



TENDER ID : KOL-TKB-2021-02-001

DATE: 26.02.2021

STATE BANK OF INDIA

**Block – “B”, 9th Floor, Samriddhi Bhavan,
1, Strand Road, Kolkata – 700 001**

SBI INVITE TENDERS

FOR

AIR CONDITIONING WORK FOR 1ST, 2ND & 5TH FLOOR

AREA AT SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA

PRICE BID OF THOSE VENDORS WILL ONLY BE OPENED WHO WILL BE QUALIFIED IN TECHNICAL BID EVALUATION

DETAILS OF ELIGIBILITY CRITERIA (WITHOUT RELEVANT DOCUMENTS, VENDORS WILL NOT BE TECHNICALLY ELIGIBLE) IS MENTIONED SEPARATELY IN ANNEXURE -1 FOR PRE-QUALIFICATION OF VENDORS.

PLEASE NOTE THAT VENDOR SHOULD FILL ALL THE PRE-CRITERIA CONDITION OF TENDER.

VENDOR WHO HAD PARTICIPATED IN EARLIER TENDER , HAVE TO APPLY AFRESH.

HVAC CONSULTANT:

M/S AIRTECH CONSULTANCY SERVICES

DH, 635 MARTIN BURN I-SPACE 1, NEWTOWN, KOLKATA-156

PHN: 9836901108, EMAIL ID: acs6555@gmail.com

LAST DATE OF SUBMISSION OF BID: UPTO 3:00 PM ON 18 / 03 / 2021

Note : “Price Bid” should be submitted through online mode only . Hard copy of Price bid will not be accepted.

NOTICE INVITING ONLINE TENDER (E-TENDERING)

SBI Invites "Online Item Rate E-Tender For **Air-Conditioning For 1st, 2nd & 5th Floor Area At SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA** , From Well-Established and Reputed Indian Firm Having Experience in VRF Work for HVAC System Allied Work (**Office of the Firm Should Be Located In KMDA Area**) Minimum 3 Years (The Order Copy of Previous Works Should Be Enclosed) Through Online E-Tender Portal www.tenderwizard.com/SBIETENDER

Details of tenders are as under:

1.	Name of the Work	:	AIRCONDITIONING WORK FOR 1ST, 2ND & 5TH FLOOR AREA AT SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA
2.	Estimated Cost	:	Rs 70,00,000.00 Plus GST as applicable
3.	Time allowed for completion	:	120 days from date of issue of work order or date of handing over the site for execution of work whichever is later.
4.	PRE-BID MEETING		03-03-2021 at 2:30 PM
5.	Earnest Money Deposit		Rs. 70,000.00 (Rupees Seventy Thousand only) in form of Demand draft only (Valid for a period of 90 Days from the last date of submission of the tender) from any scheduled Nationalized Bank drawn in favour of State Bank of India payable at Kolkata. In cover-I (Without EMD in proper form Tender will be rejected.)
6.	Validity of Tenders	:	90 days from the date of opening of Price-bid
7.	ARCHITECT NAME	:	M/S AIRTECH CONSULTANCY SERVICES Contact No: 9836901108/801617896
8.	Initial Security Deposit	:	2% of contract amount including EMD
9.	Total Security deposit	:	5% of the final bill amount including ISD.
10.	Start Date of start of submission of Price bid-	:	From 11:00 AM on 26-02-2021
11.	Last date of submission of e price bid Including EMD & Tender Cost & Cover		Up to 3:00 PM on 18-03-2021
12.	Date and time of start of e-Reverse Auction (e-RA)	:	To be intimated in due course.
a.	Start Bid Price and Minimum Decrement Value for-RA. (Bidders will need to quote on the total cost of project during e-reverse auction)	:	Start Bid Price and Minimum Decrement Value will be announced at the time of e-RA.
b.	Duration of e-Reverse Auction	:	60 Minutes + 3 extensions of 10 minutes each. Total time: 60 + 30 minutes = 90 minutes (Please note, if no bids are received during any extension, the e-Reverse Auction will terminate at that very extension.)
c.	Methodology for evaluating item rate and total amount of L1 bidder after e-Reverse Auction All tender participants are hereby requested to note that the quoted amount by the L-1 bidder in e-Reverse Auction will be considered by Bank considering lowest of following two values: • Amount quoted in reverse auction by the bidder	:	Price bids (Indicative bids) submitted by the contractors by online. At the end of reverse auction process, the lowest Bidder (L1) will be selected on the basis of Total Price, including taxes but excluding applicable GST. The item wise final price to be confirmed by the vendor shall be as under: Final Item Rate = K*(R) Sl. Rate Qty. Amount (K*R*Qty.) 1. Rs. 200 X 0.9 600 Rs. 108000/- 2. Rs. 250 X 0.9 700 Rs. 157500/- 3. Rs. 300X 0.9 200 Rs. 54000/-, etc.

	<ul style="list-style-type: none"> Amount quoted by the same bidder in the price bid before reverse auction 	Total amount worked out after completing of e-Reverse Auction and the sum of all items' amounts of work schedule calculated as above.
13	TEMS OF PAYMENT	75% against Supply of Materials against BG/PBG till completion of project. Balance 25% against completion of project after necessary deduction like @5% Retention money till D-L-T- Period for one year.
14.	For any details, please contact	: Assistant General Manager (Premises & Estate)/ Assistant General Manager (Civil) SBI, LHO, KOLKATA Sambriddhi Bhawan, <u>1, Strand Road,</u> <u>Kolkata – 700001.</u> Contact No.: +91 2243-6677 (FOR ANY TECHNICAL QUERY, PLEASE CONTACT WITH PROJECT HVAC CONSULTANT)
15.	For e-Tender related queries	: Service provider: M/s. Antares Systems Limited, Registered Office: #24, Sudha Complex, 3 rd Stage, 4 th Block, Bangalore – 560079, Karnataka. Ph.: 080-49352000 / 40482000 Fax: 080-49352034 Help Desk: Contact Persons: <i>(On working days 9 AM to 6 PM)</i> 1. Mr. Kushal Bose Mobile No.: +91 7686913157 e-Mail: kushal.b@antaressystems.com 2. Mr. Tousik Ghosh Mobile No.: +91 9674758724 e-Mail: tousik.g@antaressystems.com
16.	Liquidated Damages	: 0.50% of contract amount per week subject to max. 5% of contract value.
17.	Defects liability period	: 12 Months from the date of Virtual Completion of the work including additional work, if any.
18.	Value of Interim Certificate	: <u>No advance on materials/plant/machinery or mobilization advance shall be paid in any circumstances.</u> Running account bill will be paid after completion of each floor subject to verification by the Bank/Consultant..

IMPORTANT NOTES

	Bank will have right to take BG/PBG or undertaking on stamp paper from the firm on non-judicial stamp paper of appropriate amount on abnormally low quoted price
c)	<p>Electronically Sealed e-Tenders are invited from the SBI approved prequalified contractors Sealed tenders in two parts are to be submitted online through the following website: https://www.tenderwizard.com/SBIETENDER</p> <p style="text-align: center;">** Price bid shall not be accepted offline**</p> <p>(a)Part – I (Technical Bid + EMD): Technical Bid already available in of-line mode & EMD as stated above.</p> <p>(b) Part – II (Indicative Price Bid): This shall contain the Electronic format of Price Bid. No condition/ stipulation in this part other than unconditional general rebate shall be accepted.</p>

	Part – II (Indicative Price Bids will be opened to fix up the start price for e-Reverse Auction. The contractors can view the Tender Opening Details through their respective log-in IDs on the above-mentioned e-tender portal (Website).
d)	The Bidder is expected to examine all instructions, forms, terms and specifications in the bid documents. Failure to furnish all information required as per the Bid Documents or submission of bids not substantially responsive to the Bid Documents in every respect will be at the bidder's risk and shall result in rejection of the bid.
e)	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. Again, corrigenda, if any, are to be available in https://www.tenderwizard.com/SBIETENDER only.
f)	Conditional tender will not be accepted for further process.
g)	Tenders received without EMD shall be summarily rejected and such tenders shall not be allowed to participate in the online price bidding process (e- reverse auction). For that no communication will be made by the Bank/Consultant.
h)	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.
i)	Tenders can be downloaded from the bank's website www.sbi.co.in under Procurement News or SBI e-tender portal www.tenderwizard.com/SBIETENDER
j)	SBI has the right to accept / reject any or all tenders without assigning any reasons and no correspondence shall be entertained in this regard.

Notes:-

- ü **Conditional tenders shall be summarily rejected.**
- ü **SBI reserve their rights to accept or reject any or all the tenders, either in part or whole without assigning any reason(s) for doing so and no claim/correspondence shall be entertained in this regard.**
- ü **Quantities are tentative and can increase or decrease the quantities of any item and contractor have to execute the same at the quoted rates.**
- ü **If lowest bidder quoted excessive low rates, then the bidder should submit Demand Draft or BG from any schedule Bank other than State Bank of equal amount quoted for the said tender.**
- ü **The application forms must be submitted in a prescribed format as laid down in the enclosed Annexures. Hard Copy of the Technical bid should be submitted in sealed covers named as Technical bid (offline) super scribed with the legend "AIRCONDITIONING WORK FOR 1ST, 2ND & 5TH FLOOR AREA AT SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA" to:**

Assistant General Manager (P&E),

State Bank of India, Local Head Office, Samriddhi Bhavan, Block "B", 9th Floor,
1, Strand Road, Kolkata – 700 001.

- ü **The Price bid should be submitted in online mode only as prescribed format given in our Service Provider's portal www.tenderwizard.com/SBIETENDER.**

Yours Faithfully,

Sd/-

Asst General Manager (Civil)
Samriddhi Bhawan, Block-B, 9TH Floor,
1, Strand Road, Kolkata – 700001.

ANNEXTURE-1

PRE-QUALIFICATION CRITERIA

- 1) Firm should have fully fledged service set up at Kolkata and should have at least 10 years' experience in handling AMC of similar buildings having installation of HVAC system with VRF/VRV of minimum 150 HP. Organization chart of the service set up and AMC Orders of such installations should be furnished duly signed by authorized signatory.
- 2) Firm should have a registered office along with service station at Kolkata. Detail Organization chart of the Company and work order copy of such installations should be furnished duly signed by authorized signatory.
- 3) Firm should have qualified and trained manpower to do trouble shooting of VRF make being quoted.
- 4) Firm should be OEM or authorized dealer for VRF Unit only. For Authorized dealers, Certification of Authorization from OEM Mentioning the Installation & Service Capability of the Dealers for VRF should be submitted along with Tender.
- 5) **Firm participating in the tender should not be a joint venture company.**
- 6) Credential furnished by the vendor should not be from a joint venture company. It should be in the name of the firm participating in this tender.
- 7) **It is mandatory that the firm should have valid ISO 9001:2008 or latest ISO certification. Copy of ISO certificate shall be furnished.**
- 8) Firm should have valid electrical license.
- 9) Firm should not have incurred in any loss in any year during the last 3 financial years 2019-20, 2018-19, 2017-18. Certificates from Chartered accountant shall be furnished in this regard.
- 10) Total Estimated project cost is around 70.00 lacs. Firm should submit the completion certificate of similar work completed should be 80% of Estimated cost i.e. 56.00 lacs for one job or Two similar work of 50% i.e. 35.00 lacs for Two Jobs and Three Similar job of work value 30% i.e. 21.00 lacs for Three Jobs, along with the tender.
- 11) The Firm should have valid GST, PAN, and Trade License, ESI, PF. All copy of Trade license, GST, Pan Card, PF & ESI Registration along with IT Return, Bank Details etc needs to be submitted along with tender.

1.2 ELIGIBILITY CRITERIA FOR THE SELECTION OF VENDORS

Only such contractors who fulfill the aforesaid eligibility criteria only need apply. Joint ventures and/or consortium are not allowed and acceptable.

NOTE:

1. PLEASE SUBMIT ALL THE DOCUMENTS RELATED TO TECHNICAL ELIGIBILITY [COPY OF ITR (FOR LAST THREE YEARS), EXPERIENCE CERTIFICATE, GST, PAN, TRADE LICENCE, ESI & PF, SOLVENCY CERTIFICATE OF RS 4.00 LACS (MINIMUM) TO BE SUBMITTED ALONG WITH THE OFFER]. IN HARD COPY AT THE OFFICE OF THE ASSISTANT GENERAL MANAGER (P&E), STATE BANK OF INDIA, LOCAL HEAD OFFICE, KOLKATA

2. PRICE BID SHOULD BE SUBMITTED IN ONLINE MODE ONLY.

5. INSTRUCTION TO VENDOR/CONTRACTOR FIRMS:

- i. Duly completed application Form along with self-attested enclosures/documentary proof as prescribed in the said application form duly signed on each page of Technical Bid (Part – “A”) by the authorized signatory should be submitted in one sealed cover subscribed “**Technical Bid**” must reach the above-mentioned address and “**Price Bid**” **should be submitted only by online mode**. Please subscribe /write on the top of the Technical Bid envelope: “**AIRCONDITIONING WORK FOR 1ST, 2ND & 5TH FLOOR AREA AT SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA**”.
- ii. Any & all cost/expenditure incurred by the Vendor/Contractor firms in relation to making the application shall be borne by the Vendor/Contractor/firm. No payment by way of compensation or whatsoever shall be made by the Bank.
- iii. The Vendor should strictly furnish all the information only on the formats furnished/provided/made available. The applications not complying with this requirement are liable to be rejected outright without assigning any reason as the sole discretion of the SBI.
- iv. All corrections and overwriting should be attested & countersigned by the authorized signatory of the Vendor/Contractor firm.
- v. In case Vendor/Contractor firm intends to give additional information for which specified space is not sufficient, he may furnish such information by adding extra sheets by specifying/indicating the same in the appropriate column.
- vi. Applications received after the due date & time, incomplete/partly filled/unsigned applications, applications not accompanied with relevant annexed documents, enclosures, etc. are liable to be rejected summarily without assigning any reason there for at the sole discretion of the Bank.
- vii. Please ensure that the applications, annexed documents, enclosures etc. are signed by the Vendor/Contractor firm’s (Authorized Signatory) only and proof of mode of authorization (such as Power of Attorney, Partnership Deed indicating such authorization, resolution, authorization letter etc. as applicable) is enclosed as prescribed in the Application Form.
- viii. Delay in submission of any part arising due to postal or any other irregularities at any stage will not be considered. The bank will not be responsible for any damage in transit in case of postal delivery.
- ix. **Technical bid should contain application forms, formats duly filled with documentary proof, terms and conditions etc. No price/rate should be mentioned anywhere in the technical bid. Technical bids contain rates/price for the said work should be rejected.**
- x. All the documents should be self-attested, and the Bank will verify with the original at the material time. All the pages of the application form duly filled in, press release, terms & conditions, annexures etc. should be signed by the authorized signatory with seal of the firm.
- xi. **Price bid should contain for the project in prescribed BOQ format item rate wise only. The prescribed item rate wise BOQ format should be downloaded from our web site and to be submitted online only.**

6. OTHER TERMS AND CONDITIONS TO TENDERERS:

Tenderer to Quote for whole scope of work.

The tenderers shall quote their prices with reference to each **Item** and must tender for **whole scope of work** as per attachment to this tender.

Erasures and Alterations

Bids containing erasures and alterations in the tender documents may be rejected. All Prices shall be indicated both in words and figures. Where there is a difference between the prices quoted in words and figures, the prices given in words shall prevail.

Incomplete and late tender

Unsolicited/Incomplete/late tenders or tenders received without desired Earnest Money are liable to rejection without any further reference. Rates should be firm and exclusive of GST etc. as per Tax law in force and SBI will pay GST extra as applicable along with running account bills raised by the contractor.

Validity of Tender

The rates quoted by tenderer should be valid for a period of **90 days** from the date of opening of Price Bid for the purpose of placement of LOI/Award of Work.

Earnest Money

SBI shall return Earnest Money, where applicable, to all unsuccessful tenderers after award of job. However, earnest money to successful tenderers shall be returned only after submission of Financial Guarantee for performance.

Earnest Money deposit as stated above shall be submitted in a cover to be enclosed in a Separate Envelope with Technical bid prescribe above on Envelope as "Earnest Money". EMD may be given in the form of demand draft drawn in favour of **"STATE BANK OF INDIA."** payable at **Kolkata**, drawn on / issued by any Nationalized / Scheduled Bank. The bids received incomplete/late/unsolicited/without EMD shall be considered non-responsive and shall be rejected summarily. Earnest Money Deposit in the Form of Demand Draft for **Rs. 70,000.00 (Rupees Seventy Thousand only)** drawn in favour of **"State Bank of India" Payable at Kolkata**.

No cost payable for preparing tender

The tenderers shall not be entitled to claim any costs, charges, expenses for or incidental to in connection with preparation and submission and subsequent clarification of his tender even if SBI decides to withdraw the invitation to tender or the tender is rejected on any count.

Jurisdiction

Not with standing any other court or courts having jurisdiction to decide the questions forming subject matter or a suit any and all actions and proceedings arising out of or relating to this contract (including any arbitration in terms thereof) shall be only in the court of competent civil jurisdiction at Kolkata.

Assignment/Sub-letting

The contractor shall not assign or sub-let any part of the contract without the written consent of Owner.

Inconvenience to others

The contractor shall plan his work in such a way so as not to cause any inconvenience to public,

owner and/or other contractors at site. Contractor shall be responsible for the manner and method of execution of work. The work shall be subject to the approval of owner from time to time for the purpose of determination of the question whether the work is being executed in accordance with provisions of contract.

General

In case any clarifications are required, the tenderer shall approach the Owner in writing. The Owner shall provide such clarifications in writing only. All clarifications provided shall be binding on Owner and the tenderer.

The tenderer may visit the site and acquaint himself with the site conditions before quoting.

The tenderer should make himself fully aware and examine the specifications, schedules and drawings etc. before quoting. No claim whatsoever shall be entertained by the owner in this regard.

- a. No tenderer can withdraw his tender or revoke the same within the validity period. If a tenderer withdraws or revokes his tender or revises the tender prices for any Package within the validity period, his earnest money deposit will be forfeited without prejudice to any other right/claim that owner may have against the tenderer.
- b. Tender shall be forwarded under cover of a letter type written on the tenderers letter head and duly signed, in long hand using ink, by a duly authorized representative of the tenderer.
- c. Wherever it is mentioned "shall be done by contractor or supplied by contract" it shall be deemed to mean shall be done or supplied by contractor at his cost.
- d. At any time prior to the deadline for submission of bids, the owner for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, may modify the bidding documents by amendment thereto.
- e. The amendment will be notified in writing or by fax or E-mail to all prospective bidders who have received the bidding documents and will be binding on them.
- f. In order to afford prospective bidders reasonable time in which to take the amendment into account in preparing their bids, the owner may, at their discretion, extend the deadline for the submission of bids.
- g. The owner may, at their discretion, extend the deadline for the submission of bids by amending the bidding documents in accordance with Articles e) to g) above, in which case all rights and obligations of the owner and bidders previously subject to the deadline will thereafter be subject to the deadline as extended.
- h. Effective date of the contract shall be handing over of clear site to the contractor however the LOI (letter of intent) shall be issued for mobilization of the site activity of the contractor.

PRE-QUALIFICATION OF VENDOR – Company/DEALER PROFILE

(i)

1. Name of the Firm:

2. Address:

3. Name, Telephone Nos. including Mobile of contact person:

4. E-mail ID and address and Fax No.:

5. Constitution of the Firm:

6. Year of Establishment:

7. Name of Partners /Associates:

8. Bio-data of Partners /Associates,

Details may be given in the enclosed format (Annexure – I)

(ii) **9a. Registration Number of the Firm:**

(Copy of valid registration to be enclosed)

(iii) **9b. Details of GST registration:**

(Copy of valid registration to be enclosed)

(iv) **9c. Amount of SERVICE TAX/GST paid year-wise:**

During last 5 financial years ending on 31.03.2020

10. Name and value of major Building:

Construction works completed during the Last 7 years. Details may be given in the Enclosed format (Annexure – II)

11. **List of Technical Personnel employed:**

12. **List of other Personnel employed:**

13. **List of vendor/Contractors engaged by the Firm:**

14. **List of office equipment owned by the company:**

15. **Details of Bank account of firm**

- i. Account name (exactly as it appears on statement of account)
- ii. Account number
- iii. Name of the Bank with Branch name; branch code & IFSC Code

16. **Latest Income Tax Clearance Certificate to be enclosed:**

17. (a) List of registration with other Organizations:

(b) List of completion certificate etc. from the clients for completed/ongoing projects

(c) Certified copies of the letter of intent for award of the work from reputed Govt./Govt. of undertaking/ multinational organizations/PSUS etc.

18. **It is mandatory to have an office of the firm at Kolkata**, If the firm is not having its office in Kolkata: Please indicate the time by which it is likely to be opened an office at Kolkata with documentary evidence.

19	Turnover of the firm during last 3 years (amount in lacs)	Year ended	Turnover
		31.03.2018	
		31.03.2019	
		31.03.2020	

Note: 1. please enclose separate sheets for additional information, photographs, and documents.

2. Please enclose all the Annexes with relevant supporting documents duly self-attested.

Date:

Place:

Signature of the Vendor/Contractor with seal

(v) **ANNEXURE- II**

**LIST OF MAJOR BUILDING CONSTRUCTION WORKS COMPLETED DURING THE LAST FIVE YEARS
ENDING AS ON 31.12.2020**

Sl. No.	Name of the Client	Nature of work	Features green building and modern amenities provided	Location of the building/municipal limits	Estimated value	Built up Area in Sq.m	Height of the building	Date of start	Period of completion	Actual date of completion	Final value of the project	Reasons for delay,
1	2	3	4	5	6	7	8	9	10	11	12	13

Note: Please enclose all the Annexes with relevant supporting documents duly self-attested.

Note:

(a) The credentials issued by the Clients shall be enclosed including letter of award of the work.

(b) The work should have been executed by the firm under the name in which they are submitting the applications.

Signature of the Vendor/Contractor with seal

Date:

Place:

PROCESS COMPLIANCE STATEMENT (ANNEXURE-2)

(The bidders are required to print this on their company's letter head and sign, stamp and submit with technical Bid)

To,

M/s. Antares Systems Limited

AGREEMENT TO THE PROCESS RELATED TERMS AND CONDITIONS FOR AIR-CONDITIONING FOR SAMRIDDHI BHAVAN, E-BLOCK, 1ST, 2ND & 5TH FLOOR BANKING AREA.

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 SBI. 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 SBI and M/s. Antares Systems 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, here by confirm that we will honour 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:

LETTER OF DECLARATION

Assistant General Manager (Civil) / Assistant General Manager (P&E)

State Bank of India,
Block – “B”, 9th Floor, Samriddhi Bhavan,
1, Strand Road, Kolkata – 700 001

Dear Sir,

Having examined the BOQ, specifications, and schedule of quantities relating to the works specified in the NIT for the project and 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 agreed to execute the works specified in the said memorandum at the rates finally quoted by us through online bidding process 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 in all other respects in accordance with such conditions so far as they may be applicable.

MEMORANDUM

S. N.	Particulars	Brief details
1	Description of work	AIRCONDITIONING WORK FOR 1ST, 2ND & 5TH FLOOR AREA AT SBI SAMRIDDHI BHAVAN, 1 STRAND ROAD, E-BLOCK, KOLKATA
2	Earnest Money	Rs. 70,000.00 (Rupees Seventy Thousand only) by means of Demand Draft / Pay Order from any Scheduled Bank, drawn in favour of “ State Bank of India ” Payable at Kolkata.
3	Percentage, if any, to be deducted from Bills	5% (Five Percent) of Contract value/Cumulative Invoice Value.
4	Time allowed for completion of the Work	120 days from date of issue of work order or date of handing over the site for execution of work whichever is later.

Should this tender be accepted, I/we hereby agree:

- (i) I / We have deposited a sum of **Rs. 70,000.00 (Rupees Seventy Thousand only)** as Earnest Money with the along with our tender. We, here by, also submit our written concurrence to deposit specified sum of Initial Security Deposit within the specified time limit for due fulfillment of contractual revisions.
- (ii) We understand that both EMD and ISD amount deposited by us/to be deposited shall not to bear any interest. Should/We fail to execute the Contract when called upon to do so I / We do hereby agree that this sum (EMD and ISD) shall be forfeited by State Bank of India.
- (iii) 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 SBI, the amount mentioned in the said conditions.
- (iv) We understand that as per terms of this tender, the SBI may consider accepting our tender in part or whole or may entrust the work in phases. We, therefore, undertake that we shall not raise any claim / compensation in the eventuality of Bank deciding to curtail/reduce 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.
- (v) We, here by, 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.

Signature of Vendor with seal Name:

Address:

Contact details:

TECHNICAL SPECIFICATION

· INTRODUCTION

- This specification covers the minimum requirements for the engineering, procurement, installation and commissioning of the HVAC system to be provided inside at Samriddhi Bhavan, E-Block, 1st, 2nd & 5th Floor.

STANDARD SPECIFICATION

1.1 SCOPE OF WORK

The complete scope of work shall cover supply, erection, testing and commissioning of the entire HVAC system as detailed under specification.

1.2 BASIS OF DESIGN

The entire system has been based and designed on climatologically data available as given under Basis of Design and Scheme.

1.3 TERMS AND DEFINATIONS

The followings terms have been used in the tender specifications, drawings etc.

ISI	Bureau of Indian Standards.
ASHRAE	American Society of Heating Refrigeration & Air-conditioning Engineers, USA.
B.S.	British Standards.
CMH	Cubic Meter per Hour.
RPM	Revolutions per Minute.
BTU/Hr.	British thermal unit per Hour.
Kcal/Hr.	Kilo Calories per Hour.
HZ	Hertz.
H.P.	Horsepower
SAG	Supply Air Grills.
SAD	Supply Air Diffuser.
SAF	Supply Air Filters.
FD	Fire Damper.
VCD	Volume Control Damper.
RAD	Return Air Damper.
FAD	Fresh Air Damper.
RH	Relative Humidity.
DB	Dry Bulb Temperature.
WB	Wet Bulb Temperature.
DP	Drain Point.

1.4 The codes, regulation as detailed below shall be followed in this contract: -

Codes & Standards	Specification
IS-659: 1964	Safety code for air conditioning
IS-660: 1963 / ASHRAE Std 15 / ANSI-B-9.1	Safety code for mechanical refrigeration
ASME Sec. VIII	Unfired pressure vessels
IS-4503: 1967	Specification for Shell and tube heat exchanger
ANSI-B-31.5	Refrigeration piping
IS-3588: 1987	Specification for electrical axial flow fans
IS-4894: 1987	Specification for centrifugal fans
IS-4671: 1984	Expanded polystyrene for thermal insulation purpose

Codes & Standards	Specification
	Insulation
IS-1239: Part 1: 2004	Steel tubes, tubular and others wrought steel fittings. Specification- Part 1: Steel Tubes. mm dia
IS-1239: Part 2: 1992	Mild Steel tubes, tubular and others wrought steel fittings. Part 2: Mild Steel tubular and other wrought steel pipe.
IS 3589: 2001	Specification for steel pipes for water and sewage (168.3 to 2540 mm outside dia)
ASHRAE 62	Ventilation for acceptable Indoor air Quality.
IS-655: 2006	Metal air ducts
IS-277: 2003	Galvanized steel sheet (plain and corrugated)
ASHRAE-23	Standard method of testing and rating [67 Standards] air conditioner
ARI-450-6	Standards for water cooled refrigerant Condenser
ASHRAE 22-72	Method of testing for rating water cooled refrigerant condenser
ARI-410	Standard for air cooling and air heating coils
ARI-210	Standard for unitary air conditioning equipment
AMCA-210	Methods of performance test for fans
BS-2831	Methods of test for air filters used in AC and general ventilation
IS-702: 1988	Specification for Industrial bitumen
IS-8188: 1999	Treatment of Water for cooling towers
IS-325: 1996	3 phase induction motors
IS-4029: 1967	Guide for testing 3 phase induction motor
IS-210: 1993	Specification grey iron casting
IS-2062: 2006	Hot rolled low, medium and high tensile Structural steel
AMCA -Bulletin No.	Standard code of testing centrifugal and axial 210 flow fans
Relevant IS code	Code of practice for welding mild steel
IS-2676: 1981	Dimensions for wrought aluminium and aluminium alloy sheets and strips
ASHRAE Code	Various filters
BS-4735	Horizontal Burning for XLPE insulation
BS- 4370 Part-1	Dimensional Stability for XLPE Insulation
ASTM D 1056	Water Absorption for XLPE / Nitrile Rubber Insulation
IS 12615	High Efficiency Motor
BS:848 Part-1:1980,Part-2:1985 Part-5:1986,Part-6:1989	Method of Performance Test for Fans
BS:6540 Part-I	Methods for Test Air Filter used in1985 General Ventilations.
BS-4735	Horizontal Burning for XLPE insulation
BS- 4370 Part-1	Dimensional Stability for XLPE Insulation
ASTM D 1056	Water Absorption for XLPE Insulation
DIN EN12086	Testing of Water Vapour Permeability of Nitrile Rubber sheets
DIN EN13469	Testing of Water Vapour Permeability of Nitrile Rubber Tubes

Codes & Standards	Specification
DIN EN ISO 8497	Testing of Thermal Conductivity of Nitrile Rubber
BS: 476 Part-6 & 7	Surface Spread of Flame and Fire Propagation for Nitrile Rubber

1.5 SAFETY CODES

The following IS codes shall be followed:

Safety code for mechanical refrigeration	IS 660
Safety code for air conditioning	IS 659
Safety code for scaffolds & ladders	IS 3696
Code of practice for fire precaution in Welding & cutting operations	IS 3016
Code for safety procedures and practices In electrical works	IS 5216
Code of practice for safety and health Requirements in electrical & gas welding And cutting operations.	IS 3696

1.6 SPACS

All shop drawings shall be prepared by the A.C Contractor after examining the Architectural & AC drawings.

2.0 Design Conditions:

The design parameters to be used for detailed design of the air conditioning system as follows:

2.1 Outside Ambient Conditions

Summer: DB: 40 °C (105 °F) & WB: 28.33 °C (83 °F).

Monsoon: DB: 32.2 °C (90 °F) & WB: 30 °C (86 °F).

Equipment performs to the above ambient conditions and not fails in conditions of 43 °C DB (dry bulb).

2.2. Inside Design Condition:

2.1 Room Temperature: 23 Deg. C \pm 2 Deg.C

2.2 Relative Humidity: 55% \pm 5%

2.3 Light Load: Mention below.

2.4 Occupancy: Mention below.

2.5 Equipment: Mention below.

3.0 Design Parameters:

SUMMARY SHEET FOR THE HEAT LOAD CALCULATION WITH ENERGY RECOVERY SYSTEM, E-BLOCK,1ST,2ND,5TH FLOOR													
Sl. No.	Area	NUMBER	TOTAL	Occupancy	Inside Room Condition		Light	Equipment	FRESH AIR	TOTAL	Air Quantity		
		OF Area	SQFT		DB (F)	RH (%)	W/S QFT	KW	CFM	LOAD	Maximum	Selecti on TR/HP	Selecti on CFM
1	1ST FLOOR	1	6951	145	73	55	1.10	10.5	1370	34.4	17843	35.0 (42 HP)	17500.00
2	2ND FLOOR	1	6645	150	73	55	1.10	16.5	1378	27.0	13130	28.0 (34HP)	14500.00
3	5TH FLOOR	1	6101	160	73	55	1.10	20.0	1516	28.3	13776	30.0 (36HP)	15000.00
Total			19697							89.7	44804		

3.1. DUCTING WORK

- a) Method of Duct Design : Equal friction method
- b) Maximum air velocity in supply duct FPM : 1500.0
- c) Maximum air velocity in return duct FPM : 1000.0
- d) Friction loss in duct (maximum.) MM Wg in 100 Mt runs. : 6.66
- e) Maximum Velocity at supply air grill outlet MPM : 150.00

3. 2. INSULATION

Maximum temperature rise in the supply air duct from Air-handlers outlet to farthest outlet in °C 1.10

4.0 NOISE AND VIBRATION CONTROLS

4.1 The air conditioning contractor must take all necessary precautions to have minimum noise generation and its transmission. Minimum vibration as permitted by IS relevant code shall be ensured. A few points for guidance only are given below:

- 4.01 a) Double fire-retardant flexible connections shall be provided from air discharge to outlet of air-handler to the duct.

- b) Vibration isolation pads of suitable thickness commensurate to loading for isolation of vibration shall be provided under all equipments. In consultation with manufacturer for proper selection of vibration isolators
- c) Flexible conduit connections of minimum diameter of 50mm to motors shall be provided. All loops should be large enough to allow connections to remain flexible.
- d) All conduit connection where conduits are 60mm or larger shall be made of 1.2 meters minimum length conduit installed in the shape of U and grossly slack to provide maximum vibration isolation.
- e) The floor supported piping shall be mounted on pipe supports with 7.5mm ribbed neoprene pads between the base plate of the pipes and the floors.
- f) All items suspended from false ceiling shall be isolated on separate hangers.
- g) In case of ducts, conduits, pipes & tubes the annular space between construction and penetrating element shall be sealed with sand cement plaster.
- h) The supply duct starting from air handling unit & plenum shall be provided with 12 mm thick acoustic lining as indicated in the tender drawings.
- i) The air-conditioning contractor shall take all other precautions or shall make his own arrangements even if not specified in the tender documents for eliminating high noise levels & shall minimize vibrations in all mechanical equipments without any additional cost.

5.0 General Description and Specification of the system proposed:

The Design is to find out the Air-Conditioning System required for 1st, 2nd & 5th floor area at the of E-Block at SBI.1 Strand Road, Kolkata.

The banking area shall be air-conditioned by the VRF unit. The Installed capacity of the A.C. Unit shall be 1st floor 42 HP, 2nd floor 34 HP & 5th floor 36 HP. Indoor units (1st floor 35 TR, 17500 cfm, 2nd floor 28 TR, 14500 cfm & 5th floor 30 TR, 15000 cfm floor mounted AHU suitable for VRF). The Outdoor type VRF unit shall be located outside the building and on a MS structure. The Indoor unit capacity mansion above 55mm static pressure, 4/6 rows deep shall be in the AHU Room the Air-conditioned area as per location as shown in drawing. The Supply air main ducting from the Indoor Units shall be run below the ceiling to of existing ducting of banking area. The Conditioned air shall be distributed through the ceiling mounted type diffuser/grille as per existing distribution arrangement of banking area.

5.1 VRF System.

The total design load for 1st, 2nd, 5th floor banking area is around 90.0 TR. Therefore, it is recommended to install 3 nos Floor Mounted AHUs. Suitable for VRF with Scroll compressor. The Evaporating unit to be installed inside the AHU room of each banking area and the condensing unit to be installed at outside the Air-conditioned area in the Front side of the building. The static pressure should be minimum 60 mm and the fan motor should be with belt driven type. Oppose blade type Volume control damper to be provided outside the mouth of unit with ON / OFF marking for proper controlling & adjustment of Air quantity as per design condition. The indoor & outdoor unit to be connected with the hard-drawn copper pipe of minimum 18G thickness. All the elbow & reducer should be with the same thickness of the pipe. The suction line of the refrigerant to be insulated with 25mm thick closed cell nitrile rubber pipe section. For Exposed portion of the insulated refrigerant pipe, Aluminum Cladding with minimum 30 gauges Al. Sheet should be provided for proper insulation protection. Microprocessor based control panel to be installed for the VRF units. The microprocessor-based control unit should have a provision to lock the control panel in such a way that the same cannot operate by any UN authorized personnel. The filter face velocity of the Evaporating unit should not be more than 500 FPM. All the connected Power cable should be with Al. Ar. Cable of 1100 V grade & control cable should be with Cu. Ar. Cable of 1100 V grade. The minimum size of Power cable should be 4 sq.mm Aluminum & for control cable 2.5 sq.mm

copper. The incoming supply of the MCC should be with MCCB of 50 KA fault level & all outgoing feeder should be with MCB & for compressor MCCB of suitable rating. Single phasing & overload protection arrangement is required for all the motors. The Refrigerant pipes should be Pressure tested at 400 PSI / 200 PSI and shall hold the pressure for 24 hrs. Proper Vacuuming should be done before charging of the refrigerant.

6. VRF UNITS.

6.1 General

The Plant required shall consist of VRF type.

The Unit Shall be composed of an indoor unit with refrigerant circuit and an air-cooled outdoor unit for application with R-410A /R407C Refrigerant.

6.2 VRF type Indoor Unit (Floor mounted AHUs):

DOUBLE SKIN HORIZONTAL FLOOR MOUNTED TYPE AIR HANDLING UNITS WITH MULTIPLE DX COOLING COIL & ELECTRONIC EXPANSION VALVE SUITABLE FOR VRF.

1. Scope

The scope comprises of supply & assembly of double skin construction air handling units. The section of specification sets out the requirements for the central air handling equipment to be used in conjunction with the air distribution system.

2. General

The Supplier shall supply and assemble double-skinned central station air handling units. Each unit shall be a factory built, modular type with field assembled casing sections, complete with DIDW Backward fans, motors, v-belt drives with wire guard, cooling valves chamber, drain section, structural mountings, vibration isolators and all other related accessories as required under BOQ/ Schedule. The unit shall be horizontal Draw- thru to suit AHU room size subject to the acceptance by the consultant.

3. Size and Capacity.

The unit shall be of the type and size suitable for ensuring a performance and capacity not less than the minimum required for the design when operating under the specified conditions. The physical size of the selected unit shall be suitable for the space allocated on the drawings and in Equipment schedule.

4. Material and Construction Housing / Casing.

The housing/casing of the units shall be of double skin construction. The housing shall be so made that it can be delivered at site in semi- knocked down / assembled conditions depending upon the requirements. The main framework shall be of extruded aluminum structural sections. The TFA units & Units with Mixing Box having fresh air provision shall be provided with Thermal Break Aluminum Profile. The entire framework shall be assembled using mechanical joints to make a sturdy and strong framework for various sections. Entire framework shall be made of extruded aluminum profile.

Double Skin panels shall be $23 \pm 2 / 46 \pm 2$ mm thick as required under BOQ. Outer sheet of the panel shall be made of 0.6mm pre-coated GSS sheet with PVC guard on outside and 0.6mm galvanized sheet inside with HFC/ CFC free Polyurethane foam insulation of density not less than 40 ± 2 kg/cu. m by injection molding machine. These panels and Framework for each section shall be screwed from inside on to the framework with soft rubber gasket in between to make the joints airtight.

Suitable doors with nylon handles, aluminum die cast hinges & hatches shall be provided for access to various panels for maintenance. Units shall be required with access door(s) for maintenance purpose. The entire frame shall be mounted on rolled / formed GSS heavy gauge galvanized steel

The cooling coil segment shall have a full width, multi sloped drain pan that extends Downstream of the coil to provide sufficient amount of space to contain moisture Carry-over. The unit design shall not require a drain pan in any downstream section to contain the coil condensate. Drain pan must be accessible for inspection and cleaning.

The cooling coil Drain pan shall be made of minimum 22G stainless steel sheet externally insulated with 13 mm thick closed cell Nitrile rubber insulation (For coastal area insulation thickness 19 mm) with multiple slopes to facilitate fast removal of condensate.

5. Codes & Standards:

The design, materials, manufacture, inspection, of the units shall comply with all currently applicable statutes, regulations, codes, and standards in the locality where the equipment is to be installed. In particular, the units shall confirm of the following standards:

BS EN 1886

Mechanical & thermal performance of casing

AMCA 210
rating

Laboratory methods of testing fans for sound & Air Performance

1. .

IEC 60204-1:2005 / EN 60204-1:2006
requirements.

Safety of machinery – electrical equipment of Machines part 1 general

6. Fan

The fan segment shall be equipped with double inlet double width (DIDW) centrifugal type wheels with high efficiency fan backward curved blades as specified in BOQ. The Fan shall be selected for optimum duty with respect to efficiency and noise level.

All fans shall bear the AMCA seal and shall be tested in accordance with AMCA standard.

The fan housing shall be of Galvanized sheet steel and the impellers shall be fabricated from heavy gauge Galvanized steel sheet as per approved manufacturers' standard. The side plates shall be die formed for efficient smooth airflow and minimum losses. Fan impeller shall be mounted on solid shaft supported to housing with angle iron frame and pillow block heavy-duty ball bearings. Fan housing and motor shall be mounted on a common extruded aluminum base mounted inside the fan section on anti-vibration spring mounts. The fan outlet shall be connected to casing with the help of fire retardant & anti-fungal fabric to reduce the transmission of vibration from the unit on to the ducts.

The fan outlet velocity shall not exceed 10 m/s.

DX- Cooling coil specification

The coil shall have 9.52 mm dia (O.D.) & made from seamless solid drawn copper tubes. The minimum thickness of tube shall be 0.3 mm for cooling coils.

The depth of the coil shall be such as to suit the requirements. Viz. re-circulated air applications, or 100% fresh air applications. The coil Row shall be 3nos cooling coil selection. Computerized cooling coil selection output shall be submitted. Each section of the coil shall be fitted with flow and return headers to feed all the passes of the coil properly. The headers shall be of copper

The fins shall be of aluminum. The minimum thickness of the fins shall be 0.15 mm. Fin spacing shall be 11-12 fins per inch (4-5fins per cm). Fins may be sine wave/corrugated type. The tubes shall be mechanically expanded for maximum thermal contact between fins and tubes. The fins shall be evenly spaced and upright. The fins bent during installation shall be carefully realigned. The Coil Casing shall be of SS. For 100 % fresh air application, Fins shall be hydrophilic coated type.

Each coil shall be factory tested at 600 PSI. Pressure & Face velocity across coil shall not exceed 2.54 m/ s.

Stacked coils shall have an Intermediate drain pan extending to the entire finned length of the coil. Cooling coils in stacks- section shall not be acceptable unless provided with an intermediate drain pan of the similar material and thickness of primary drain pan. The intermediate drain pan shall have drop tubes to guides condensate to the main drain pan.

Motors

The motor shall be of high efficiency (IE-2) totally enclosed fan cooled squirrel cage induction motor with IP-55 protection, class F insulation & selected for quiet running. The motor shall be suitable for operation on $415 \pm 10\%V$., 3phase, 50Hz. A.C supply. The fan-motor combination shall be optimum so that power consumption and noise level may be minimized.

7. Dampers

Dampers shall be opposed blade type. Blades shall be made of aerofoil design hollow extruded aluminum sections with integral gasket and assembled within a rigid extruded aluminum alloy frame. All linkages and supporting spindles shall be made of aluminum or nylon, turning in Teflon bushes. Manual dampers shall be provided with a Bakelite knob for locking the damper blades in position. Linkages shall be extended wherever specified for motorized operation. Damper frames shall be sectionalized to minimize blade warping. Air leakage through dampers when in the closed position shall not exceed 1.5% of the maximum design air volume flow rate at the maximum design air total pressure.

8. Filters

Pre – filters (MERV-8 / G-4):

Cleanable filter made of dry cleanable synthetic type minimum 50mm thick, shall be provided on the suction side of AHU as standard equipment with the unit. These filters shall have the efficiency of 90% down to 10-micron particle size. When these filters become loaded or full of dirt, it is removed from service and replaced by another filter. Face velocity across these filters shall not exceed 155 MPM.

Filters

Microvee – filters (MERV-15):

These filters shall Bag type of Suitable Depth to handle the designed air quality & have the efficiency of 95% down to 3-micron particle size. When these filters become loaded or full of dirt, it is removed from service and replaced by another filter. Face velocity across these filters shall not exceed 155 MPM.

9. Safety Features

The fan access door shall be equipped with micro-switch interlocked with fan motor to enable switching off the fan motor automatically in the event of door opening. The access door shall be further having wire mesh screen as an added safety feature bolted on to the unit frame.

Fan and motor base shall be properly earthed from the factory.

All screws used for panel fixing, projecting inside the unit shall be covered with PVC caps to avoid human injury.

Unit's needs to be CE certified.

10. Performance Data

The Unit shall be selected for the optimum operating point with respect to noise level & efficiency of the equipment. Fan performance rating and power consumption data with operation points clearly indicated shall be submitted and verified at the time of testing commissioning of the installation.

11. Submittals

After assembly of the units at site the manufacturers shall submit three complete sets of AHU drawings, test certificates of coil, test certificate of fan, test certificate of unit and operation-maintenance manual.

6.3 VRF type Outdoor Unit:

- i. The outdoor unit shall be factory assembled, piped internally, pre-wired and shall be designed to operate at outdoor ambient temperature as high as 40 deg. C.
- ii. The Refrigerant circuit shall be composed of a gas inlet, one shot coupling, a condenser coil, and a liquid outlet one shot coupling.
- iii. VRF Type unit should be with R407C / R410A or equivalent, eco friendly refrigerant.
- iv. The condenser coil must be the multi-pass, cross-finned type, equipped with aluminum plate fins mechanically bonded to seamless oxygen free copper tubes. The coil shall be cleaned, dehydrated, and tested for leakage at the factory.
- v. The Condenser fan shall be aluminum propeller type, statically and dynamically balanced and the fan shall be directly driven by the motor for up flow or horizontal air discharge. The Motor shall be permanently lubricated and shall be protected from water invasion.
- vi. The Unit shall contain a scroll type compressor from the same manufacturer. The compressor shall be direct in line type and equipped with vibration proof rubber. The compressor shall be welded shell type and spring suspended internally. The compressor shall be protected against a break down by the mercury over current relay, pressure switch and in-built internal thermostat.

6.4 Unit Control

The indoor unit shall be equipped with a remote control as well as manual operation switch, fan speed selector switch and a thermostat mounted on the remote-control switch. The operation switch shall include the function of "OFF – FAN- COOL". The operation control shall confirm to manual starting, automatic continuous operation whenever the thermostat requires, and the protection devices allow. The unit shall be restarted by resetting the operation switch if any one of the protection devices trips.

6.5 Protection Devices

The magnetic switch box incorporated in the outdoor or indoor unit shall contain magnetic contactor for all motors, including condenser fan motor, over current relays, and auxiliary relays.

6.6 Operation sequence

A rotary type switch on the remote-control box manually selected the ventilating or cooling operation. When the operation switch is set at FAN the evaporator fan is started. When the operation switch is set at COOL and all electrical protective devices are satisfied, the thermostat in the remote-control box controls the compressor operation.

7. Noise Levels:

Noise level inside the conditioned area resulting from the units shall not be more than NC 35

All running equipments shall be isolated from the building structure and the support isolated from other items of equipment.

All the units shall have anti-vibration mountings of approved make and these shall be subject to approval of the consultant.

All the Air distribution system should be designed in such a way so that inside noise level should be within NC 35.

8. Vibration Isolators:

All plant shall be isolated from the building structure and the support isolated from other items of equipment.

9 Refrigeration pipes and thermal insulation:

Refrigerant pipe work between the Outdoor unit and the indoor unit shall be installed to the satisfaction of Consultant. The thermal insulation shall be non-corrosive to metal, water repellent and fire resistant. The pipe work will be run as indicated on the drawings. All necessary unions, flanged valves or fittings should be provided for disconnecting.

The unit shall be factory charged and factory tested. The refrigerant pipe work shall be factory charged pre-insulated pipe works supplied by the manufacturer to suite the respective A.C. Unit.

10. Pipe Supports:

All refrigerant piping shall be supported to prevent deflection, bulking and vibration. Piping shall be supported at all changes in direction and at intervals of not more than 1.2 meters on straight runs. Pipe supports and clamps shall be subject to approval of consultant. Pipe work on roofs and floors shall be supported on off-set clamps, floor. The Pipe support stands shall be bolted to the concrete slab or steel members. Vertical pipe work shall be supported with trapeze hangers with rods suspended from inserts. Condensate drainpipe supports shall be capable of vertical adjustment after installation of piping. All pipe works passing through the walls, floors and roof slabs shall be provided with pipe sleeves of adequate size to allow the passage of insulation.

11 TFA/HRWs TECHNICAL SPECIFICATION:

SCOPE

The scope of this section comprises of the supply of double-skin "TREATED FRESH AIR Units " conforming to the following specifications. The manufacturer or their principals shall have at least 15 years of designing and manufacturing experience directly in the product i.e. energy recovery devices, with a two tier, two air stream unit design in India. The heat recovery wheel & Casing should be from the same manufacturer. The manufacturer of the wheel should have manufacturing units in India.

TYPE

The Treated Fresh Air units shall be two stream units in double skin construction, comprising of supply air section, return air section and Heat Recovery Section. The supply air section shall include the following sections if defined in the Bill of Quantities:

The Treated Fresh Air units shall be of such capacities and static pressures as mentioned in the Bill of Quantities.

CASING

The units shall be made of extruded Aluminum hollow profile frames. The profile box size shall be of thermal break type. The unit should be devoid of any welded construction and should be of cabinet type. All the frames should be assembled using glass fiber reinforced nylon joints/corners to make a self-supporting frame.

The Casing shall be AHRI certified (As per AHRI 1350) for the following parameters –

- 1 Deflection: The Deflection class shall be min CD4
- 2 Leakage: The leakage class shall be Minimum CL6
- 3 Thermal transmittances: The Thermal transmittance shall be minimum CT3
- 4 Thermal Bridging: Thermal Bridging shall be minimum CB3

The panels shall be of double skin construction with both inner and outer steel sheets being minimum 0.8mm thick. Outside sheet shall be pre coated & plasticized and inner sheet shall be galvanized with PUF Insulation of 40 kg/m³ density.

The Inspection and access panels shall be hinged type. The hinges shall be casted, powder coated Zinc alloy. Flushed Locks and Handles shall be of glass fiber reinforced polyamide. Other panels will be screwed on to the frame with sealant and soft rubber gasket thus making the joints airtight. All screws used for panel fixing shall be covered with PVC caps.

Special hollow gaskets and seals shall be used on inspection doors and to create separation between the airstreams to ensure negligible air leakage and mixing

The entire casing shall be mounted on galvanized channel. Condensate drain pan shall be fabricated from 18 g GSS/SS construction.

OUTDOOR VERSION

For Outdoor Installation units have factory installed galvanized sheet metal roof. Exhaust air hood with bird screen will be provided for exhaust air & intake louvers will be provided for intake sections

Exhaust Air hood & roof shall be shipped separately due to shipping restrictions.

4 SUPPLY AIR SECTION

The supply air section shall comprise of the following:

5.1 FAN SECTION

The fan shall be backward curved plenum type. Fan performance shall be based on test as per AMCA standard. The Plenum fans use backward curved blade wheel, made of cold rolled steel sheet, protected with polyester powder coating finish. Inlet cones are die-formed from galvanized steel sheet. These cones provide smooth airflow into the wheel for even loading.

Structural components of the plenum fans are made of galvanized steel sheet and sections, electrically welded, with the exception of the larger sized models, which use hot rolled steel sections protected with polyester powder coating finish.

5.2 MOTOR AND DRIVE

Fan motor shall be energy efficient and suitable for 415±10% volts, 50 cycles, 3 phase squirrel cage, totally enclosed fan cooled with IP – 55 protections. Motor shall be designed for quiet operation. Drive shall be direct driven and suitable for VFD.

5.3. FILTER SECTION

The filter section shall be normally designed for deep folded disposable synthetic pre-filters (Panel Type) for Class EU3. The Fine Filters is asked in BOQ, shall be as per required Grade in BOQ. The filter elements shall be mounted on rails and shall be easily pulled out for replacement. The rails shall be provided with efficient gaskets to minimize the risk of leakage

5.5 DAMPER SECTION

Damper section shall contain a built-in damper of aluminum profile with leakage class III. The damper blades shall be connected with plastic gear wheels with a gasket of silicon rubber to produce tightness between the blades. The Dampers shall have provision for damper actuator mounting.

6 RETURN AIR SECTION

The return air section shall comprise of above sections. The specification for this section shall remain same as defined in 5.1, 5.2 & 5.3

7 HEAT RECOVERY SECTION

The Heat Recovery section shall include enthalpy wheels and shall have minimum recovery of 75 % of total heat, i.e. both sensible and latent (each being 75 %). Necessary computerized selection of the wheel should be provided along with the bid to justify the same. The wheel shall be made of pure aluminum foil coated with molecular sieve desiccant with pore diameter of 30Å. The cross contamination between the two air streams shall be nil and leakage less than 0.04%. The vertical and radial run of the wheel shall be less than 1 mm per meter of diameter. The wheels shall have no contact labyrinth seals for effective sealing between the two air streams.

Detailed specification for the wheel shall be as per 8.0 i.e. "HEAT RECOVERY WHEEL"

8 Heat Recovery Wheel specifications:

Rotor/wheel matrix shall have following Matrix —

The substrate: The substrate or wheel matrix should be made of pure aluminum foil to allow.

- a) Quick and efficient uptake of thermal energy.
- b) Sufficient mass for optimum heat transfer
- c) Maximum sensible heat recovery at a relatively low rotational speed of 20 to 25 rpm.

The substrate shall not be made from any material which is combustible or supports combustion like synthetic fibrous media.

The wheel shall have minimum 75% both Sensible and Latent Balanced Effectiveness as per AHRI 1060. The wheel has to be certified as per DIN EN ISO 846 with 0% fungal and bacterial growth at 95% Relative humidity and above.

Fire rating: NFPA - 90A certification with 0% for Flame spread classification should be confirmed by manufacturer.

The Wheel shall be AHRI certified in accordance with standard 1060 and carry the AHRI certification stamp. The product shall be produced in an ISO certified facility

NECESSARY SOFTWARE SELECTION OF THE WHEEL HAS TO BE ENCLOSED TO JUSTIFY THE PRESSURE DROP AND EFFICIENCY CALCULATIONS. THE SELECTION SOFTWARE SHALL SHOW HRW PERFORMANCE IN SUMMER, MONSOON & WINTER.

The Desiccant: The desiccant should be water molecule selective and non-migratory. The desiccant should be molecular sieve 3Å, (certified by a third party lab to have an internal pore diameter of 3Å), so as to keep the cross contamination to absolute minimum and also ensure the exclusion of contaminants from the air streams, while transferring the water vapor molecules.

The desiccant, of sufficient mass which should not be less than 5 kg per 1000 cfm of air, should be coated with non masking porous binder adhesive on the aluminum substrate to allow quick and easy uptake and release of water vapor. A confirmation has to be provided by manufacturer of wheel to this effect. A matrix with desiccants impregnated in nonmetallic substrates, such as synthetic fiber, glass fiber, etc. will not be accepted.

The rotor/wheel matrix shall have equal sensible and latent recovery.

The weight of desiccant coating and the mass of aluminum foil shall be in a ratio to ensure equal recovery of both sensible and latent heat over the operating range. Accordingly, a rotor matrix which has an etched or oxidized surface to make a desiccant on a metal foil and results in insufficient latent recovery and hence unequal recovery, or a rotor matrix made from desiccant integrated in a synthetic fiber matrix which results in insufficient sensible recovery, high rotation speed, and unequal recovery, will not be accepted.

Rotor : With optimum heat and mass through matrix formed by desiccant, of sufficient mass, coated on an aluminum foil, the rotor should rotate at lower than 20 to 25 RPM, thereby also ensuring long life of belts and reduced wear and tear of seals.

The rotor shall be made of alternate flat and corrugated aluminum foil of uniform width.

The rotor honeycomb matrix foil should be so wound and adhered (full node line adhesive to be provided) so as to make a structurally very strong and rigid media which shall not get cracked, deformed etc. due to change of temperature or humidity.

The rotor having a diameter up to 2400 mm shall have spokes to reinforce the matrix. The internal threaded rod type spokes shall not be acceptable as it weakens the wheel structural strength thereby reducing the service life. From 2000 mm diameter upwards, the option of a special wing structure, to prevent the rotors from wobbling or deforming due to the successive pressure differentials, will be available.

Sectioned wheels, with pie segments, capable of being assembled in the field, shall be available as an option, above 2600 mm in diameter. Wheels above 3400 mm in diameter shall be segmented and provided with wing structures spokes and flanged rim. The segmented wheels shall be provided with field rotation adjustment mechanism. The HRW hub shall be fabricated out of heavy-duty steel to have high mechanical strength. Light duty Aluminum hub shall not be accepted.

The surface of the wheel/rotor should be highly polished (FACED) to ensure that the vertical run out does not exceed + 1 mm for every 1 meter diameter, thereby ensuring, negligible leakage, if labyrinth non contact seals are provided, and minimal drag, if contact wiper seals are provided.

The radial run out also shall not exceed + 1 mm for every 1-meter diameter, thereby minimizing the leakage/drag on the radial seals and minimizes the fluctuation in the tension of the drive belt.

The number of wraps (of alternative corrugated and flat foil) for every inch of rotor radius shall be very consistent to ensure uniform air flow and performance over the entire face in the air stream. Flute height and pitch will be consistent to a very tight tolerance to ensure uniform pressure drop and uniform airflows across the rotor face.

The rotor shall be a non clogging aluminum media, having a multitude of narrow aluminum foil channels, thus ensuring a laminar flow, and will allow particles up to 800 microns to pass through it.

The media shall be cleanable with compressed air, or low-pressure steam or light detergent, without degrading the latent recovery.

The Cassette / casing

The recovery wheel cassette/casing shall be manufactured from tubular / sheet metal structure to provide a self-supporting rigid structure, complete with access panels, purge sector, rotor, bearings, seals, drive mechanism complete with belt. The sheet metal should be coated with a special corrosion inhibitor coating and a certificate for the same should be provided.

The rotor/wheel should have a field adjustable purge mechanism to provide definite separation of airflow minimizing the carryover of bacteria, dust and other pollutants, from the exhaust air to the supply air. It shall be possible, with proper adjustment, to limit cross contamination to less than 0.04% of that of the exhaust air concentration.

The face and radial seals shall be four (4) pass noncontact labyrinth seals / brush seals for effective sealing between the two air streams, and also for a minimum wear and tear ensuring long life of the seals.

PERFORMANCE TESTING

The HRW manufacturer shall have in-house test facilities for performance testing of HRWs. If required, the manufacturer shall be able to offer type testing of HRWs at their works and submit a type test report. The manufacturer shall have test facilities for carry over testing at the same facilities where HRWs are manufactured.

12 DUCTWORK

STANDARD SPECIFICATION FOR AIR CIRCULATION SYSTEM:

This section deals with supply, erection, testing & balancing of GI sheet metal duct work and air registers conforming to specifications as given below:

12.1 MATERIAL FOR DUCTING

The duct shall be fabricated out of galvanized sheet, class VIII (Zinc coating 120 gm/m²) as per the parameters given below which are conforming to IS 655-1963.

MAXIMUM	THICKNESS	TYPE OF TRANSVERSE	BRACING
Up to 600	0.63	S-drive, pocket or bar, Slips, on 2.5m centers	None
601 to 750	0.63	S-drive, pocket or bar, slips, on 2.5m centers, S-drive, 25mm pocket, or 25 mm bar slips on 2.5m centers.	25 x 25 x 3 mm, angles, 1.2m from joint
751 to 1000	0.80	Drive, 25-mm pocket or 25mm bar slips, on 2.5 m centers 40 x 40 mm angle connections,	25 x 25 x 3 mm angles, 1.2 m from joint
1001 to 1500	0.80	40-mm bar slips, with 35 x 3 mm bar reinforcing on 2.5 m centers	40 x 40 x 3 mm angles, 1.2 m from joints
1501 to 2250		40 x 40 mm angle connections, or 40-mm bar slips, 1 m maximum centers with 35 x 3 mm bar reinforcing	40 x 40 x 3 mm diagonal angles, or 40 x 40 x 3 mm angle 60 cm from joint

*Ducts 2250 mm and larger require special field study for hanging and supporting methods.

In addition to above the following points should be also taken into account while fabrication of ducts.

- All ducts of size larger than 450mm shall be cross broken.
- All ducts shall be supported from the ceiling / slab by means of MS rods of dia 9mm with MS angle of size 40 x 40 x 5 mm at the bottom with neoprene pad in between the duct & MS angle. The ducts shall be suspended from the ceiling with the help of dash fasteners. Provision for necessary ancillary materials required for hanging the ducts shall be arranged by the contractor.
- The vanes shall be provided wherever required and shall be securely fastened to prevent noise & vibration.

- d) The rubber gasket shall be installed between duct flanges in all connections and joints.
- e) All flanges and supports should be primer coated.
- f) The flexible joints shall be fitted to the delivery side of AHU fans with Fire Retardant Double canvass. The length of flexible joints should not be less than 150 mm and not more than 300 mm between face.
- g) The ducting work can be modified if deemed necessary in consultation with the Engineer in Charge to suit actual site conditions in the building.

h) Box Type Dampers & Splitters

- i) These dampers shall be provided in the ducting work for proper control and balancing of air distribution. All dampers shall be louver type robust construction. These dampers shall be fitted with easily accessible operating mechanism, complete with links, levers, quadrant for proper control and setting in a desired position. The position of the handle of the damper operating mechanism shall be clearly visible and shall indicate the position of the damper in the duct. All dampers, splitters shall be fabricated out of G.S. sheet of two gauges higher than the duct piece having these fittings. Dampers shall be installed in duct at all required locations. **No extra payment shall be made separately since these form part of Air Circulation System.**

NOTE: In case angle iron supports are not feasible to be installed for supporting the ducts due to height constraint then the contractor shall support the ducts with M.S flats of at least double the thickness of the angle iron supports.

12.2 A) VOLUME CONTROL DEVICES

The opposed blade volume control device shall be made of Powder Coated extruded aluminum construction in black anodized finish. Opposed blades shall be pivoted to extruded aluminum frame with Nylon bushes. Specially designed blade shall have an overlapping lip which shall ensure a tight closure.

B) FRESH AIR INTAKE LOUVERS WITH BIRD SCREEN

The fresh air intake louvers at least 50mm deep will be made of powder coated extruded aluminum construction. Bird / insect screen will be provided with the intake louvers. The blades shall be inclined at 45 degree on a 40mm blade pitch to minimize water ingress. The lowest blade of the assembly shall be extended out slightly to facilitate disposal of rainwater without falling on door / wall on which it is mounted.

The intake louvers shall be provided with factory fitted aluminum construction volume control dampers in black anodized finish.

12.3 PAINTING

All ducts collar / shoot behind the grills / diffuser shall be given at least two coats oil black enamel paints.

12.4 TESTING

The complete duct system shall be tested for air leakage & complete air distribution system shall be balanced in accordance with air quantities indicated on the approved drawing

13.0 STANDARD SPECIFICATION OF THERMAL / ACOUSTIC INSULATION

This section deals with supply and fixing of **thermal / acoustic** insulation of ducts, pipes etc. as per the specification given in this section.

Special Notes:

1. All the party should submit the Equipment ratting chart at different temperature / outside condition.
2. Compressor ratting chart should be submitted along with tender for proper technical evaluation of the capacity offered.
3. Vendor should submit the technical Data Sheet & Shop drawing within 7 days from date of issue of order for necessary approval by consultant before physically start the work at site.
4. After Commissioning vendor should conduct performance testing of the entire system for 72 hrs.

5. Vendor should submit the complete operation & maintenance manual containing As Built Drawing, Do's & Don't, Operation procedure, set points of different parameters, Catalogue & Technical details etc.

LIST OF APPROVED MAKES:

SR NO	ITEM	ACCEPTABLE MAKES
1	VRF Outdoor Units	Blue Star, Voltas, Daikin, Carrier, Hitachi, Mitsubishi
2	AHU Suitable for VRF.	Citizen/ Edgetech/VTS/Zeco.
3	HRWs.	Bry-Air / Greenheck
4	GI Sheets	SAIL / JINDAL/ TATA
5	Fusible link type Fire Damper.	Caryaire, Dynacraft, RAVISTAR, Premier
6	Vibration Isolators/Flexible Connectors	Resistoflex, Dunlop, Cori
7	Fiber glass	UP Twiga, Kimmco, Owens corning
8	Nitrile Rubber	Armaflex, K-Flex, supreme
9	V Belts/Pulleys	Fenner, Dunlop
10	Electrical Panel	EAP/SCHNEIDER/SIMENSE/
11	Cable	Finolex, Gloster, Havels
12	VFD	Danfoss/Simense/ABB
13	Thermostat	Danfoss/Simense/JCI/Honeywell

Special Terms & Conditions:

1. **Terms of Payment:** Mentioned in above NIT.

2. SITE VISIT

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

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

3. OWNERSHIP OF DRAWINGS

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

4. DETAILED DRAWINGS AND INSTRUCTIONS

The SBI through its Consultants shall furnish with reasonable promptness additional instructions by means of drawings or otherwise necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof and reasonably inferable there from. The work shall be executed in conformity therewith and the contractor will prepare a detailed programmed schedule indicating therein

the date of start and completion of various activities on receipt of the work order and submit the same to the SBI through the Consultant.

5. 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 contractor. If the contractor observes any discrepancy between the drawings and specifications, he shall promptly notify the SBI in writing under intimation of the Consultant. If the contractor performs any act which is against the law, rules, and regulations he shall meet all the costs arising there from and shall indemnify the SBI any legal actions arising there from.

6. 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/Owner the contractor shall be responsible for the same and shall at his own expenses rectify such error, if so, required to satisfaction of the SBI.

7. PROTECTION OF WORKS AND PROPERTY

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

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

8. INSPECTION OF WORK

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

9. ASSIGNMENT AND SUBLETTING

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

10. CONTRACT AGREEMENT

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

11. 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.

12. CONTRACTOR'S SUPERINTENDENCE

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

13. INSURANCE OF WORKS

Without limiting his obligations and responsibilities under the contract the contractor shall insure in the joint names of the Owner and the contractor with first name being of Owner's name, against all loss or damages from whatever cause arising other than the excepted risks, for which he is responsible under the terms of contract and in such a manner that the Owner and contractor are covered for the period stipulated 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 occurred by the contractor in the course of any operations carried out by him for the purpose of complying with his obligations under clause.

- a) The works for the time being executed to the estimated current Contract value thereof, or such additional sum as may be specified together with the materials for incorporation in the works at their replacement value.
- b) The constructional plant and other things brought on to the site by the contractor to the replacement value of such constructional plant and other things.
- c) Such insurance shall be effected with an insurer and in terms approved by the SBI which approval shall not be unreasonably withheld and the contractor shall whenever required produce to the Architect/Consultant/Owner the policy of insurance and the receipts for payment of the current premiums.

13.1. 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 :

- d) The permanent use or occupation of land by or any part thereof.
- e) The right of SBI to execute the works or any part thereof, on, over, under, in or through any lands.
- f) Injuries or damages to persons or properties which are unavoidable result of the execution or maintenance of the works in accordance with the contract.
- g) Injuries or damage to persons or property resulting from any act or neglect of the SBI, their agents, employees or other contractors not being employed by the contractor or in respect of any claims, proceedings, damages,

costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the SBI, their employees, or agents or other employees, or agents or other contractors for the damage or injury.

13.2 Contractor to indemnify SBI

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

14.0 Third Party Insurance

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

15.0 Minimum Amount of Third-Party Insurance

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

The minimum insurance cover for physical property, injury, and death is Rs.5.0 lacs per occurrence with the number of occurrences limited to four. After each occurrence contractor will pay additional premium necessary to make insurance valid for four occurrences always.

16.0 Accident or Injury to Workmen

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

17. Insurance against accidents etc to workmen

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

18. Time allowed for completion

Total completion time for the above work is 120 days from date of Agreement excluding Sunday & Bank holidays. Normal Project working time should consider from 10.0 am to 6.0pm.

19. Remedy on Contractor's failure to insure

If the contractor fails to effect and keep in force the insurance referred to above or any other insurance which he may be required to effect under the terms of contract, then and in any such case the SBI may effect and keep in force any

such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the SBI as aforesaid and also deduct 15% of contract value from any amount due or which may become due to the contractor, or recover the same as debt from the contractor.

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

20.0 BOQ

SL.	DESCRIPTION	UNIT	QTY
	Part A - Supply of Equipment-		
I	Supply of VRF unit for Outdoor		
	Supply of Air Cooled all Inverter controlled Variable Scroll Compressor Unit by using R-410A refrigerant, cooling mode, low noise inverter-based condenser fans. Unit shall be provided with micro processor-based panel for sequential starting of condensing units, coils, expansion valves, fins with specially factory coated hydrophilic treatment for heat & rust corrosion. All the Corded and cordless remote should synchronise each other for the units. The unit shall also be provided with mounting frame duly painted and other standard accessories. Minimum COP shall not be less than 4.1 at 50% rated load & ambient condition shall be considered as 40.0-degree C. Minimum capacities of each outdoor units are as follows:		
	Make- Daikin/Carrier/Voltas/Blue Star / Hitachi/Mitsubishi.		
	1ST FLOOR-		
a1	14 HP	Nos.	1
a2	14 HP	Nos.	1
a3	14 HP	Nos.	1
	2ND FLOOR-		
b1	10 HP	Nos.	1
b2	12 HP	Nos.	1
b3	12 HP	Nos.	1
	5TH FLOOR-		
c1	12 HP	Nos.	1
c2	12 HP	Nos.	1
c3	12 HP	Nos.	1
2.0	Indoor Units (VRV Type)		
	Double Skin Horizontal Floor Mounted AHUs. (Suitable for VRF).		
	Double Skin construction (25mm thk. insulated sandwich Panels) vertical/horizontal floor mounted type AHU complete with DIDW Backward curved centrifugal blower, Filter section with 50 mm thick pre-filter (MERV-8) & Along with 305 mm thick rigid media type Miro-vee filter (MERV-15) mounted on a common filter frame and 4RD/ 6 RD DX cooling coil with UV-lamp. AHU shall have sandwiched insulated drain pans.		
	Make- Edgetech/Zeco/Vts/Citizen		
A1	Supply of Capacity 17500 CFM, 60 mm static pressure, 35 TR, 3nos Cooling coil section & 1nos Centrifugal blower.(1st floor).	Nos.	1
A2	VFD for above AHU Motor.	Nos.	1
B1	Supply of Capacity 14500 CFM, 60 mm static pressure, 28 TR, 3nos Cooling coil section & 1nos Centrifugal blower. (2nd floor).	Nos.	1
B2	VFD for above AHU Motor.	Nos.	1
C1	Supply of Capacity 15000 CFM, 60 mm static pressure, 30 TR, 3nos Cooling coil section & 1nos Centrifugal blower. (5th floor).	Nos.	1
C2	VFD for above AHU Motor.	Nos.	1

3.0	Supply of AHU Expansion Kit.	Nos.	9
4.0	Heat recovery units		
A1	Supply of Decicent Rotor Heat Recovery Enthalpy wheel with Supply & Exhaust fan for capacity of 1300 CFM exactly as per specification of minimum heat transfer efficiency of 75% with double skin construction. (1st,2nd floor)	Nos.	2
A2	2 nos VFD one for supply & one for exhaust fans for TFAs	Nos.	4
	Make : Bry Air / Greenheck		
B1	Supply of Decicent Rotor Heat Recovery Enthalpy wheel with Supply & Exhaust fan for capacity of 1500CFM exactly as per specification of minimum heat transfer efficiency of 75% with double skin construction. (5th floor)	Nos.	1
B2	2 nos VFD one for supply & one for exhaust fans for TFAs	Nos.	2
	Make : Bry Air / Greenheck		
	TOTAL PART-A		
	Part B- Low Side Installation work		
1.0	Lifting, shifting, positioning, Installation and testing & Commissioning of Modular type outdoor air condensing units equipped with highly efficient scroll compressors, with all inverter type compressor(s).		
	OUTDOOR UNIT		
	1ST FLOOR-		
a1	14 HP	Nos.	1
a2	14 HP	Nos.	1
a3	14 HP	Nos.	1
	2ND FLOOR-		
b1	10 HP	Nos.	1
b2	12 HP	Nos.	1
b3	12 HP	Nos.	1
	5TH FLOOR-		
c1	12 HP	Nos.	1
c2	12 HP	Nos.	1
c3	12 HP	Nos.	1
2.0	Indoor Units (VRV Type)		
	Double Skin Horizontal Floor Mounted AHUs. (Suitable for VRF).		
	Double Skin construction (25mm thk. insulated sandwich Panels) vertical/horizontal floor mounted type AHU complete with DIDW Backward curved centrifugal blower, Filter section with 50 mm thick box type pre-filter (MERV-8) & 305 mm thick rigid media type Miro-vee filter (MERV-15) mounted on a common filter frame and 4RD/6 RD DX cooling coil with UV-lamp. AHU shall have sandwiched insulated drain pans.		
A1	Lifting, shifting, positioning, Installation and testing & Commissioning of Capacity 17500 CFM, 60 mm static pressure, 35 TR, 3nos Cooling coil section & 1nos Centrifugal blower. (1st floor).	Nos.	1

A2	VFD for above AHU Motor.	Nos.	1
B1	Lifting, shifting, positioning, Installation and testing & Commissioning of Capacity 14500 CFM, 60 mm static pressure, 28 TR, 3nos Cooling coil section & 1nos Centrifugal blower. (2nd floor).	Nos.	1
B2	VFD for above AHU Motor.	Nos.	1
C1	Lifting, shifting, positioning, Installation and testing & Commissioning of Capacity 15000 CFM, 60 mm static pressure, 30 TR, 3nos Cooling coil section & 1nos Centrifugal blower. (5th floor).	Nos.	1
C2	VFD for above AHU Motor.	Nos.	1
3.0	Installation and testing & Commissioning AHU Expansion Kit.	Nos.	9
4.0	Installation, Testing & Commissioning of Heat recovery units along with Necessary Channel Supports from wall to wall/floor Support as required.		
A1	Lifting, shifting, positioning, Installation, and testing & Commissioning of Decicent Rotor Heat Recovery Enthalpy wheel with Supply & Exhaust fan for capacity of 1300 CFM exactly as per specification of minimum heat transfer efficiency of 75% with double skin construction. (1st,2nd floor)	Nos.	2
A2	2 nos VFD one for supply & one for exhaust fans for TFAs.	Nos.	4
B1	Lifting, shifting, positioning, Installation, and testing & Commissioning of Decicent Rotor Heat Recovery Enthalpy wheel with Supply & Exhaust fan for capacity of 1500CFM exactly as per specification of minimum heat transfer efficiency of 75% with double skin construction. (5th floor)	Nos.	1
B2	2 nos VFD one for supply & one for exhaust fans for TFAs.	Nos.	2
5.0	Refrigerant Piping (VRV System)		
	Supply of Interconnecting refrigerant pipe work with (13mm/19mm thick) closed cell elastomeric nitrile rubber tubular insulation between each set of indoor & outdoor units as per specifications, all piping inside the room shall be properly supported with MS hanger & clamps.		
a	12.7 mm dia - 19 mm thk. Insulation with alu. Cladding.	RMT	280
b	28.58mm dia - 25 mm thk. Insulation with alu. Cladding.	RMT	280
6.0	Supply of VRV systems including topping R410A gas as per site requirements. Refrigerant shall be environmental friendly R410A.	Nos.	3
7.0	Drain Piping		
	Rigid PVC piping complete with fittings, supports as per specifications and insulated with 6 mm thick closed cell elastomeric nitrile rubber insulation.		
a	32 mm NB	Rm.	80
8.0	Civil/cutting work along with Finishing of the same for laying of cu and drainpipe, Fresh air & Exhaust air opening etc..	Lot	1
9.0	Supply, install, testing & commissioning of MS frame structure for fixing on wall type duly painted by red oxide primer for mounting the outdoor units to be provided with the rubber pads, the frame should painted with two coats black color for VRF Unit. Drawing will be provided by HVAC Vendor	Nos.	9

	TOTAL PART-B		
	Part-C, Ducting Works		
1	Sheet metal ducting with Class VIII (120 GSM) G. I. Sheet complete with turning vanes, hangers, bracings, supports etc. as per IS-655		
a	20G (0.60 mm) GSS Ducting	Sq. Mtr.	60
b	22G (0.60 mm) GSS Ducting	Sq. Mtr.	40
2	Entire duct Thermal insulations of duct complete with 19 mm thick Al. foil pasted nitril rubber.	Sq. Mtr.	60
3	Duct acoustic insulation with 25 mm thick Arma sound Board.	Sq. Mtr.	40
4	Extruded Aluminum Fresh Air Louvers with Bird Screen and MS VCD	Sq. Mtr.	1.5
5	Extruded Aluminum Exhaust Air Louvers with Bird Screen and MS VCD	Sq. Mtr.	1.5
6	MS/GI Duct Damper (VCD)	Sq. Mtr.	1.5
7	Supply & Fixing of Fire-retardant type Canvass connection for indoor unit	Nos.	15.0
8	Spring Return Type Motorized Fire Damper as per UL-555	Sq. Mtr.	1.5
9	Spring Return Type Motorized ON/OFF type Actuator for above Fire Damper with Smoke cum Heat Detector along with Control Panel.	Nos.	3
10	Room Thermostat with 4-20 mA along with PT 100 Temperature sensor necessary Controller with control cabling to connect the thermostat with AHU VFD.	Nos.	3
	Total for Part-C		
	Part-D, Electrical Works		
1.0	Cabling Works		
	Supplying & Laying of 1100V grade XLPE cable for mains and sub mains as per specifications and drawings. (MAKE-KEI/POLYCAB/GLOSTER/CCI/MESCAB/HAVELLS)		
a	4 C X 35 mm sq. Al (for VRF unit).	RMT	250
b	4C X 10 mm sq. Al (AHU)	RMT	110
c	4C X 6 mm sq. Al (HRW)	RMT	90
d	3C X 2.5 mm sq. Al for Fire Damper.	RMT	90
e	2C x 1.5 sq.mm Cu Cable	RMT	150
f	3C x 1.5 sq.mm Cu Cable	RMT	200
2.0	Supplying and fixing compression type gland complete with brass gland, brass ring & rubber ring for dust & moisture-proof entry of XLPE armored cables as below:		
a	4 C X 35 mm sq. Al (for VRF unit).	Nos.	18
b	4C X 10 mm sq. Al for (AHU)	Nos.	6

c	4C X 6 mm sq. Al (HRW)	Nos.	8
d	3C X 2.5 mm sq. Al for Fire Damper.	Nos.	6
e	2C x 1.5 sq.mm Cu Cable	Nos.	6
f	3C x 1.5 sq.mm Cu Cable	Nos.	20
3.0	Electrical Panel		
	(MAKE-EAP/SIEMENS/SCHNEIDER)		
a	1ST, 2ND, 5TH FLOOR-(Typ), Distribution Panel.		
	One (1)- Incoming feeder having		
	160A 4P 25KA with O/L,S/C Protection Thermal Mag. Release MCCB		
	160A MCCB Door Interlock		
	Multifunction Meter with RS485 Port		
	160/5A 15VA CL1 CT		
	6A Control MCB		
	One (1) - Set 3 phase, 4wire, 50Hz, 415V, 200A, 36KA, Aluminum bus bars.		
	Three (3)- Outgoing feeders each consist of		
	80A 4P 25KA MCCB with O/L,S/C Protection Thermal Mag. Release		
	80A MCCB Door Interlock		
	One (1) No.- 96 Sq. mm. Digital Ammeter 0-200A		
	One (1) No.- Ammeter with Selector Switch		
	Auto/Manual Selector switch		
	R,Y,B,On,Off,Trip Indicating Lamp		
	6A SP 10KA MCB		
	All Panels should have potential free contacts for integration with BMS		
	One (1)- Outgoing feeders each consist of		
	32A 4P 18KA MCB with O/L,S/C Protection Thermal Mag. Release		
	DOL Bypass Starter along with Semiconductor fuse etc for installation of above VFD inside the panel		
	32A MCCB Door Interlock		
	One (1) No.- 96 Sq. mm. Digital Ammeter 0-200A		
	One (1) No.- Ammeter with Selector Switch		
	Auto/Manual Selector switch		
	R,Y,B,On,Off,Trip Indicating Lamp		
	6A SP 10KA MCB		
	All Panels should have potential free contacts for integration with BMS		
	Two (2)- Outgoing feeders each consist of		
	20A 3P 18KA MCB with O/L,S/C Protection Thermal Mag. Release		
	DOL Bypass Starter along with Semiconductor fuses etc for installation of above VFD inside the panel.		
	20A MCCB Door Interlock		
	One (1) No.- 96 Sq. mm. Digital Ammeter 0-200A		
	One (1) No.- Ammeter with Selector Switch		
	Auto/Manual Selector switch		
	R,Y,B,On,Off,Trip Indicating Lamp		
	6A SP 10KA MCB		

	All Panels should have potential free contacts for integration with BMS		
	One (1)- Outgoing feeders each consist of		
	20Amp, SP,10ka,MCB		
	All Panels should have potential free contacts for integration with BMS		
	PANEL AS ABOVE	Nos.	3
4.0	Cable trays in A.C Plant area		
a	100 mm wide	RMT.	50
5.0	Earthing equipment supplied by the AC contractor	Lot.	1
	TOTAL PART-D		
	TOTAL- (A+B+C+D) = E		
6.0	Buy Back including Dismantling & Removing of Package type ac units along with electrical panel. (1st, 2nd & 5th floor).		
a	17TR Ductable units along with Copper Pipe & Electrical Panel.	Nos.	6
b	11TR Ductable units along with Copper Pipe & Electrical Panel.	Nos.	1
c	5.5TR Package units along with Copper Pipe & Electrical Panel.	Nos.	2
	(F) Total Value after Buy Back-		
	GRAND TOTAL = G=(E-F) (EX GST)		
H	Amount of AMC Will not be considered in Grand Total (AMC will be negotiable during execution decided by the appropriate authority of Bank)		
	3 years all inclusive maintenance cost after 1 years warranty period.		
	1st Year.		
	2nd Year.		
	3rd Year.		
	Total Value of AMC-		

Note : Vendors are requested not to submit price bid in hard copy . **Price can only be submitted through online mode** though banks e-Tendering website www.tenderwizard.com/SBIETENDER