shall be suitable for operation with 415 V + 10%, 50 Hz + 3%, 3 Phase supply for outdoor units & 220 V + 10%, 50 Hz + 3%, 1 Phase supply for indoor units.

The VRV system shall provide stable, trouble free & safe operation, with flexibility of operating desired indoor units. The outdoor units must be capable of delivering exact capacity proportional to the number of indoor units switched on & the heat load in the air conditioned area. The proportional operation shall be achieved by varying speed of the compressor in the outdoor units.

The operation of the VRV system shall be through independent wired/ wireless remote controllers as specified. The entire system shall be integrated with intelligent building management system of leading vendors like Honeywell / Johnson Controls / Siemens etc, through BAC Net Gateway. The detailing of operation required through BMS system are detailed under specifications of BMS system.

The system shall be multi-split system with inverter driven scroll compressor for application with R410A refrigerant and shall be composed of ceiling type indoor units / 4-way cassette type indoor units / 2-way cassette type indoor units / wall type

indoor unit / floor type indoor unit and an outdoor unit as specified in tender drawings & Bill of Quantities, with a distributed refrigeration cycle, electrical components and enclosing cabinets. Both indoor units and outdoor unit shall be properly assembled, internally piped and wired, thoroughly tested and charged with refrigerant at factory and shall be topped up at site after erection.

Additional charge of refrigerant should be supported by engineering calculation. Each refrigeration cycle shall be equipped with scroll compressor, a solenoid valve, a heat exchanger, an accumulator, and a 4-way valve and flare connection parts.

SPECIFICATION OF OUTDOOR UNITS:

Outdoors units of the VRV system shall be compact air cooled type.

All the compressors of the out door units must be Inverter scroll type. Each module of out door unit must have separate 1# inverter compressor, suitable to operate at heat load proportional to indoor requirement.

"Anti Corrosive" treatment (Blue Fins) for Al. fins of Condenser Coils is mandatory. The treatment should be suitable for areas of high pollution and salt laden air.

The outdoor units must be suitable for up to 150 m refrigerant piping between outdoor unit & the farthest indoor units, total piping of 300 m for all the indoor units. Allowable level difference between out door unit & indoor units shall be 50 m in case of out door unit on top & 40 m in case of out door unit at bottom. Allowable level difference between various indoor units connected to one out door unit shall be up to 15 m.

Back up operation, in case of failure of one of the compressors of out door unit, for single module outdoor units or failure of one of the modules in case of multiple module outdoor units shall be possible. The VRV outdoor unit shall always be supplying at least 33% of back up operation, of the full load capacity.

The outdoor unit shall employ system of equal run time for all the compressors, inverter or on/ off type, within each out door unit – Single Module or Multi Module.

The outdoor units shall be suitable to operate within an ambient temperature range of – 5 Deg C to 45 Deg C, in cooling mode & – 20 Deg C to 15 Deg C in heating mode.

Air cooled condenser shall have Axial Flow, upward throw fan, directly coupled to fan motors with minimum IP 55 protection. The outdoor unit condenser fan shall be able to develop external static pressure up to 6 mm of H2O.

The entire operation of outdoor units shall be through independent remotes of indoor units. No separate Start/ Stop function shall be required.

Starter for the Outdoor Unit compressor shall "Direct on Line" type. Inverter compressor of the unit shall start first & at the minimum frequency, to reduce the inrush current during starting. Refrigerant control in the outdoor unit shall be through Electronic Expansion Valve. Complete refrigerant circuit, oil balancing/ equalizing circuit shall be factory assembled & tested.

The compressor(s) shall be hermetically sealed scroll and designed for continuous operation even at high ambient temperatures of Mumbai. All condensing unit should have a combination of fixed speed and invertors driven scroll compressor. All invertors driven scroll compressor should have protection for electronic circuits and elimination of electromagnetic sound, which may interfere with the control function of the machine. The unit shall have safety device such as high-pressure switch, fan motor safety thermostat, invertors overload protector, fusible plugs and fuses for trouble free operation of the unit. The condenser shall be air cooled, made of Cu. tubes with extended Aluminium fins. The condenser coil shall be multi-pass, cross-finned tube type, equipped with highly efficient Aluminium fins, mechanically bonded to oxygen free copper tubes. The coil shall be cleaned, dehydrated and tested or leakage at the factory. The Cabinets shall be fabricated out of heavy gauge steel, properly formed for close fit and structural rigidity. All access panels shall be so constructed as to be quickly and easily removable. All outside surface shall be finished with powder coating for protection against humid weather. The condenser fans shall be stepped control depending on no. of compressor operational & ambient condition, driven and designed to achieve low condensing temperatures & operate continuously and silently. One out-door unit should be capable to be connected up-to 16 nos. various indoor unit. All out-door units shall have BMS compatible communicable controller.

Noise level of outdoor units shall not exceed 63 dB (A) at a distance of 1.5 m from the unit.

The outdoor units shall confirm to Technological Guideline for Harmonic Suppression – JAEG 9702-1995. High Harmonic Environmental Target Level for Power Distribution system shall be 5%.

Outdoor units shall be complete with following safety devices:
High pressure switch
Fan driver overload protector
Inverter Overload Protector
Fusible Plug

Unit shall be supplied with
Installation manual
Operation Manual
Connection Pipes
Clamps
Units shall be available in configuration 5 HP, 8 HP upto 48 HP, within increments of 2 HP as specified in tender drawings & Bill of Quantities.

WALL MOUNTED UNITS

Wall mounted units must be compact & stylish design that does not detract from the décor of the room.

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 out door 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 –

Operation Manual
Installation Manual
Installation panel
Paper pattern for installation
Insulation tape/ Clamps/ Screws
The unit must be available in following capacities –
0.8 HP, 1 HP, 1.25 HP, 1.6 HP, 2.0 HP, 2.5 HP

CONTROLS SYSTEM FOR VRV AIR CONDITIONING SYSTEM

WIRED REMOTE CONTROLLER

Wired remote controller shall be supplied as specified in the “Bill of Quantities”.

The controller must have large crystal display screen, which displays complete operating status.

The digital display must allow setting of temperature with 1 Deg C interval.

Remote shall be able to individually program by timer the respective times for operation start and stop
within a maximum of 72 hours

Remote must be equipped with thermostat sensor in the remote controller that will make possible more
comfortable room temperature control

The remote shall be able to monitor room temperature & preset temperature by microcomputer & can select cool/ heat operation mode automatically.

The remote must constantly monitor malfunctions in the system & must be equipped with a "self diagnosis function" that let know by a message immediately when a malfunction occurs.

It shall be possible to wire the remote up to 500 RMT.

WIRELESS REMOTE CONTROLLER

Wireless remote controller shall be supplied as specified in the "Bill of Quantities"
The same operation modes & settings as with wired remote controllers must be possible.
Compact light receiving unit to be mounted into wall or ceiling shall be included.

CENTRAL REMOTE CONTROLLER

Central Remote controller shall be supplied as specified in the "Bill of Quantities"

Following functions shall be possible
Control Max 64 Groups (128 indoor units)
Zone control
Malfunction code display
All the functions available with wired remote controller
It should be possible to wire the remote to 1000m

Control, Operation & Setting	Start/ Stop control Temperature adjustment mode setting Remote control setting Temperature setting Filter sign reset
Display	Air conditioner operation setting & status Set temperature Indoor unit error Indoor air inlet temperature Filter sign

The BAC Net gate way shall be as per ASHRAE 135, Data link - IEE802.3, BACnet/IP, conformance Class 3, with RS232C port.
BAC Net gateway hard ware shall be suitable for operation between -10 Deg C to 50 Deg C & humidity range between 0% to 98%, without condensation.

AIR CONDITIONING MANAGEMENT SYSTEM

The VRV system supplied must be provided with PC based air conditioning management system, form the supplier of VRV equipments. The required hard ware must be selected, suitable for up to minimum 128 indoor units.
The air conditioning management system, in broad terms must undertake following functions

Energy efficiency functions
Control & optimization of system
Operation & monitoring
Expanded network functions
Complete operation & monitoring of VRV air conditioning system shall be possible through this PC based system.
Following major functions shall be possible:

Monitoring	Air conditioning status monitoring Indoor unit error monitoring Indoor air inlet temperature monitoring Filter choke sign monitoring
Control, Operation & Setting	Start/ Stop control Temperature adjustment mode setting Remote control setting Temperature setting Filter sign reset
Display	Air conditioner operation setting & status Set temperature Indoor unit error Indoor air inlet temperature Filter sign
Measurement	Accurate operation time Number of switching times Power consumption (Optional with KWH meter) Room temperature Outdoor temperature
Printing	History Statistics Setting information

The A/C management system must be able to connect to existing LANs.
Remote monitoring of the complete HVAC system shall be possible.
System shall be capable to take external signal like Security/ Fire for forced shut off.
Required hardware shall be suitable for operation between -10 Deg C to 50 Dg C & humidity range, of 0% to 98%, without condensation.

NOTE - ALL OUT-DOOR UNITS SHALL BE MOUNTED ON MS ANGLE FRAME STRUCTURE. THE MS ANGLE FRAME STRUCTURE SHALL BE PAINTED WITH EPOXY PAINT. THE SHADE OF THE PAINT SHALL BE APPROVED BY APPROVED BY THE ARCHITECT.

CONTROLS AND INTERLOCKING

All electrical control devices should be enclosed in the indoor and outdoor units. The compressor should be protected against breakdown by a quick response over current relay, a high-pressure switch, a wrap around type oil heater and a discharge gas thermistor.

In addition to the compressor protection devices, the indoor / outdoor fan motor should be protected by an internal thermostat.

The indoor fan motor shall be directly supplied with the power source from the control circuit. The functions of these control devices shall compose an electrical sequence of manual starting and stopping, automatic continuous operation whenever the room thermostat requires, and the protection devices allow the operation.

The remote control switch should be designed to provide simple operation such as On/Off, temperature and fan speed only without trouble shooting functions.

The remote control should be BMS compatible for centralized monitoring. All units/remote control shall have COM port for required interface with BMS.
The required software with open protocol to transfer readings on the BMS shall be in your scope.

Codes and Standards:
The design, manufacture and performance of the Air-conditioner shall comply with all currently applicable statutes, regulations and safety coded in the locality where the equipment is being installed. The unit and its components shall also confirm to the latest applicable IS/ARI/ASHRAE standards.

4.0 Compressors:

4.1 The compressor shall be rotary/scroll type of multi cylinder configuration on three phases, 50c/s. 400 volts electric supply. The compressor could be either hermetically sealed or semi-hermetic accessible type.

4.2 The refrigerant cooled motor of compressor should be protected against over heating by an internal thermostat embedded in the winding.

4.3 The compressor should be mounted on Dunlop cushy foot mountings to eliminate the vibration totally.

4.4 The compressor should be forced lubricated by a positive displacement oil pump working in either direction.

4.5 The Compressor performance data at different operating conditions for both cooling capacity and power consumption should be furnished along with performance curves.

4.6 Crank case heater should be a part of the compressor to prevent too high refrigerant solubility in oil during idle periods.

4.7 The compressor should be fully serviceable in our country with spare parts.

6.0 Cooling Coil:

6.1 Coils shall be of extended fin and tube type with aluminium fins firmly bonded to copper tubes. Velocity of air across the coil shall not exceed 152 meters per minute. The tubes shall be 16mm OD and will be bonded with 12 Fins per inch. Condenser coil shall have anti corrosive coating.

7.0 Evaporator Blower

7.1 Double inlet double width type centrifugal blower with forward curved blades impeller specially designed for noise free operation. The blower should develop a static pressure of 50 mm WG.

7.2 The blower motor shall be TEFC, Squirrel cage suitable for 3 phase, 50 HZ 400 volts supply.

8.0 Controls / Instrumentation:

8.1 Refrigeration controls and safety cutouts to be provided shall be as under: -

a) Thermostatic Expansion Valve.
b) Pilot solenoid Valve.
c) Hp Cutout
d) Lp Cutout
e) Adjustable Thermostat
f) Airstat
g) Humidistat

9.0 **Testing**

The split air-conditioner should be factory assembled pre-wired and tested for performance on a test bed. The test results of each unit should be furnished along with the test certificates while delivering the units.

REFRIGERANT PIPING

The indoor and outdoor units shall be connected with 16G Hard Copper refrigerant piping. Piping sizes should be to suit the distances between indoor and out door units and as per manufacturers recommendations. All piping connections for the units should be performed inside the unit.

The refrigerant piping should be insulated with EPDM Rubber foam of minimum 19 MM thick.

Lastly, cover up the pipes sections with the help of 36 G Aluminium sheets on straight pipes and 28 G Al. sheet on bends, tees, valves etc.

DRAIN PIPING

1) Condensate from the evaporator unit shall be drained through properly installed drain piping designed to prevent any accumulation of condensate in the drain pan.

Drain piping shall be made of 1.1/4" dia / 2" dia rigid PVC pipe of 6 Kg/Sq cm. pressure rating with water tight threaded connections, leading from the room unit to a suitable drain point.

Complete drain piping shall be made leak proof and water tight by means of precise installation and the use of leak proof sealant/adhesives.

4) Insulation of drain piping will be done by elastomeric Rubber insulation/ EPDM to be done with thickness recommended in BOQ

NOTE : ALL OUT-DOOR UNITS SHALL BE MOUNTED ON TERRACE TYPE M.S. ANGLE FRAME STRUCTURE. THE M.S. ANGLE FRAME STRUCTURE SHALL BE PAINTED WITH EPOXY PAINT. THE SHADE OF THE PAINT SHALL BE APPROVED BY THE ARCHITECT / CLIENT. THE CONDENSING UNIT STAND SHALL HAVE 300 MM CLEAR SPACE ALL AROUND CONDENSING UNITS

This system includes the AC system comprising of the following:

Mountings & Accessories

Anti-vibrations mounting shall be provided by the AC Contractor.

Flexible connections shall be securely fixed to the unit sections by means of fixing strips or flange connections. All flexible connection will be air tight and suitable for the maximum operating pressure associated with the system.

CHECK LIST FOR INSTALLATION

Following check list to be followed

1. While Brazing the Ref. Copper pipes be sure to blow Nitrogen (Bleeding 5psi/0.02MPa) through them.
2. The Hard Copper(16G) pipe should always be in a straight line clamped at 2mtr interval, whereas Soft Copper pipe should be clamped at 1mtr level. Make- Mandev
3. Position of Refnet(Joints) should be laid Horizontal. There is no restriction for Liquid pipe Joints.
4. Brazing rod should be of only Harris make. Do not use flux to braze, as it corrodes the pipe.
5. All Refrigerant pipes should be insulated with 19mm closed rubber Nitrile Insulation 'O' Class. Pipes after separation tube to Indoor Unit can be of 13mm thick.(standard condition 30ºC(86ºF)and 85% Humidity.
6. Wherever there are two insulations sleeve joints, the joints should be covered with Aerotape.(2mm thick- Self Adhesive)
7. Wherever there is a Brazing joint in the copper pipe at that point there should be a covering of red tape for future reference.
8. Wherever copper pipe with insulation is supported, the pipe should be covered with hard PVC (sleeve) before clamping to avoid compression & water leakage at a later date.(Clamping should not be allowed for copper pipe)
9. Entire Field Refrigerant pipes should be Flushed with N2, to remove out Foreign particles and Carbon deposits, if any. Pressure(leak) Test with N2 at 550-575psig for 24Hrs.
10. Entire drain pipe has to be covered with 6mm(exposed)/9mm(concealed) thick Nitrile insulation
11. 'U' Trap to be provided in Condensate Drain, near all the Ductable(Med-Hi Static) Indoor.
12. Ensure Proper drain Slope of Main Header incase of Common Drain for Cassettes/Ductables.
13. All Flexible electrical cables should be in hard conduits.
14. Transmission cable 1.25Sqmm x 2 Core(shielded) and power supply cable should not lie in same conduit. Minimum 2 feet distance should maintain.
15. Digital Vaccum(micron) Guage to be used for Vaccum and it should attain 750-500micron or minimum 8hours for both the Refrigerant lines.
16. Ref. Gas should be charged with proper Caliber Electronic Weighing Scale only
17. All the Outdoor condensing unit to have 2 anti vibration(Rubber pad- 10mm thick) mounts.

18. All the condensing units to have Isolator(MCB) & ELCB 100/300Ma for servicing & safety.
19. Hi-wall Split AC installation should have minimum 2" space on Top for sufficient Return Air.
20. Do not Install Units where Voltage changes a Lot, Large amount of Mineral/Cooking oil splash or Kitchen Exhaust is present.

INSTALLATION, START UP AND COMMISSIONING

1. Check for the Diversity of Indoor Unit and ODU. Do not allow diversity if all Indoor units are likely to be operated simultaneously.
2. Check drawings for Proper design of piping and distribution Joints as per the Installation manual (or approved Design Tool). Total piping length should not exceed 1000meters. This piping length includes all bends/Elbows. Farthest I/U can be at 165mtr from O/U. Farthest I/U from 1st Joint not more then 40mtr.
3. Carry out all visual checks and preliminary checks before start up (i.e. after achieving desired Vaccum) of the equipment viz Voltage, Earthing, Clean Indoor space etc.
4. Do not open the service Valve after Vaccumizing, as Oil may enter the Field pipe. Top up the additional Amount of Refrigerant Gas first, before charging the Refrigerant gas, Charging lines should be purge.(Note Charging Line size 5/16")
5. Charge the refrigerant through suction line(in a system with pre-charged refrigerant, only top up if required).
6. Make Sure Phase Voltage for 1Ø is 230V(±10%) and for 3Ø is 410V(±10%), E-N= 0V, 50Hz
7. Power Supply to TB1 in Outdoor and TB2 in Indoor, Transmission wire to T3 of outdoor and TB5 in Indoor.
8. Check for Communication wire properly connected to Indoor and Outdoor. Indoor unit setting from 1- 50 and outdoor address setting 51-99,100.
9. Signal Receiver for a Wireless Remote controller should have a space of atleast 1mtr from General Lighting.
10. All Medium and Hi static Ductable Machines 'U' Trap to be filled with water Manually.
11. Check Compressor, Fan Motor Amps, Suction and Discharge Pressure, Condensor Air In/Out temperature. Maintenance Tool reading of 3 hours each at Full Load and Partial Load.
12. Check the Indoor Unit Blower direction for 3 phase Indoor Units.
13. Ensure that the Duct system is completed and practically Leakage-Free.

HANDING OVER DOCUMENTATION

1. Preparing Handing over documents covering following:-
2. All as Built Drawing duly certified by consultant/customer.
3. Technical catalogs/Bulletins of all equipments supplied/Installed.
4. Contact details of Equipment Supplier/Dealer/Customer.

5. Equipment Data with serial Numbers for all equipment.
6. Heat Load calculation sheets for all area covered in the projects.
7. Commissioning report comprising performance reading(Maintenance Tool).

TRAINING

With the help of all above documentation, end user's operating staff/Engineers must be imparted operational training. This initiative can ensure trouble free operation, avoid costly break down etc.

SHEET METAL WORK-

SMACNA STANDARDS

Unless otherwise specified here, the construction, erection, testing and performance of the ducting system shall conform to the SMACNA-2005 standards ("HVAC Duct Construction Standards – Metal and Flexible – Second Edition – 2005"-SMACNA)

All ducting shall be fabricated of LFQ (Lock Forming Quality) grade prime G.I. raw material furnished with accompanying Mill Test Certificates.

Galvanizing shall be of 180gms/sq.m. (total coating on both sides). In addition, if deemed necessary, samples of raw material, selected at random by owner's site representative shall be subject to approval and tested for thickness and zinc coating at contractor's expense.

SELECTION OF G.I. GAUGE AND TRANSVERSE CONNECTORS

Duct Construction shall be in compliance with 2" (500 Pa) w.g. static norms as per SMACNA. All transverse connectors shall be the TDF system standard makes of similar 4-bolt systems with built-in sealant.

Non-toxic, AC-applications grade P.E. or PVC Gasketing is required between all mating flanged joints. Gasket sizes should conform to flange manufacturer's specification.

Low Pressure Ducting (Up to 50mm of WG)

Sr No	Duct size (mm)	Nominal Thickness as per SMACNA	Joint/ Reinforcement class as per SMACNA
1	Up to 900	24 G/ 0.63 mm	TDF
2	901-1000	22 G/ 0.80 mm	TDF
3	1001-1200	20 G/ 1.00 mm	TDF
4	1201-2100	20 G/ 1.00 mm	Rolamate I
5	2001-2400	18 G/ 1.20 mm	Rolamate J
6	Above 2401	18 G/ 1.20 mm	Rolamate J with Intermediate reinforcement @ 600 mm

Notes:

*1- SMACNA – Sheet Metal & Air conditioning Contractors' National Association Inc – "HVAC Duct Construction Standards- Metal and Flexible"-2000, U.S.A.

*2-Reading Guide- For duct sizes between, say, 651 mm and 700 mm, when the pressure class is 1" w.g. static, we require a standard 'E' class flange and duct gauge of 24. For the

same size range but with static pressure at 4" w.g. a standard 'H' class flange with duct gauge of 24 should be used.
*3-The standard flange classes available are designated E, H and J. For E & H class of standard make use gasket size 10 mm wide and 4.5 mm thick. For standard J-class use 15 mm wide and 6 mm thick gasket.

Design Parameters for duct design shall be:
Maximum Velocity at Supply Air Duct :1200FPM

DUCT CONSTRUCTION

The fabricated duct dimensions should be as per approved drawings and all connecting sections are dimensionally matched to avoid any gaps.

Dimensional Tolerances: All fabricated dimensions will be within +/- 1.0mm of specified dimension. To obtain required perpendicular, permissible diagonal tolerances shall be +/- 1.0 mm per meter.

Each and every duct pieces should be identified by color coded sticker which shows specific part numbers, job name, drawing number, duct sizes and gauge . Ducts shall be straight and smooth on the inside. Longitudinal seams shall be airtight and at corners only, which shall be either Pittsburgh or Snap Button Punch as per SMACNA practice, to ensure air tightness

Changes in dimensions and shape of ducts shall be gradual (between 1:4 and 1:7). Turning vanes or air splitters shall be installed in all bends and duct collars designed to permit the air to make the turn without appreciable turbulence.

Plenums shall be shop/ Reinforcement of ducts shall be achieved by either cross breaking or straight beading depending on length of ducts

As per SMACNA page no. 1.74, fig. 1-8 "Duct Sizes 19" (483 mm) wide and larger which have more than 10 ft^2 of unbraced panel shall be beaded or cross broken unless ducts will have insulation covering or acoustical liner. This requirement is applicable to 20 G (1.00 mm) or less and 3" W.G. (750 Pa) pressure or less. Ducts for 4" W.G. (1000 Pa) or more do not require beads or cross-breaks." factory fabricated panel type and assembled at site.

FLEXIBLE ALUMINIUM DUCTING-

The ducting shall be fully flexible, compressible and extendable made of 2 ply multi layered Aluminium polyester foil bonded together by quality adhesive and reinforced with high carbon corrosion proof spring wire. The distance between spring wires shall not exceed 1". The ducting shall be strong, durable and should not go out of shape even fully extended. The ducting should be also available with insulation of desired thickness.

SUPPORT FOR HORIZOTAL RECTANGULAR DUCT

Sr. No.	Maximum Duct Size(mm)	Hanger Rod Diameter	Interval (mm)
1	Upto - 700	6 mm	2400
2	701 - 1200	8 mm	2400
3	1201 - 2000	10 mm	2400
4	Above 2000	12 mm	2400

As an alternative, slotted galvanized brackets attached to the top two bolts of the Rolamate system may also be used as appropriate for the site condition. To provide the required thermal brake effect, Neoprene or equivalent material of suitable thickness shall be used between duct supports and duct profiles in all supply air ducts not enclosed by return air plenums.

INSTALLATION PRACTICE

All ducts shall be installed as per tender drawings and in strict accordance with approved shop drawings to be prepared by the Contractor. The Contractor shall provide and neatly erect all sheet metal work as may be required to carry out the intent of these specifications and drawings. The work shall meet with the approval of Owner's site representative in all its parts and details.

All necessary allowances and provisions shall be made by the Contractor for beams, pipes, or other obstructions in the building whether or not the same are shown on the drawings. Where there is interference/fouling with other beams, structural work, plumbing and conduits, the ducts shall be suitably modified as per actual site conditions.

Ducting over false ceilings shall be supported from the slab above, or from beams. In no case shall any duct be supported from false ceilings hangers or be permitted to rest on false ceiling. All metal work in dead or furred down spaces shall be erected in time to occasion no delay to other contractor's work in the building.

Where ducts pass through brick or masonry openings, it shall be provided with 25mm thick appropriate insulation around the duct and totally covered with fire barrier mortar for complete sealing.

All ducts shall be totally free from vibration under all conditions of operation. Whenever ductwork is connected to fans, air handling units or blower coil units that may cause vibration in the ducts, ducts shall be provided with a flexible connection, located at the unit discharge.

TESTING

After duct installation, a part of duct section (approximately 5 % of total ductwork) may be selected at random and tested for leakage. The procedure for leak testing should be followed as per SMACNA- "HVAC Air Duct Leakage Test Manual" (First Edition)

VOLUME CONTROL DAMPER-

1.VCD shall be fabricated of minimum 18G GSS and shall be of robust construction.
2.VCD shall be single blade type for round duct and Multiple opposed blade type for rectangular duct.

3.VCD shall have a locking device mounted outside the duct to hold the VCD in a fixed position without vibration. Fully open and fully closed position shall be marked for easier operation of VCD.
4.Motor operated VCD shall be provided, if specified. Actuator for dampers shall develop sufficient torque for easy operation of VCD. VCD shall be provided with Teflon or brass bushing for blade shaft. .Motor operated VCD shall be provided with Teflon bushing or sealed ball bearing for blade shaft.
5.Volume control dampers shall be provided in every branch duct from individual main ducts. Volume control dampers shall also be provided in branch duct from main connecting to individual supply / exhaust air outlets, and inlets, fresh air intake duct, etc.

FIRE DAMPERS

1. All supply and return air ducts at plant room crossings and at all floor crossings shall be provided with fire dampers of at least 90 minute fire rating. These shall be multi leaf dampers.
2. Fire dampers blades and outer frames shall be of 18G GSS construction. The damper blades shall be provided on both ends using chrome plated spindles in self lubricated bronze bushes. Stop shall be provided on top and bottom of damper housing made of 18G GSS. For preventing smoke leakage, side metallic compression seals shall be provided.
3. Fire damper shall be provided with factory fitted sleeves. Access doors shall be provided within the duct in accordance with the manufacturer's recommendation.
4. For SS duct, all fire dampers shall be fabricated from SS 304 sheet. Outdoor air grills shall be of the single louver type with opposed blade volume control dampers adjustable from the face of the grilles.
5. Fire isolating dampers complete with outer frame, damper blades, motorised or fusible link actuator, linkages and sleeves, shall be installed in all locations as may be required by the relevant Authorities. In
particulars, fire dampers shall be installed in ducts where they pass through compartmentation walls, fire walls and concrete floors except in the case where the duct itself is in a fire isolated shaft.
6. Fusible link type fire dampers shall be provided at all locations. Fusible link fire dampers shall be of the spring or dead weight type and shall be complete with fusible link 72 Deg. C rating so that they close automatically and remain closed under fire condition. The damper shall have a rating of not less that the rating of the fire separation walls or floors and shall be tested by aapproved testing authority.
7. All fire dampers shall be approved by the relevant Authorities. Inspection door shall be provided for fire dampers. Fire dampers shall be UL 555 rated and certified by UL. All fire dampers shall be complete with factory fabricated and fitted duct sleeve. The joints at the sleeve end shall be slip on type.
8. Fire damper for this project are Motorized dampers complete with UL listed Motorized actuators of suitable torque, Control panel, 230V.

GRILLES AND DIFFUSERS-

A DIFFUSERS AND GRILLES (AIR DIFFUSION EQUIPMENT)
1. Supply air diffuser shall be of the round universal type with adjustable GI/Aluminum round sliding volume control dampers. Dampers shall be adjustable by a removable key or screw driver from the face of the diffuser from below.
2. The type and quantity of diffusers and grilles shall be provided, as specified in the drawing. The CONTRACTOR shall ensure that the diffusers and grilles offered are of requisite capacity, throw and terminal velocity. Diffusers and grilles shall be fabricated

from factory coated with rust resistant primer or extruded aluminum section with powder coating as specified in the drawing.
3. Whenever VCD is provided with diffusers or grilles it shall be located within the duct collar. Diffusers and grilles shall be of flush pattern.
4. Ceiling diffuser shall be equipped with fixed air distribution grids, removable key operated volume control dampers and anti-smudge rings. The extruded aluminum diffusers shall be provided with removable central core and concealed key operation for volume control damper.
5. Linear diffusers shall be of extruded aluminum construction.
6. Slot diffuser shall be of extruded aluminum construction multi-slot type with air pattern controller provided in each slot. Supply air slot diffusers shall be provided with hit and miss VCDs in each slot.
7. Grilles with VCD shall be single acting or double acting, as specified in the drawing. Grilles without VCD shall have fixed blades or adjustable blades, as specified in the drawing.
8. All round diffusers, grilles and registers shall be of extruded aluminum construction, and epoxy powder coated.
9. Aluminum registers, diffusers and grilles shall be approved by Architect. The shade of epoxy powder coating for grilles, registers and diffusers shall be approved by Architect.
10. All ceiling diffusers shall be of the louver face type with removable core complete with opposed blade volume control dampers. The diffuser surface shall be completely flush with the false ceiling.
11. Supply registers shall be of the rectangular universal type with adjustable horizontal and vertical vanes complete with opposed blade volume control dampers. Dampers shall be adjustable by a removable key or screwdriver from the face of the registers.
12. Fresh air and discharge air grilles shall be of the fixed single louver type with opposed blade volume control dampers adjustable from the face of the grilles. All diffusers, registers and grilles shall be selected to account for the noise levels as specified for various areas.
13. For areas where square ceiling diffusers are used, they shall be of the louver face type with removable core complete with opposed blade volume control damper.
14. Outdoor air grilles shall be of the fixed single louver type with opposed blade volume control dampers adjustable from the face of the grilles

ACCESS DOOR
1. Access door shall be provided in duct before and after equipment installed in duct and at all fire damper locations. All access doors shall be fabricated of the same material as the duct work and shall have minimum two hinges. Hinges shall be zinc plated and pins shall be of brass. Access doors shall be of minimum of 305 mm x 305 mm size. At least two heavy solid brass fasteners and a brass handle are required for each door. A continuous neoprene rubber gasket shall be adhered to the opening frame with adhesive.

INSTALLATION-
A good quality expanded polyethylene /rubber of uniform thickness and width shall be used as gasket between flange joints. The gaskets shall be fixed by a suitable adhesive and holes made by passing a heated rod through.

1. All ducts shall be rigid and shall be adequately supported and braced where required with standing seams, tees or angles of ample size to keep the ducts true to shape and to prevent buckling, vibration or breathing. All the joints shall be made tight and all interior surfaces shall be smooth. Bends shall be made with radius not less than one half the width of the duct or with properly designed interior curved vanes where metal ducts or sleeves

terminate in woodwork, brick or masonry openings, tight-flanged collars. Ducting over false ceiling shall be supported from the slab above or from beams.
In no case a duct shall be supported from the false ceiling hangers or to be permitted to rest on a hung ceiling.

2. All holes in concrete, masonry etc. made by contractor for fixing supports etc. shall be made good and restored to original finish by him.

3. Air handling units and fans shall be connected to duct work by inserting at air inlet and air outlet a double canvass sleeve. Each sleeve shall be minimum 100mm long, securely bolted to duct and units. Each sleeve shall be made smooth and the connecting ductwork rigidly held in the line with unit inlet or outlet.

TESTING-
All the test readings shall be furnished for peak summer and monsoon outside conditions.

1. After completion all such system shall be tested for leakage.
2. The entire air distribution system shall be balanced to supply the air quantities as required in various zones and rooms to maintain the specified room conditions. The final readings shall be recorded and submitted to the Consultant for approval before acceptance and taking over of the entire system by the Employer.

PAINTING-
Angle iron flanges, stiffeners, hangers and supports shall be painted with 2 coats of anti rust primer and those remaining uncovered shall be further painted with 2 coats of synthetic enamel paints of black color.

INSULATION

ACOUSTIC INSULATION-
First 3-meter length of supply air duct shall be acoustically insulated with 48m thick fiberglass of density 48 Kg./Cu. M. and covered with 28 G perforated Aluminium sheets from the inside of the duct.
a) Apply a thin layer of tar paints.
b) Fix-up fiberglass slabs
c) Cover-up with perforated Aluminium sheets with the help of G. I. Screw Washers.

THERMAL INSULATION-
The scope of this section comprises the supply and application of insulation conforming to these specifications.

DUCT INSULATION

MATERIAL
Insulation material shall be Open/Closed Cell Elastomeric Nitrile Rubber
Density of Material shall be between 40 to 66Kg/m3
Thermal conductivity of elastomeric nitrile rubber shall not exceed 0.033 W/m.Kat mean temperature of 0°C
Insulation material shall have anti-microbial product, which is EPA (Environmental Protection Agency), USA approved, as an integral part of insulation that can not be washed off or worn off.

It shall give enhanced level of protection against harmful Microbes such as bacteria, mold, mildew and fungi and should confirm to following standards: Fungi Resistance – ASTM G21 and Bacterial resistance – ASTM G 22 / ASTM 2180.
The insulation shall have fire performance such that it passes Class 1 as per BS476 Part 7 for surface spread of flame as per BS 476 and also pass Fire Propagation requirement as per BS476 Part 6 to meet the Class 'O' Fire category as per 1991 Building Regulations (England & Wales) and the Building Standards (Scotland) Regulations 1990
Material should be FM (Factory Mutual), USA approved.
Water vapor permeability shall not exceed 1.74 x 10-14 Kg / (m.s.Pa), i.e. Moisture Diffusion Resistance Factor or 'μ' value should be minimum 10000.
Thickness of the insulation shall be as specified for the individual application.

THICKNESS SELECTION CHART FOR NITRILE RUBBER INSULATION Design Basis: Condensation Control				
	Supply air duct surrounded by Return air.	Supply air duct in non air conditioned area.	Return air duct surrounded by Return air.	Return air duct in non air conditioned area.
Supply Air Duct (Line Temperature 14 Deg. C)	13mm	18mm	9 mm	13 mm

External thermal insulation shall be provided as follow:

The thickness of the nitrile rubber shall be as shown on drawing or identified in the schedule of quantity. Following installation procedure should be adopted:

Duct surfaces shall be cleaned to remove all grease, oil, dirt, etc. prior to carrying out insulation work.

Measurement of surface dimensions shall be taken properly to cut closed cell elastomeric rubbers sheets to size with sufficient allowance in dimension.

Material shall be fitted under compression and no stretching of material should be allowed.
A thin film of adhesive shall be applied on the back of the insulating material sheet and then on to the metal surface.

When adhesive is tack dry, insulating material sheet shall be placed in position and pressed firmly to achieve a good bond.

All longitudinal and transverse joints shall be sealed as per manufacturer recommendations.

The adhesive shall be strictly as recommended by the manufacturer.
The detailed Application specifications are as per the manufacturer's recommendation.

RECOMMENDED ADHESIVE:

In all cases, the manufacturer's recommended Adhesive should be used for the specified purpose.

(C) FALSE CEILING INSULATION

The false ceiling shall be insulated with 50 mm thick fiberglass slab of 16 Kg. / Cu. M. density. The fiberglass slab shall be wrapped in polyethylene bags.

Installation procedures

First the supports for raised floor should be installed on to the floor. Then the floor shall be cleaned with brush to remove all dirt, cement etc. If floor is uneven it should be made smooth prior to carrying out insulation work.

Allow an additional 5 mm to the total dimensions while cutting Insulation sheet. Ensure you measure the cutting dimensions on the top surface of the insulation sheet. This can be identified by the products markings; "they are always on the top surface. This surface is the one you will see after installation.

All Insulation sheet and floor surfaces shall have all-over adhesive coverage. Adhesive should be applied on the side that has no product markings and identification printing. This side is the one that curves inwards.

During installation avoid air bubbles. Always apply pressure on fixing the Insulation sheet, this action will ensure maximum bond strength.

All cut Insulation sheet edges shall be of a "clean cut nature & not cut rough".

All seams and joint shall be sealed with SR 505 adhesive. All seams and joints should have no more than 10mm of adhesive showing on the outer skin of the finished Insulation sheet installation.

Measurement of surface dimensions shall be taken properly to cut closed cell elastomeric rubbers sheets to size with sufficient allowance in dimension. Material shall be fitted under compression and no stretching of material shall be permitted. A thin film of adhesive shall be applied on floor with brush and then on to the back of the insulating material sheet with brush/small piece of sheet metal having smooth edges. When adhesive is tack dry, insulating material sheet shall be placed in position and pressed firmly to achieve a good bond. All joints shall be sealed. SR 505 adhesive of Pidilite should be used for all cavity floor applications.

Preparation of all Necessary Shop Drawings:

The contractor shall be responsible for preparation of all the necessary shop drawings indicating all the technical details and features including the Design Basis Report, Technical calculations & Heat Loads, CFM calculation sheets, technical compliance reports etc so as to ensure adherence to the technical bid document of the tender.

The shop drawings shall be got approved from the Architect who shall offer feedback and observations on the said drawings. It shall be the responsibility of the contractors to incorporate all the suggestions, feedback & observations received from the Architect or Clients and submit the final shop drawings, which would be approved by the Architects and released for execution. The revisions shall be incorporated till the time the Architects and or Clients are fully satisfied with the authenticity and correctness of the shop drawings.

The shop drawings shall be prepared for each and every element of the work such as installation of Indoor & outdoor units, Piping details, drain pipe details, Electrical scheme, details showing fixing of units etc and indicating all the possible technical detailing & elements of the respective items of the works in line with the tender specifications and terms and conditions of the tender.

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 32 / 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 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
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 32 / 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 between0.015 % 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 mis- matches 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 around10 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 / Consultant.

4. False Ceiling closure check list duly signed by SBIIM / Client / Equipment manufacturer/ 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 above19.1 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. S. No.	OUTER DIAMETER IN INCH & (MM)	WALL THICKNESS IN GUAGE & (MM)	LENGTH IN FEET & (MTRS.)	TEMPER	WEIGHT PER METER (kg.)	SOCKET AND ELBOW THICKNESS IN SWG & (MM)	RUBBER INSULATION THICKNESS
1.	1/4" (6.4 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.1265	18 (1.2mm)	15mm
2.	3/8" (9.5 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.199	18 (1.2mm)	15mm
3.	1/2" (12.7 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.2714	18 (1.2mm)	15mm
4.	5/8" (15.9 mm)	19 (0.99 mm)	50' (15.24)	Soft	0.4241	18 (1.2mm)	15mm
5.	3/4" (19.1 mm)	19 (0.99 mm)	50' (15.24)	Soft	0.5147	18 (1.2mm)	20mm
6.	1/4" (6.4 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.1265	18 (1.2mm)	15mm
7.	3/8" (9.5 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.199	18 (1.2mm)	15mm
8.	1/2" (12.7 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.2714	18 (1.2mm)	15mm
9.	5/8" (15.9 mm)	19 (0.99 mm)	12' (3.658)	Half Hard	0.4241	18 (1.2mm)	15mm
10.	3/4" (19.1 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.4164	18 (1.2mm)	20mm
11.	7/8" (22.2 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.489	18 (1.2mm)	20mm
12.	1.0" (25.4 mm)	20 (0.88 mm)	12' (3.658)	Half Hard	0.6054	18 (1.2mm)	20mm
13.	1 1/8" (28.6 mm)	19 (0.99 mm)	12' (3.658)	Half Hard	0.7865	18 (1.2mm)	20mm
14.	1 1/4" (31.8 mm)	18.5 (1.1 mm)	12' (3.658)	Half Hard	0.843	16 (1.6mm)	20mm
15.	1 3/8" (34.9 mm)	18 (1.21 mm)	12' (3.658)	Half Hard	1.155	16 (1.6mm)	20mm
16.	1 1/2" (38.1 mm)	17.5 (1.3 mm)	12' (3.658)	Half Hard	1.340	16 (1.6mm)	20mm
17.	1 5/8" (41.3 mm)	17 (1.43 mm)	12' (3.658)	Half Hard	1.594	16 (1.6mm)	20mm

Use Soft tube only for Indoor Unit Connection

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 CABLING:

Communication cable and control cabling: Communication cable and control cabling should be of non-polar shielded 2 core cable 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.

LIST OF MATERIALS OF APPROVED BRAND AND THEIR MANUFACTUERS
AC Equipments: Blue Star,Mitsubishi Elec., Daikin, Hitachi, Toshiba, Mitsubishi Heavy, Train.

NB. 1) The contractor should obtain prior approval from Employer / Consultants before placing order for any specific materials. Employer may / delete any of the makes or brands out of the above list.

2). All materials should conform to relevant standards and codes of BIS.

3) Materials with I.S.I. mark shall be used duly approved by the SBIIMS Engineer / Architect.

Note: - If any material is found to be not up to the mark, the contractor will have to produce original bills/certificate from the manufacturer or his authorised Distributor for authenticity and genuineness of the material for consideration and as per make approved by the SBIIMS. The same will not be considered for payment.

MODE OF MEASUREMENT

1. Unless otherwise stated, all pipes shall be measured net, length as laid and measured overall fittings, such as bends, junctions, etc., and given in running meters. The length shall be taken along the center line of the pipes and fittings.

2. Length of fittings viz, taps, valves, traps etc., which are paid under appropriate items shall not be re-measured under linear measurements as enumerated above.

3. Soil waste and vent pipes shall be measured along the center line of the stack including the connecting bends/tees to W.C. Pan, Nahani trap, etc. and shall be paid as enumerated above.

4. W.C. Pans, Lavatory basins, Sinks, Drain boards, Urinals, Mirrors, Glass shelf Toilet paper Holder, shall be measured by number and shall include all accessories as enumerated in detail specification under each item.

5. Unless otherwise specified, all types of taps, valves, etc., shall be measured by number and paid separately.

6. Manholes, inspection Chambers, Gully traps, etc. shall be constructed according to detail specification and measured by number and paid separately. The depth of Manhole shall mean the vertical distance from the top of the Manhole cover to the outgoing invert of the main drain channel.

7. Water meter shall include Y strainer and other appurtenances required by the local bodies and shall include brick masonry chamber, etc., as per detailed specifications and item shall be measured by number and paid for accordingly or as per schedule of quantity.

PREAMBLE TO SCHEDULE OF QUANTITIES

Note: While quoting rates for each item of work, the contractor shall include for the following irrespective whether it has been mentioned or not in the description of the item without any extra claim / payment.

1. All unexposed surfaces of timber (any variety) used shall be treated with necessary coats of wood preservative.
2. All exposed surfaces of timber (any variety) shall also have necessary coat of wood primer / putty and paint / polish as per description in the item.
3. Before making bulk quantities , the contractor shall make each of the item as sample and get it approved in writing from the consultants minor modification if and as suggested by the consultant the same shall have to be incorporated without any extra cost.
4. All exposed edges of ply board shall be fixed with cedar / teak wood lipping.
5. All fabrics / leatherite to be used shall cost Rs. 300/ - per meter unless otherwise specified in the item.

   Difference in cost for approved sample shall be adjusted accordingly.
6. For furniture item where required whether mentioned or not shall be include providing an fixing of Brass / Power coated handles /knobs multipurpose locks, mini tower bolts ,ball catchers, hinges, screws and sliding rails etc.
7. Back of all storage, cabinets, and consoles shall be in 6mm commercial ply only.
8. Thickness of laminates to be used shall be 1 mm except where specified.
9. Ant termite treatment is to provide for all wood / board /ply used in the storage.