



SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD.

TENDER DOCUMENTS
FOR
AC Works
AT

**NEW PREMISES OF SBI ADB
BAJPUR, BRANCH & RACC- US
NGR,(UTTARAKHAND)**

SBI INFRA MGMT. SOL. PVT. LTD.

5THFLOOR, D- BLOCK,
11, PARLIAMENT STREET,
NEW DELHI-110001

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Notice Inviting Tender
TENDER ID-DEL201907013 **10-07-2019**

SBI Infra Management Solutions Pvt. Ltd. on behalf of State Bank of India invites online Tenders from the Contractors for the **AC WORK NEW PREMISES OF SBI ADB BAJPUR BRANCH& RACC, US NAGAR (RUDRAPUR) - UTTARAKHAND (RBO-V)**

Details of tenders are as under:

1.	Name of Work	:	Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR, - UTTARAKHAND (RBO-V)
2.	Time allowed for completion	:	60 days from date of handing over of the site.
3.	Earnest Money Deposit (1% of Estimated cost)	:	Rs.8600/ (Eight thousand six hundred Only) by crossed Bank Draft / Banker's Cheque drawn in favour of State Bank of India, Haldwani (to be enclosed in sealed envelope as a part of Technical Bid).
4.	Initial Security Deposit	:	2% of the total value of the contract including Earnest Money.
5.	Tender processing fee	:	A <u>non-refundable</u> amount of Rs. 1000/- (Rupees ONE Thousand only) to be paid only through SB Collect payment portal available in SBI site https://www.onlinesbi.com favour of SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD. On or before 28/07/2019. (Receipt to be enclosed in sealed envelope as a part of technical Bid)
6.	Additional Security Deposit	:	If the difference of L-1 tender amount and estimated amount is more than 10%, the L-1 bidder has to submit refundable additional security deposit equal to the difference amount by Demand Draft / Joint STDR with Bank.
7.	Last date and time of receipt of Tenders	:	29/07/2019 upto 4.00 p.m.
8.	Address at which the Tenders are to be submitted	:	<u>Technical Bid:</u> to be uploaded online and to be submitted BY L-1 Vendor in Hard Copy at SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD., State Bank of India, Administrative Office, First Floor, Kusumkhera, Kaladhungi Road, Haldwani-263139. <u>Price Bid:</u> Price Bid to be uploaded Online www.tenderwizard.com/SBIETENDER
9.	Date and time of opening of Tenders	:	29/07/2019 at 4.30 p.m.

10.	Place of opening Tenders	:	SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD., State Bank of India, Administrative Office, First Floor, Kusumkhara, Kaladhungi Road, Haldwani-263139.
11.	Defects Liability Period	:	12 months from the date of handing over of the project to the satisfaction of Bank.
12.	Validity of Offer	:	90 days from the date of opening the Tenders.
13.	Liquidated Damages	:	At the rate of 0.5% of the Contract Value per week which subject to a maximum of 5% of the accepted Contract Value.
14.	For e-Tender related queries		<p>Service provider: M/s. Antares Systems Limited, Registered Office: #24, Sudha Complex, 3rd Stage, 4thBlock, Bangalore – 560079, Karnataka. Ph.: 080-49352000 / 40482000 Fax: 080-49352034</p> <p>Help Desk: Contact Persons: (On working days 9 AM to 6 PM) 1. Mr. Vinod Singh Bora Mobile No.: +91 9718227288 e-Mail: vinodsingh.b@antaressystems.com 2. Mr. Kushal Bose Mobile No.: +91 7686913157 e-Mail: kushal.b@antaressystems.com 3. Mr. Tousik Ghosh Mobile No.: +91 9674758724 e-Mail:tousik.g@antaressystems.com</p>

Mode of Submission of Tender: The tender shall be submitted in both physical and online in two cover system in accordance with the procedure detailed herein below. Specified documents shall be sealed in envelopes of appropriate size each of which shall be sealed.

- 1) First Envelope marked **Cover 1** shall contain Earnest Money Deposit along with Covering Letter and Cost of Tender Document.
- 2) Envelope marked **Cover 2** shall be of adequate size and shall contain envelopes marked **Covers 1 & Undertaking as in Annexure- I** and shall be properly sealed. This envelope shall be endorsed on the outside face as under:

**“Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR, -
UTTARAKHAND (RBO-V) ”**

The envelope marked **Cover 2 SBI INFRA MANAGEMENT SOLUTIONS PVT. LTD., State Bank of India, Administrative Office, First Floor, Kusumkhara, Kaladhungi Road, Haldwani-263139. On 29/07/2019 by 16.00hrs**

containing the tender documents as per instructions mentioned above shall be submitted in the office of

Envelope marked **Cover 1** containing Earnest Money Deposit along with Covering Letter and Cost of Tender Document, will be opened if the Earnest Money Deposit or Cost of Tender Document is not found as prescribed, the tender shall be rejected.

working day at the same time.

State Bank of India has the right to accept / reject any or all tenders without assigning any reasons.

SBI Infra Management Solutions Pvt. Ltd. (SBIIMS)

SIGNATURE OF THE TENDERER

INSTRUCTIONS TO THE TENDERERS

1.0 Scope of Work

Sealed tenders are invited by SBI Infra Management Solutions Pvt. Ltd., New Delhi for and on behalf of State Bank of India for the **Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR, - UTTARAKHAND (RBO-V)**

1.1 Site and its Location

The proposed work is to be carried out at **Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR , - UTTARAKHAND (RBO-V) Tender Documents**

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

Instructions to Tenderers
General Conditions of Contract
Special Conditions of Contract
Additional Specifications
Drawings
Price Bid

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

- a) Price Bid
- b) Additional Specifications
- c) Technical Specifications
- d) Drawings
- e) Special Conditions of Contract
- f) General Condition of Contract
- g) Instruction to Tenderers

2.3 Complete set of tender documents including relative drawings can be downloaded from e-tendering portal of the e-tendering service provider engaged by SBIIMS.

2.4 The tender documents are not transferable.

2.0 Site Visit

3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and

data which may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions, liaison requirements with local authorities/ authorities maintaining the campus, security agencies guarding the campus, traffic regulations in and around the site etc;

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

3.0 **Earnest Money Rs.8600/ (Eight thousand six hundred Only)**

4.1 The tenderers are requested to submit the Earnest Money of in the form of Demand Draft of Bankers' Cheque in favour of State Bank of India payable at **Haldwani** drawn on any Bank in India.

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

4.3 No interest will be paid on the EMD.

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

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

4.0 **Initial Security Deposit**

The successful tenderer will have to submit a sum equivalent to 2% of contract value less EMD, by means of Demand Draft drawn in favour of State Bank of India payable at New Delhi within a period of 7 days of acceptance of tender.

5.0 **Security Deposit**

6.1 Total security deposit shall be 5% of contract value. Out of this 2% of contract value is in the form of initial security deposit, which includes the EMD. Balance 3% shall be deducted from the running account bill of the work at the rate of 10% of the respective running account bills i.e., deduction from each running bill account will be 10% till total 3% of contract value is reached. 50% of the total security shall be paid to the contractors on the basis of Consultant's certifying the virtual completion. The balance 50% would be paid to the contractors after the defects liability period as specified in the contract provided he has carried out all the work and attended to all the defects in accordance with the condition of the contract and clearance, if any, of the observations of the CTE of CVC.

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

6.0 **Signing of Contract Documents**

The successful tenderer shall be bound to implement the contract by signing an agreement and conditions of contract attached herewith within 7 days from the receipt of intimation of acceptance of his tender by the Bank. However, the written acceptance of the tender by the Bank will constitute a binding agreement between the Bank and successful tenderer whether such formal agreement is subsequently entered into or not.

7.0 **Completion Period**

Time is essence of the contract. The work should be completed in all respects in accordance with the terms of contract within a period of **60 Days** from the date of handing over of the site.

8.0 **Validity of Tender**

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

10.0 **Liquidated Damages**

The liquidated damages shall be 0.5% per week subject to a maximum of 5% of the accepted Contract Value.

11.0 **Rate and Prices:**

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

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

11.2.1 The tenderers need not quote their rates for which no quantities have been given. In case the

tenderers quote their rates for such items those rates will be ignored and will not be considered during execution.

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

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

11.4 Each page of the BOQ shall be signed by the authorized person and cutting or over writing shall be duly attested by him.

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

11.5.1 The rate quoted shall be firm and shall include all costs, allowances, taxes, levies etc. and deduction at source for Income Tax, Work Contract Tax etc. will be made as per statutory rules.

11.5.2 The contractor shall be required to conduct necessary tests of the water brought from tube well or any other outside source, from approved laboratory.

11.5.3 The contractor is required to comply with all act of the Government relating to labour and the rules and regulations made there under from time to time and to submit at the proper times all particulars and statements required to be furnished to the appropriate authorities.

12 Vendor has to submit in Hard copy the tender document along with all terms & Conditions, Specifications and subsequent annexure and corrigendum's duly signed and stamped by authorized representative/ signatory on becoming L1. However we accept all the terms and conditions along with the specifications, Drawings, Layouts etc defined in the tender documents.

12.0 Nominated Contractor for Allied work, if any.

The contractor shall get allied works executed only through Contractors already in SBI's Panel, for different categories of works.

Annexure-I
UNDERTAKING
(To be submitted along with the technical Bid)

To

VICE PRESIDENT (CIVIL),
SBI INFRA MANAGEMENT SOLUTIONS PVT LTD,
5TH FLOOR, D-BLOCK,
11, PARLIAMENT STREET,
NEW DELHI 110001.

Dear Sir,

**Reg.: Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR , -
UTTARAKHAND (RBO-V)**

I / We refer to the tender notice issued by you for AC Interior & Furnishing works and allied works in connection with the above.

1. **I undertake to submit in Hard copy the tender document along with all terms & Conditions, Specifications and subsequent annexure and corrigendum's duly signed and stamped by authorized representative/ signatory on becoming L1. However we accept all the terms and conditions along with the specifications, Drawings, Layouts etc defined in the tender documents.**
2. I / We hereby offer to perform, provide, execute, complete and maintain the works in conformity with the drawings, designs, conditions of contracts, specifications, schedule of quantities relating to the works.
3. I / We have satisfied myself / ourselves as to the site conditions, examined the drawings and all aspects of the tender conditions, subject to above, I / We do hereby agree, should this tender be accepted in whole or in part, to:
 - a. Abide by and fulfill all the terms and provisions of the said conditions annexed here to,
 - b. Complete the works within **60 Days** as per the work programme enclosed with the tender in two or three shifts if considered necessary by the Employer / Consultants at no extra cost to the Employer.
4. I / We have deposited a **non-refundable amount of Rs. 1,000/- (Rupees One Thousand only)** towards cost of Tender and an **earnest money of Rs.8600/ (Eight thousand six hundred Only)** in the form of Demand Draft / Banker's Cheque drawn in favour of **SBIIMS payable at Haldwani** and **State Bank of India payable at Haldwani**, respectively which, I / We note, will not bear any interest and is liable for forfeiture.
 - I. If our offer is withdrawn within the validity period of acceptance by the Employer.
Or
 - II. If the contract agreement is not executed by us within 7 days from the date of receipt of the letter of acceptance.
Or
 - III. If we fail to pay the initial security deposit as stipulated.
Or
 - IV. If the work is not commenced within 3 days after issue of work order.
5. I / We understand that you are not bound to accept the lowest or any tender you receive.

The names of **DIRECTORS** of our Firm are:

1. _____
2. _____
3. _____

4. _____

Yours faithfully,

Signature

Designation

Name of Partner / Director of the Firm, authorized
to sign or name of person having power of attorney
to sign the contract. (Certified true copy of power
of attorney should be attached)

Signature and address of witnesses:

a. Signature

Name

Address

b. Signature.....

Name

Address

AGREEMENT

This agreement made on the _____ day of _____ Two Thousand _____ BETWEEN State Bank of India a corporation constructed under the State Bank of India Act, 1955 and having its Local Head Office at New Delhi and many other places, (hereinafter called "the Employer") of the one part and M/s _____ through its _____ having its registered office at _____ (hereinafter called "the Contractor") of the other part.

WHEREAS the Employer is desirous of executing Certain Works to be carried out **Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH & RACC, US NAGAR , - UTTARAKHAND (RBO-V)** as per Schedule-I, to this agreement and has caused Drawings, Bills of Quantities and Specification describing the work to be done, prepared by **SBIIMS**. (hereinafter called "the Consultant").

AND WHEREAS the said Drawings, the Bills of Quantities marked pages _____ to _____ (inclusive) and the Specifications as stated have been signed by or on behalf of the parties hereto:

AND WHEREAS the Contractor has agreed to execute the work upon the Conditions of Tender and the Conditions of Contract and further subject to the Special Conditions set forth in Schedule-II hereto attached (hereinafter collectively referred to as "the said Conditions") as per the said Drawings and as described in the said Specification and included in the said Bills of Quantities for the sum of Rupees _____

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the sum of Rupees _____ to be paid at the time and in the manner set forth in the said Conditions, the Contractor shall upon and subject to the said Drawings and described in the said Specification and Bills of Quantities.
2. The Employer shall pay to the Contractor the said sum of Rs. _____
or such other sum as shall become payable hereunder at the times and in the manner specified hereinafter.
3. The term "The Consultant" in the said conditions shall mean **SBI Infra Management Solutions Pvt. Ltd., New Delhi** or in the event of their ceasing to be Consultants for the purposes of this Contract, such other persons as shall be nominated for that purpose by the Employer, not being a person to whom the contractor shall object for reasons considered to be sufficient by the Employer mentioned in the said Conditions. Provided always that no persons subsequently appointed to be Consultants under this Contract shall be entitled to disregard or overrule any decision or approval or direction given or expressed by the Consultants for the time being.
4. The said Conditions, Specifications and Priced Bills of Quantities shall be read and construed as forming part of this agreement, and the parties hereto shall respectively abide by and submit themselves to the conditions and stipulations and perform the agreement on their parts respectively in such Conditions, Specifications and Priced Bills of Quantities contained.
5. This agreement is subject to jurisdiction of courts in Delhi only.
6. **The AGM (P&E), SBI, LHO, New Delhi** shall exercise powers on behalf of the said Employer for the purpose of the Contract Agreement.
7. Whereas both the parties agree to sign the following annexure Annexed to this Agreement in token of their acceptance.
 - (i) Agreement
 - (ii) General Conditions of contract.
 - (iii) Special Condition of Contract.
 - (iv) Safety Codes.
 - (v) Specifications.
 - (vi) Material Testing & Their Frequency.
 - (vii) List of Approved Makes/ Brands
 - (viii) Priced Bill of Quantities.
 - (ix) Drawings.

8. The Bank shall pay the contractor such sum as shall become payable hereunder at the times and in the manner specified in the said Conditions mentioned in the General Conditions of Contract.
9. Whereas the Contractor hereby undertakes and agrees to carry out and complete the works within **60 Days** from the date of handing over site or 15 days from the date of issue of letter of acceptances, whichever is later. The Contractor agrees and has deposited the sum of Rs. _____ by way of Initial Security Deposit for due fulfillment of this Contract for the Works. It is agreed that the Security Deposit shall be deducted from each running bills and refunded to the contractor as per clause 2 of the General Conditions of the Contract Annexed herewith.
10. Whereas it is agreed that the earnest money amounting to **Rs.8600/ (Eight thousand six hundred Only)** deposited by the Contractor in the form of Demand Draft along with the tender shall be forfeited in full in case the Contractor does not remit the Initial Security Deposit within the stipulated period of the start of the works by the stipulated date mentioned in the award letter.
11. Whereas Shri _____ is the accredited representative(s) of the Contractor who would be responsible for taking instructions from the Employer in relation to the Works. The Contractor agrees to pay Sales Tax or any other Tax on material or finished works like Works Contract Tax, Turnover Tax etc. including Income Tax in respect of this Contract of the Works and the Employer will not entertain any claim whatsoever in this report nor the Employer shall be responsible to pay any Tax as mentioned above. If due to non – payment of any of the aforesaid Tax or other Taxes connected with the Works, the Contractor suffers any loss or damages occurred to the Contractor and the Employer will be entitled to claim damages from the contractor for non completion of the Work within **12 calendar months** stipulated in Para 9, above.
12. Whereas the Contractor hereby declares the list of all the relative working with the Employer which is annexed herewith.

OR

Whereas the Contractor declares that none of his relative is working with the Employer.

OR

Whereas the Contractor declares that he has associated himself with the agencies of the appropriate classes of person for Sanitary and Water Supply Installation etc. or any other specialized job to complete the works.

The Plans, Drawings, Specifications, Contract Documents and the Documents above mentioned shall form basis of this Contract and the decision of **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D- Block, 11, Parliament Street, New Delhi- 110001** for the time being as mentioned in the Conditions of Contract in reference to all matters of dispute as to material, workmanship or account and as to the intended interpretation of the clauses of the Agreement or any of the document attached hereto shall be final and binding on both parties and may be made rule of the court.

13. The work comprises of the **"Existing PREMISES OF SBI SIDCUL BRANCH "** as mentioned above and all subsidiary and other works connected therewith on the same site as may be ordered to be done from time to time by **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D- Block, 11, Parliament Street, New Delhi- 110001** for the time being even though such works may not have been shown on the , Plans or described in the said Specifications or Schedule of Quantities of various classes of Work to be done.
14. The Employer through the **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D- Block, 11, Parliament Street, New Delhi- 11000** reserves himself the right of altering the Plans, Drawings and nature of Work of adding to or omitting any items of work or having portions of the same carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this Contract.
15. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen in Delhi and only the courts of Delhi shall have jurisdiction to determine the same.
16. The several parts of this Contract have been read to us and fully understood by us.
In Witness whereof the parties above named have executed these presents today and year first hereinabove written.

Signed, Sealed and Delivered by:

Authorized Representative of Employer

11

Authorized Representative of Contractor

Contractor's Signature & Stamp

SCHEDULE I

**Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH US NAGAR , -
UTTARAKHAND (RBO-V)**

all as described in Tender and Drawings inclusive hereto as Specifications.

SCHEDULE II

The following Letters/ Correspondence form a part of Agreement:

- 1.
- 2.
- 3.

As witness our hands the day and year first written above,

In presence of

Signature:

Name:

Occupation:

Address:

Signature by the said Employer

Name:

Designation:

Address:

In presence of

Signature:

Name:

Occupation:

Address:

Signature by the said Contractor

Name:

Designation:

Address:

GENERAL CONDITIONS OF CONTRACT

1.0 Definitions:

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

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

1.1.1 'SBI' shall mean State Bank of India (client) having its Corporate Centre at State Bank Bhavan, Madame Cama Road, Mumbai-400 021 and includes the client's representatives, successors and assigns.

'Consultants/Consultants' shall mean *SBIIMS*. 'Site Engineer' shall mean an Engineer appointed by the Bank as their representative to give instructions to the contractors.

1.1.2 'The Contractor' shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include legal personal representative of such individual or the composing the firm or company and the permitted assignees of such individual or firms of company. The expression 'works' or 'work' shall mean the permanent or temporary work described in the "Scope of work" and / or to be executed in accordance with the contract and includes materials, apparatus, equipment, temporary supports, fittings and things of all kinds to be provided, the obligations of the contractor hereunder and work to be done by the contractor under the contract.

1.1.3 'Engineer' shall mean the representative of the Consultant/Consultant.

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

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

1.1.6 "Week" means seven consecutive days.

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

2.0 Total Security Deposit

Total Security Deposit comprise of
Earnest Money Deposit
Initial Security Deposit
Retention Money

a) Earnest Money Deposit:

The tenderer shall furnish EMD of **Rs.8600/ (Eight thousand six hundred Only)** in the form of Demand Draft drawn in favour of State Bank of India payable at New Delhi on any Scheduled Bank. No tender shall be considered unless the EMD is so deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time the period when he is required to keep his tender open acceptance by the SBI or after it is accepted by the SBI the contractor fails to enter into a formal agreement or fails to pay the initial security deposit as stipulated or fails to commence the work within the stipulated time.

b) Initial Security Deposit (ISD)

The amount of ISD shall be 2% of accepted value of tender including the EMD in the form of D/D drawn on any scheduled Bank and shall be deposited within 7 days from the date of acceptance of tender.

c) Retention Money:

Besides the ISD as deposited by the contractor in the above said manner the retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the

contractor and claimed in each bill provided the total security deposit i.e. the ISD plus Retention Money shall both together not exceed 5% of the contract value. 50% of the total security deposit shall be refunded to the contractor without any interest on issue of Virtual Completion certificate by the Consultant / consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

d) Language

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

3.0 Errors, Omissions and Discrepancies

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

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

4.0 Scope of Work:

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

5.0 i) Letter of Acceptance:

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

ii) Contract Agreement:

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

6.0 Ownership of Drawings:

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

7.0 Detailed Drawings and Instructions:

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

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

8.0 Copies of Agreement

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

9.0 Liquidated Damages:

If the contractor fails to maintain the required progress in terms of clause 30 of GCC or to complete

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

10.0 Materials, Appliances and Employees

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

11.0 Permits, Laws and Regulations:

Permits and licenses required for the execution of the work shall be obtained by the contractor at his own expenses. The contractor shall give notices and comply with regulations, laws, and ordinances rules, applicable to the contract. If the contractor observes any discrepancy between the drawings and specifications, he shall promptly notify the SBI/ SBIIMS in writing under intimation of the Consultant / 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.

12.0 Setting out Work:

The contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof and get it approved by the Consultant/ 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 Consultant / consultant the contractor shall be responsible for the same and shall at his own expenses rectify such error, if so, required to satisfaction of the SBI/ SBIIMS.

13.0 Protection of Works and Property:

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

He shall take adequate care and steps for protection of the adjacent properties. The contractor shall take all precautions for safety and protections of his employees on the works and shall comply with all applicable provisions of Govt. and local bodies safety laws and building codes to prevent accidents, or injuries to persons or property on, about or adjacent to his place of work. The contractor shall take insurance covers as per clause 26.0 at his own cost. The policy may take in joint names of the contractor and the SBI and the original policy may be lodged with the SBI.

14.0 Inspection of Work:

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

15.0 Assignment and Subletting

The whole of work included in the contract shall be executed the contractor and he shall not directly entrust and engage or indirectly transfer, assign or underlet the contract or any part or share thereof or interest therein without the written consent of the SBI/ SBIIMS 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.

16.0 Quality of Materials, Workmanship & Test₁₅

All materials and workmanship shall be best of the respective kinds described in the contract and in

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

ii) **Samples**

All samples of adequate numbers, size, shades and pattern as per specifications shall be supplied by the contractor with out any extra charges. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site detailed literature / test certificate of the same shall be provided to the satisfaction of the Consultant / Consultant. Before submitting the sample / literature the contractor shall satisfy himself that the material / equipment for which he is submitting the sample / literature meet with the requirement of tender specification. Only when the samples are approved in writing by the Consultant / consultant the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall be signed by the Consultant / Consultant for identification and shall be kept on record at site office until the completion of the work for inspection / comparison at any time. The Consultant / Consultant shall take reasonable time to approve the sample. Any delay that might occur in approving the samples for reasons of its not meeting the specifications or other discrepancies inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment etc. shall be to the account of the contractor.

iii) **Cost of Tests**

The cost / expenditure required for the tests shall be borne by the contractor if such test is intended by or provided for in the specification or BOQ.

iv) **Costs of Tests not provided for**

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

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

17.0 Obtaining Information Related to Execution of Work

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

18.0 Contractor's Superintendence

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

19.0 Quantities

- i) The Bill of Quantities (BOQ) unless or otherwise stated shall be deemed to have been prepared in accordance with the Indian Standard Method of Measurements and quantities. The rate quoted shall remain valid for variation of quantity against individual item to any extent subject to maximum variation of the contract value by 25%. The entire amount paid under Clause 20, 21 hereof as well as amounts of prime cost and provisional sums, if any, shall be excluded.

Variation exceeding 25%: The items of work executed in relation to variation exceeding 25% shall be paid on the basis of provisions of clause 22 (e) hereof.

20.0 Works to be measured

The Consultant / Consultant may from time to time intimate to the contractor that he required the work to be measured and the contractor shall forthwith attend or send a qualified representative to assist the Consultant in taking such measurements and calculations and to furnish all particulars or to give all assistance required by any of them. Such measurements shall be taken in accordance with the Mode of measurements detailed in the specifications. The representative of the Consultant / Consultant shall take joint measurements with the contractor's representative and the measurements shall be entered in the measurement book. The contractor or his authorised representative shall sign all the pages of the measurement book in which the measurements have been recorded in token of

his acceptance. All the corrections shall be duly attested by both representatives. No over writings shall be made in the M book should the contractor not attend or neglect or omit to depute his representative to take measurements then the measurements recorded by the representative of the Consultant / consultant shall be final. All authorised extra work, omissions and all variations made shall be included in such measurement.

21.0 Variations

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

22.0 Valuation of Variations

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

- a)
 - i) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein.
 - ii) Rates for all items, wherever possible should be derived out of the rates given in the priced BOQ.
- b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of works are carried out, otherwise the prices for the same shall be valued under sub-clause (c) hereunder.
- c) Where the extra works are not of similar character and /or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the receipt of the letter of acceptance inform the Consultant / consultant of the rate which he intends to charge for such items of work, duly supported by analysis of the rate or rates claimed and the Consultant / Consultant shall fix such rate or prices as in the circumstances in his opinion reasonable and proper, based on the market, rate.
- d) Where extra work cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender of the BOQ or, if not, so stated then in accordance with the local day work rates and wages for the district; provided that in either case, vouchers specifying the daily time (and if required by the Consultant / Consultant) the workman's name and materials employed be delivered for verifications to the Consultant / consultant at or before the end of the week following that in which the work has been executed.
- e) It is further clarified that for all such authorised extra items where rates cannot be derived from the tender, the Contractor shall submit rates duly supported by rate analysis worked on the market rate basis" for material, labour, hire / running charges of equipment and wastage etc. plus 15% towards establishment charges, contractor's overheads and profit. Such items shall not be eligible for escalation.

23.0 Final Measurement

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

24.0 Virtual Completion Certificate (VCC)

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

- a) Clear the site of all scaffolding, wiring, pipes, surplus materials, contractor's labour, equipment and machinery.
- b) Demolish, dismantle and remove the contractor's site office, temporary works, Contractor's Signage, Dump labour sheds/camps and constructions and other items and things whatsoever brought upon or

erected at the site or any land allotted to the contractor by the SBI and not incorporated in the permanent works.

- c) Remove all rubbish, debris etc. from the site and the land allotted to the contractor by the SBI and shall clear, level and dress, compact the site as required by the SBI.
- d) Shall put the SBI in undisputed custody and possession of the site and all land allotted by the SBI.
- e) Shall hand over the work in a peaceful manner to the SBI.
- f) All defects / imperfections have been attended and rectified as pointed out by the SBI/ SBIIMS to the full satisfaction of SBI/ SBIIMS.

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

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

25.0 Work by other Agencies

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

26.0 Insurance of Works

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

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

26.2 Damage to Persons and Property

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

- a) The permanent use or occupation of land by or any part thereof.
- b) The right of SBI/ SBIIMS to execute the works or any part thereof on, over, under, in or through any lands.
- c) Injuries or damages to persons or properties which are unavoidable result of the execution or maintenance of the works in accordance with the contract.
- d) Injuries or damage to persons or property resulting from any act or neglect of the SBI or its employees or other contractors not being employed by the contractor or for or in respect of any

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

26.3 Contractor to Indemnify SBI

The contractor shall indemnify the SBI/ SBIIMS against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the matters referred to in the provision sub-clause 26.2 of this clause.

26.4 Contractor's Superintendence

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

26.5 Third Party Insurance

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

26.5.2 Minimum amount of Third Party Insurance

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

26.5.3 The minimum insurance cover for physical property, injury, and death is Rs. 5 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.

26.6 Accident or Injury to Workman

The SBI/ SBIIMS shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workmen or other person in the employment of the contractor or any sub-contractor, save and except an accident or injury resulting from any act or default of the SBI/ SBIIMS or their agents, or employees. The contractor shall indemnify and keep indemnified SBI/ SBIIMS 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.

26.6.1 Insurance against Accidents etc. to Workmen

The contractor shall insure against such liability with an insurer approved by the SBI/ SBIIMS during the whole of the time that any persons are employed by him on the works and shall, when required, produce to the Consultant / 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 be insured against the liability in respect of such persons in such manner that SBI/ SBIIMS in indemnified under the policy but the contractor shall require such sub-contractor to produce to the Consultant / Consultant when such policy of insurance and the receipt for the payment of the current premium.

26.6.2 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/ SBIIMS 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 of such premium or premiums aforesaid 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 others rights of the SBI/ SBIIMS against contractors. In respect of such default, the employer shall be entitled to deduct from any sums payable to the contractor the amount of any damages costs, charges, and other expenses paid by the SBI/ SBIIMS 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.

27.0 Commencement of Works:

The date of commencement of the work will be reckoned as the date of handing over site or three days from the date of issue of letter of acceptance of the tender by the SBI which ever is later.

28.0 Time for Completion

Time is essence of the contract and shall be strictly observed by the contractor. The entire work shall be completed within a period of **60 Days** from the date of commencement. If required in the contract or as directed by the Consultant / Consultant. The contractor shall complete certain portions of work before completion of the entire work. However the completion date shall be reckoned as the date by which the whole work is completed as per the terms of the contract.

29.0 Extension of Time

If, in the opinion of the Consultant/consultant, the work be delayed for reasons beyond the control of the contractor, the Consultant/consultant may submit a recommendation to the SBI/ SBIIMS to grant a fair and reasonable extension of time for completion of work as per the terms of contract. If the contractor needs an extension of time for the completion of work or if the completion of work is likely to be delayed for any reasons beyond the due date of completion as stipulated in the contract, the contractor shall apply to the SBI/ SBIIMS through the Consultant / Consultant in writing in detail and his justification if any, for the delays. The Consultant/Consultant shall submit their recommendations to the SBI in the prescribed format for granting extension of time. While granting extension of time the contractor shall be informed the period-extended time which will qualify for levy of liquidated damages. For he balance period in excess of original stipulated period and duly sanctioned extension of time by the SBI/ SBIIMS the provision of liquidated damages as stated under clause10.0 of Instructions to the Tenderers shall become applicable. Further the contract shall remain in force even for the period beyond the due date of completion irrespective whether the extension is granted or not.

30.0 Rate of Progress

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

31.0 Work during Nights and Holidays

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

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

32.0 No Compensation or Restriction of Work.

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

the contractor shall act accordingly. In the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work fully but which he did not derive in consequence of the foreclosure of the whole or part of the work.

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

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

33.0 Suspension of Work

- i) The contractor shall, on receipt of the order in writing of the Consultant / consultant (whose decision shall be final and binding on the contractor) suspend the progress of works or any part thereof for such time and in such manner as Consultant / consultant may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of following reasons.
 - a) One account any default on the part of the contractor, or
 - b) for proper execution of the works or part thereof for reasons other than the default of the contractor, or for safety of the works or part thereof.
 - c) The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Consultant / consultant.
- ii) If the suspension is ordered for reasons (b) and (c) sub-para (i) above: the contractor shall be entitled to an extension of time equal to the period of every such suspension. No compensation whatsoever shall be paid on this account.

34.0 Action when the whole Security Deposit is forfeited

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

- a) To rescind the contract (of which rescission notice in writing to the contractor by the Consultant / consultant shall be conclusive evidence) and in which case the security deposit of the contractor shall be forfeited and be absolutely at the disposal of SBI/ SBIIMS.
- b) To employ labour paid by the SBI and to supply materials to carry out the work, or any part of the work, debiting the contractor with the cost of the labour and materials (the cost of such labour and materials as worked out by the Consultant / Consultant shall be final and conclusive against the contractor) and crediting him with the value of the work done, in all respects in the same manner and at the same manner and at the same rates as if it had been carried out by the contractor under the terms of this contract the certificate of Consultant / Consultant as to the value of work done shall be final and conclusive against the contractor.
- c) To measure up the work of the contractor, and to take such part thereof as shall be unexecuted, out of his hands, to give it to another contractor to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess the certificates in writing of the Consultants / Consultant shall be final and conclusive) shall be borne by original contractor and may be deducted from any money due to him by SBI/SBIIMS under the contract or otherwise, or from his security deposit or the proceeds of sale thereof, or sufficient part thereof. In the event of any of above courses being adopted by the SBI/ SBIIMS the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any material or entered into any engagements or make any advances on account of, or with a view to the execution of the work or the

performance of the contract and in case the contract shall be rescind under the provision aforesaid, the contractor shall not be entitled to recover or to be paid any sum or any work done or actually performed under this contract, unless, and until the Consultant / consultant will have certified in

writing the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified.

35.0 Owner's Right to Terminate the Contract

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

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

Or shall assign or sublet this contract without the consent in writing of the SBI/ SBIIMS through the Consultant / consultant or shall charge or encumber this contract or any payment due to which may become due to the contractor thereunder:

- a) Has abandoned the contract; or
- b) Has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for days after receiving from the SBI through the Consultant / Consultant written notice to proceed, or
- c) Has failed to proceed with the works with such diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or has failed to remove the materials from the site or to pull down and replace work within seven days after written notice from the SBI/ SBIIMS through the Consultant/ Consultant that the said materials were condemned and rejected by the Consultant/ Consultant under these conditions; or has neglected or failed persistently to observe and perform all or any the acts, matters or things by this contract to be observed and performed by the contractor for seven days after written notice shall have been given to the contractor to observe or perform the same or has to the detriment of good workmanship or defiance of the SBI's or Consultant's/ Consultant's instructions to the contrary subject any part of the contract. Then and in any of said cases the SBI/ SBIIMS and or the Consultant / Consultant, may notwithstanding any previous waiver, after giving seven days notice in writing to the contractor, determine the contract, but without thereby affecting the powers of the SBI or the Consultant / Consultant or the obligation and liabilities of the contractor the whole of which shall continue in force as fully as if the contract had not been so determined and as if the works subsequently had been executed by or on behalf of the contractor. And further the SBI/ SBIIMS through the Consultant / consultant their agents or employees may enter upon and take possession of the work and all plants, tools, scaffoldings, materials, sheds, machineries lying upon the premises or on the adjoining lands or roads use the same by means of their own employees or workmen in carrying on and completing the work or by engaging any other contractors or persons to complete the work and the contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other contractor or other persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter as convenient the SBI or the Consultant / consultant shall give a notice in writing to the contractor to remove his surplus materials and plants and should the contractor fail to do so within 14 days after receipt thereof by him the SBI/ SBIIMS sell the same by public auction after due publication, and shall adjust the amount realised by such auction. The contractor shall have no right to question any of the act of the SBI/ SBIIMS incidental to the sale of the materials etc.

36.0 Certificate of Payment

The contractor shall be entitled under the certificates to be issued by the Consultant / Consultant to the contractor within 14 working days from the date of certificate to the payment from SBI/ SBIIMS from time to time. The SBI/ SBIIMS shall recover the statutory recoveries towards Income tax, Work contract tax as per the prevailing bye laws and other dues including the retention amount from the certificate of payment.

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

The Consultant/ Consultant shall have power to withhold the certificate if the work or any part thereof is not carried out to their satisfaction. 22

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

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certificate.

The SBI/ SBIIMS shall modify the certificate of payment as issued by the Consultant/ Consultant from time to time while making the payment.

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

The contractor shall not submit interim bills when the approximate value of work done by him is less than Rs.7 lacs and the minimum interval between two such bills shall be 30 days.

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

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

37.0 Settlement of Disputes and Arbitration

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

- ii) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Consultant or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to the **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D-Block, 11, Parliament Street, New Delhi- 110001** and endorse a copy of the same to the Consultant, within 30 days from the date of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the Bank be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D-Block, 11, Parliament Street, New Delhi- 110001** in the manner and within the time as aforesaid. The contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D-Block, 11, Parliament Street, New Delhi- 110001** in writing in the manner and within the time aforesaid.
- iii) **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D-Block, 11, Parliament Street, New Delhi- 110001** shall give his decision in writing on the claims notified by the contractor. The contractor may within 30 days of the receipt of the decision of the **Vice President (Civil), SBI Infra Management Solutions Pvt. Ltd., 5th Floor, D-Block, 11, Parliament Street, New Delhi- 110001** submit his claims to the conciliating authority namely the **Circle Development Officer, SBI, New Delhi** for conciliation along with all details and copies of correspondence exchanged between him and the Regional Manager.
- iv) If the conciliation proceedings are terminated without settlement of the disputes, the contractor shall, within a period of 30 days of termination thereof shall give a notice to the concerned **Chief General Manager of the Bank** for appointment of an arbitrator to adjudicate the notified claims failing which the claims of the contractor shall be deemed to have been considered absolutely barred and waived.
- v) Except where the decision has become final, binding and conclusive in terms of the contract, all disputes or differences arising out of the notified claims of the differences arising out of the notified claims of the contractor as aforesaid and all claims of the Bank shall be referred for adjudication through arbitration by the Sole Arbitrator appointed by the **Chief General Manager of the Bank**, It will also be the objection to any such appointment that the Arbitrator so appointed is a Bank Officer and that he had to deal with the matters to which the Contract relates in the course of his duties as Bank Officer. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever another arbitrator shall be appointed in the manner aforesaid by the **Chief General Manager of the Bank**, Such person shall

be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each dispute alongwith the notice for appointment of arbitrator. It is also a term of this contract that no person other than a person appointed by **Chief General Manager of the Bank**, as aforesaid should act as arbitrator.

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

It is also a term of the contract that if any fees are payable to the arbitrator these shall be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a Bank Officer. It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof, shall be paid and fix or settle the amount of costs to be so paid.

38.0 Water Supply

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

That the water used by the contractor shall be fit for construction purposes to the satisfaction of the Consultant / Consultant.

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

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

39.0 Power Supply

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

If the contractor after approval from bank is using Bank electricity & water supply, a sum of 1% of the final bill will be deducted from the contractor towards consumption charges.

40.0 Treasure Trove etc.

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

41.0 Method of Measurement

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

42.0 Maintenance of Registers

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

- i) Register for Cement / Paint / Lead / Specific Materials

- ii) Register for Steel
- iii) Register for Secured Advance
- iv) Register for Bulkage of Sand
- v) Register for Silt Test
- vi) Register for Sieve Analysis for Fine Aggregate
- vii) Register for Sieve Analysis for Course Aggregate
- viii) Register for Slump Test.
- ix) Register for Concrete Cube Test.
- x) Register for Hindrance to Work.
- xi) Register for Consumption of Cement
- xii) Register for Running Account Bill
- xiii) Register for Labour

43.0 Force Majeure

- 43.1 Neither contractor nor SBI/ SBIIMS shall be considered in default in performance of their obligations if such performance is prevented or delayed by event such as but not to war, hostilities revolution, riots, civil commotion, strikes, lockout, conflagrations, epidemics, accidents, fire, storms, floods, droughts, earthquakes or ordinances or any act of god or for any other cause beyond the reasonable control of the party affected or prevented or delayed. However a notice is required to be given within 30 days from the happening of the even with complete details, to the other party to the contract, if it is not possible to serve a notice, within the shortest possible period without delay.
- 43.2 As soon as the cause of force majeure has been removed the party whose ability to perform its obligations has been affected, shall notify the other such cessation and the actual delay incurred in such affected activity adducing necessary evidence in support thereof.
- 43.3 From the date of occurrence of a case of force majeure obligations of the party affected shall be suspended during the continuance of any inability so caused. With the cause itself and inability resulting there from having been removed, the agreed time of completion of the respective obligations under this agreement shall stand extended by a period equal to the period of delay occasioned by such events.
- 43.4 Should one or both parties be prevented from fulfilling the contractual obligations by a state of force majeure lasting to a period of 6 months or more the two parties shall each other to decide regarding the future execution of this Agreement.

44.0 Local Laws, Acts, Regulations:

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

- i) Minimum wages Act 1948 (Amended)
- ii) Payment of wages Act 1936 (Amended)
- iii) Workmen's compensation Act 1923 (Amended)
- iv) Contract labour regulation and abolition act 1970 and central rules 1971 (Amended)
- v) Apprentice act 1961 (Amended)
- vi) Industrial employed (standing order) Act 1946 (Amended)
- vii) Personal injuries (Compensation insurance) act 1963 and any other modifications
- viii) Employees' provided fund and miscellaneous provisions Act 1952 and amendment thereof.
- ix) Shop and establishment act
- x) Any other act or enactment relating thereto and rules framed there under from time to time.

45.0 Accidents

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

Signature of Contractor & Seal

SPECIAL CONDITIONS OF CONTRACT

1.0 Scope of Work

The scope of work is to carry out **Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH US NAGAR, - UTTARAKHAND (RBO-V)**

2.0 Address of Site

The site is located at **Air Conditioning Works of NEW PREMISES OF SBI ADB BAJPUR BRANCH US NAGAR, - UTTARAKHAND (RBO-V)**

3.0 Dimension and Levels

All dimensions and levels shown on the drawing shall be verified by the contractor on the site and he will be held responsible for the accuracy and maintenance of the entire dimension and the levels. Figured dimensions are in all cases to be accepted and no dimension shall be scaled. Large-scale details shall take precedence over small – scale drawing. In case of discrepancy the contractor shall ask for clarification from the Consultant / Consultant before proceeding with the work.

4.0 Notice of Operation

The contractor shall not carry out any important operation without the consent in writing from the Consultant / Consultant.

5.0 Construction Records

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

6.0 Safety of adjacent Structures and Trees

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

7.0 Temporary Works

Before any temporary works are commenced, the contractor shall submit at least 7 days in advance to the Consultant / consultant for approval complete drawings of all temporary works he may require for the execution of the works. The contractor shall carry out the modifications relating to strength, if required by the Consultant/ Consultant may require in accordance with the conditions of contract at his own cost. The contractor shall be solely responsible for the stability and safety of all temporary works an unfinished works and for the quality of the permanent works resulting from the arrangement eventually adopted for their execution.

8.0 Temporary Roads

The contractor shall provide access roads to the site from the nearest main road at no extra cost and as directed by the Consultant/ Consultant. The contractor shall also responsible for proper maintenance of this access road and would take all care to see that existing services, if any, are maintained in working order at his own cost. The laying and maintaining the temporary roads within the site area shall be the contractor's responsibility and the contractor shall take such measures that are necessary and as directed by the Consultant/ Consultant.

9.0 Water, Power and Other Facilities

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

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

The contractors for other trades directly appointed by the SBI/ SBIIMS shall be entitled to take power and water connections from the temporary water and power supply obtained by the contractor. However, the concerned contractor shall make their own arrangements to draw the supply and pay directly the actual consumption charges at mutually agreed rates between them. All municipal charges

for drainage and water connection for construction purposes shall be borne by the contractor and charges payable for permanent connections, if any, shall be initially paid by the contractor and the SBI will reimburse the amount on production of receipts.

b) The SBI/ SBIIMS as well as the Consultant / Consultant shall give all possible assistance to the contractors to obtain the requisite.

c) Permission from the various authorities, but the responsibility for obtaining the same in time shall be of the contractor.

10.0 Office Accommodation

a) The contractor shall provide and maintain all necessary offices, workshops, stores, shelters, sanitary facilities, canteens and other temporary structures for themselves in connection with the work at the site own cost after getting the approval from the Consultant / consultant.

b) All temporary buildings and facilities as mentioned above shall be removed on completion of the work or at any other earlier date as directed by the Consultant / consultant.

All the expenses for obtaining statutory approvals and maintenance of the above facilities as well as running expense shall be borne by the contractor at no extra cost. It is also the responsibility of the contractor to obtain statutory approvals for providing the above facilities.

11.0 Facilities for Contractors' Employees

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

12.0 Lighting of Works

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

13.0 Fire Fighting Arrangements

i) The contractor shall at all times provide suitable arrangements for the fighting at his own cost. For this purpose he shall provide requisite number of fire extinguishers and adequate number of buckets, some of which are of be always kept filled with sand and some with water. These equipments shall be provided at suitable prominent and easily accessible places and shall be properly maintained.

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

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

14.0 Site Order Book.

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

15.0 Site Meetings

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

16.0 Disposal of Refuse

The contractor shall cart away all debris, refuse etc. arising from the work from the site and deposit the same as directed by the Consultant/ Consultant at his own cost. It is the responsibility of the

contractor to obtain from the local authorities concerned to the effect that all rubbish arising out of contractor's activities at the construction site or any other off-site activities borrow pits has been properly disposed off.

17.0 Contractor to Verify Site Measurement

The contractor shall check and verify all site measurements whenever requested by other specialists contractors of other sub contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness as will not in any way delay the works.

18.0 Displaying the Name of the Work

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

19.0 Bar Bending Schedule

The contractor shall prepare a detailed bar bending schedule for all reinforced concrete works and get them approved by the Consultant/ Consultant well in advance.

20.0 As Built Drawings

- i) For the drawing issued to the contractor by the Consultant/Consultant. The Consultant / Consultant will issue two sets of drawings to the contractor for the item for which some changes have been made. From the approved drawings as instructed by the SBI / SBIIMS/ Consultant / Consultant. The Contractor will make the changes made on these copies and return these copies to the Consultant/ Consultant for their approval. In case any revision is required or the corrections are not properly marked the Consultant/ Consultant will point out the discrepancies to the contractor. The contractor will have to incorporate these corrections and /or attend to discrepancies either on the copies as directed by the Consultant/ Consultant and resubmit to him for approval. The Consultant / Consultant will return one copy duly approved by him.
- ii) For the drawings prepared by the Contractor, the Contractor will modify the drawing prepared by him wherever the changes are made by the SBI/ SBIIMS Consultant/ Consultant. And submit two copies of such modified drawings to the Consultant/ Consultant for approval. The Consultant/ Consultant will return one copy of the approved drawing to the Contractor.

21.0 Approved Make

The Contractor shall provide all materials from the list of approved makes at his own cost. The Consultant/ Consultant may approve any make / agency within the approved list as given in the tender after inspection of the sample / mock up.

22.0 Procurement of Materials

The Contractor shall make his own arrangements to procure all the required materials for the work. All wastage's and losses in weight shall be to the contractors account.

23.0 Excise Duty, Taxes, Levies etc.

The contractors shall pay and be responsible for payment of all taxes except GST, duties, levies, royalties, fees cess, or charges in respect of the works including but not limited to sales tax, tax on works contract excise duty, and octroi, payable in respect of materials, equipments plant and other things required for the contract. All of the aforesaid taxes except GST, duties, levies, fees and charges shall be to the contractors account and the SBI shall not be required to pay any additional or extra amount on this account. Variation of taxes, duty fees, levies etc if any, till completion of work shall be deemed to be included in the quoted in the quoted rates and no extra amount on this account. Variation of taxes, duties, fees, levies, etc if any till completion of work shall be deemed to be included in the quoted rates and no extra claim on this account will in any case be entertained. If a new tax or duty or levy or cess or royalty or octroi is imposed under as statute or law during the currency of contract the same shall be borne by the contractor.

24.0 Acceptance of Tender

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

SPECIFICATIONS FOR SERVICES

1.0 General

- 1.1 The drawings for services are diagrammatic but shall be followed as closely as actual construction permits. Any deviations from the drawings shall be in conformity with Consultant and structural drawings. The dimensions designated by the manufacturers shall take precedence over the drawings.
- 1.2 At completion of work the Contractor shall submit one set of tracings and two sets of prints of "As-Built-Drawings". These drawings shall, among others, include invert levels, pipe runs, diameters, location of valves, access panels, layout of equipment, piping connections and such other information for maintenance & future extensions. Guarantees given by manufacturers shall be assigned to the Employer along with names & addresses of manufacturers, suppliers and information about spare parts.
- 1.3 All site test shall be carried out with prior intimation to the Bank Engineer / Consultant. All defects shall be rectified and tests conducted again to the satisfaction of the Bank Engineer / Consultant. In addition to the test required by the specifications, the Contractor shall also conduct tests required by the Consultant and by the Municipal or other Authorities.
- 1.4 All work shall be executed by competent and licensed persons. The contractor shall maintain liaison with Municipal and other controlling Authorities. He shall obtain their approvals and certificates as required by the bye – laws at appropriate stages.
- 1.5 No cutting / chasing shall be done in load bearing structural members without prior approval of the Asstt. Engineer. Sleeves and openings shall be provided during the progress of construction in preference to cutting at later date.
- 1.6 The Consultant may require typical mock up(s) to be installed in advance for approval. Undamaged materials from the mock up shall be allowed to be reused in the work.
- 1.7 Unless otherwise described in the item CI / SCI pipes and fittings shall be a spigot and socket type.
- 1.8 G.I. pipe spouts shall be paid as per item of G.I. pipes (internal work). Cutting and making good is included. The free ends may be skew-cut.
- 1.9 Wherever use of G.I. pipes is called for the same shall be medium class (class – B)

2.0 Materials :

- 2.1 The materials shall conform to the specifications and in absence thereof to Indian Standards. The products should bear the ISI Mark.
- 2.2 The makes of materials for use in this work are broadly approved as per list given below. The Contractor shall, however, get particular makes and samples approved before ordering:
- 2.3 Notwithstanding any interim or final approval the Contractor remains responsible for satisfactory performance of all fittings & fixtures. The liability of the Contractor is not limited by any approval of the make of materials.
- 2.4 The item rate of mirror includes extra packing piece of AC plain sheet, where required due to off set between plaster & glazed tiles surface.

3.0 Testing

- 3.1 The sand cast iron soil, waste and vent pipes and fittings including joints shall be tested by pumping smoke into the pipe at the lowest end.
- 3.2 All G.I pipes and fittings including joints shall be tested to hydraulic pressure of 6 kg / cm² (60 meters) avoiding water hammer. The test pump having been stopped the test pressure should maintain without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds keeping the joints exposed for inspection during the testing.
- 3.3 All stone ware pipes shall be tested with water pressure of 1.5m head of water at the highest point of the section under test.

"TECHNICAL SPECIFICATIONS"

1. AIR DISTRIBUTION

1.1 Scope

The scope of this section comprises of supply, fabrication, installation and testing of all sheet metal ducts and supply, installation, testing and balancing of grilles, registers and diffusers in accordance with these specifications.

1.2 GOVERNING STANDARDS

Unless otherwise specified here, the construction, erection, testing and performance of the ducting system shall conform to the SMACNA-1995 standards ("HVAC Duct Construction Standards – Metal and Flexible – Second Edition–1995"-SMACNA)

1.3 RAW MATERIAL

1.3.1 Ducting

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

1.3.2 Galvanising shall be of 120gms/sq.m. (Total coating on both sides)

1.3.3 In addition, if deemed necessary, samples of raw material, selected at random by owner's site representative shall be subject to approval and tested for thickness and zinc coating at contractor's expense.

1.3.4 The G.I. raw material should be used in coil-form (instead of sheets) so as to limit the longitudinal joints at the edges only irrespective of cross-section dimensions.

1.3.5 Duct Connectors and Accessories

All transverse duct connectors (flanges/cleats) and accessories/related hardware are such as support systems shall be zinc-coated (galvanized).

1.4 FABRICATION STANDARDS

All ductwork including straight sections, tapers, elbows, branches, show pieces, collars, terminal boxes and other transformation pieces must be factory- fabricated as specified . This will require fabrication by utilizing the following machines and processes to provide the requisite quality of ducts and speed of supply:

- 1.4.1 Coil lines to ensure location of longitudinal seams at corners/folded edges only to obtain the required duct rigidity and low leakage characteristics. No longitudinal seams permitted along any face side of the duct.
- 1.4.2 All ducts, transformation pieces and fittings to be made on CNC profile cutters for

required accuracy of dimensions, location and dimensions of notches at the folding lines.
- 1.4.3 All edges to be machine treated using lockformers, flangers and roller for turning up edges.
- 1.4.4 Sealant dispensing equipment for applying built-in sealant in Pittsburgh lock where sealing of longitudinal joints are specified.

1.5 SELECTION OF G.I. GAUGE AND TRANSVERSE CONNECTORS

- 1.5.1 Duct Construction shall be the in compliance with 1" (250 Pa) w.g. static norms as per SMACNA.
- 1.5.2 All transverse connectors shall be the 4 bolt slip – on flanges system (supplied by factory) or equivalent imported makes of similar 4-bolt systems with built-in sealant.
- 1.5.3 The specific class of transverse connector and duct gauge for a given duct dimensions will be as per Table 1 below for the 1" (250 Pa) pressure class.
- 1.5.4 Non-toxic, AC-applications grade P.E. or PVC Gasketing is required between all mating flanged joints. Gasket sizes should conform to flange Manufacturer's specification.

Recommended SMACNA Standard at 4 Feet Transverse Joint Reinforcement

Duct static pressure in Inches	1"	2"	3"	4"	6"
Duct Size (mm)					
150-250	B-26	B-26	B-26	B-26	C-26
251-300	B-26	B-26	B-26	C-26	C-24
301-350	B-26	C-26	C-26	C-26	C-24
351-400	B-26	C-26	C-26	D-26	D-24
401-450	C-26	C-26	C-26	D-26	E-24
451-500	C-26	C-26	D-24	D-24	E-24
501-550	C-26	C-26	D-24	E-24	F-22
551-600	C-26	D-26	E-24	E-24	F-22
601-650	C-26	D-26	E-24	E-24	F-22
651-700	C-26	D-26	E-24	F-22	G-22R
701-750	C-26	E-24	E-24	F-22	G-20
751-900	D-26	E-24	F-22	G-22R	H-20 R
901-1000	E-24	F-22	G-22 R	H-20 R	I-18 R
1001-1200	E-24	G-22	H-20 R	I-18 R	I-18 R
1201-1300	F-22	H-20 R	I-18 R	I-18 R	J-18 R
1301-1500	F-22	H-20 R	I-18 R	I-18 R	-
1501-1800	H-22R	I-18 R	J-18 R	-	-
1801-2100	I-20 R	J-18 R	-	-	-
2101-2400	I-18 R	J-18 R	-	-	-
2401-2700	I-18 R	-	-	-	-

Note:

- ☐ SMACNA – Sheet Metal & Air Conditioning Contractor National Association Inc. " HVAC Duct construction standard Metal & Flexible" – 2005 USA.
- ☐ In 1" static pressure i.e. comfort cooling application optional " C&S and C&SS cleats joints can be used
Upto 450mm duct size use C&S Cleats
451 mm to 750mm duct size use " C&SS cleats.
Over 750mm duct size use TDC Flanges with respective gauges as mentioned above.
- ☐ Alphabets B, C, D, E, F, G, H, I and J per SMACNA 2005, transverse joint reinforcement table 1-12m (T-25b flanged).
- ☐ R means reinforcement with Zeebar Stiffener.

1.6 DUCT CONSTRUCTION

- 1.6.1 The fabricated duct dimensions should be as per approved drawings and all connecting sections are dimensionally matched to avoid any gaps.
- 1.6.2 Dimensional Tolerances: All fabricated dimensions will be within +/- 1.0mm of specified dimension. To obtain required perpendicularity, permissible diagonal tolerances shall be +/- 1.0 mm per metre.

- 1.6.3 Each and every duct pieces should be identified by color coded sticker which shows specific part numbers, job name, drawing number, duct sizes and gauge
- 1.6.4 Ducts shall be straight and smooth on the inside. Longitudinal seams shall be airtight and at corners only, which shall be either Pittsburgh or Snap Button Punch as per SMACNA practice, to ensure air tightness
- 1.6.5 Changes in dimensions and shape of ducts shall be gradual (between 1:4 and 1:7).
Turning vanes or air splitters shall be installed in all bends and duct collars designed to permit the air to make the turn without appreciable turbulence
- 1.6.6 Plenums shall be shop/factory fabricated panel type and assembled at site.
- 1.6.7 The deflection of transverse joints should be within specified limit for rectangular duct deflection as given in SMACNA. Page no. 7.6
- 1.6.8 Reinforcement of ducts shall be achieved by either cross breaking or straight beading depending on length of ducts

As per SMACNA page no. 1.74, fig. 1-8

"Duct Sizes 19" (483 mm) wide and larger which have more than 10 sq.ft. of unbraced panel shall be beaded or cross broken unless ducts will have insulation covering or accoustical liner. This requirement is applicable to 20 g (1.00 mm) or less and 3" W.G. (750 Pa) pressure or less. Ducts for 4" W.G. (1000 Pa) or more do not require beads or cross-breaks.

Table 3 Support for Horizontal duct-Rectangular

Sr. No.	Maximum Duct Size(mm)	Hanger Rod Diameter	Interval(mm)	SLOTTED ANGLE IRON SUPPORTS
1	Up to - 700	10 mm	2400	
2	701 - 1200	10 mm	2400	
3	1201 - 2000	10 mm	2400	
4	Above 2000	12 mm	2400	

1.7 SUPPORT SYSTEM

A completely galvanized system consisting of fully threaded rods, slotted angles, nuts, washers and anchor bolts as supplied by manufacturer generally conforming to SMACNA standards should be used.

- 1.7.1** To provide the required thermal brake effect, Neoprene or equivalent material of suitable thickness shall be used between duct supports and duct profiles in all

supply air ducts not enclosed by return air plenums.

1.8 INSTALLATION

1.8.1 Tools and tackles for site work

The duct installation shall conform to SMACNA norms. For duct assembly and installation the use of suitable tools and tackles should be used to give the required duct quality and speed of installation including (but not restricted to)

- a) Electric Pittsburgh Seamer – used for closing Pittsburgh joints
- b) Electric Slitting shear – to make cut-outs
- c) Drilling machine with drill bits – for drilling holes in sheet metal work
- d) Hammer drill machine with drill bits – for drilling holes in building structures for anchors
- e) Hoisting system – for lifting the duct assembly upto mounting heights

1.8.2 Installation Practice

All ducts shall be installed as per tender drawings and in strict accordance with approved shop drawings to be prepared by the Contractor.

1.8.3 The Contractor shall provide and neatly erect all sheet metal work as may be required to carry out the intent of these specifications and drawings. The work shall meet with the approval of Owner's site representative in all its parts and details.

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

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

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

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

1.9 DOCUMENTATION & MEASUREMENT FOR DUCTING

All ducts fabricated and installed should be accompanied and supported by following documentation:

1. For each drawing, all supply of ductwork must be accompanied by computer-generated detailed bill of materials indicating all relevant duct sizes, dimensions and quantities. In addition, summary sheets are also to be provided showing duct area by gauge and duct size range as applicable.
2. Measurement sheet covering each fabricated duct piece showing dimensions and external surface area along with summary of external surface area of duct gauge-wise.
3. All duct pieces to have a part number, which should correspond to the serial number, assigned to it in the measurement sheet. The above system will ensure speedy and proper site measurement, verification and approvals.

1.10 TESTING

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

1.11 Dampers

- a. All dampers shall be with louver dampers of robust construction and tightly fitted. The design, method of handling and control shall be suitable for the location and service required.
- b. Dampers shall be provided with suitable links, levers and quadrants as required for their proper operation; control or setting devices shall be made robust, easily operable and accessible through suitable access doors in the ducts. Every dampers shall have an indicating device clearly showing the damper position at all times.
- c. Dampers shall be placed in ducts and at every branch of supply air duct connections, whether or not indicated on the drawings for the proper volume control and balancing of the system.
- d. The construction of MS dampers shall conform to the following specifications :

Louver dampers (with grills / slot diffusers / diffuser plenums)

Frame : 20 Gauge MS sheet

Blades : 26 Gauge MS sandwiched aerofoil construction .

Box type dampers (in ducts / duct branches)

Frame : 20 Gauge MS
sheet Blades : 22 Gauge
MS sheet .

Butterfly type dampers (with flexible ducts/plenums)

Frame : 22 Gauge MS sheet
Blades : 22 Gauge MS sheet (150/200 mm
dia) . Blades : 20 Gauge MS sheet (250/300
mm dia)

1.12 Motorised Combined Smoke And Fire Dampers – Spring Return Type

- a. All supply and return air ducts at AHU room crossings and at all floor crossings shall be provided with approved make fire and smoke dampers of atleast 90 minutes fire rating.
- b. Fire damper blades and outer frame shall be formed of 1.6 MM galvanised sheet steel. The damper blade shall be pivoted on both ends using chrome plated spindles in self lubricated bronze bushes. Stop seals will be provided on top and bottom of the damper housing made of 16 G galvanised sheet steel. For preventing smoke leakage side seals will be provided.

In normal position damper blade shall be held in open position with the help of a 24 V operated electric actuators thereby providing maximum air passage without creating any noise or chatter.

- c. The damper shall be actuated through electric actuator. The actuator shall be energised with the help of signal from smoke detector installed in AHU room / R.A. duct/Damper. Smoke detector shall also be provided by A/c Contractor. The fire damper shall also close due to temp rise in SA. Ducts thru the electric temp. sensor factory set at 165 Deg. F. micro switches with bakelite base will be provided to stop fan motor and give open and close signal at remote panel in case of motorised actuator.
- d. Each dampers in case of motorised smoke-cum-damper shall have its own panel which will incorporate necessary circuit required to step down voltage available from UPS or emergency power supply to show status of the damper (open or close) to allow remote testing of damper and indication in event of damper closure due to signal from smoke sensor /temp. sensor and reset button. Additional terminal will be provided to have signal (sound beep or visual) in central control room in case BMS is provided.
- e. Damper actuator shall be spring return Schneider/ Siemens make so as to close the damper in the event of power failure automatically and open the same in case of power being restored.
- f. The fire dampers shall be mounted in fire rated wall with s duct sleeve 600 MM long. The sleeve shall be factory fitted on fire damper. The joints at sleeve end shall be slip on type. Minimum thickness of GI sheets shall be 18 G.

1.13 Supply/ Return Air Diffusers

- a. Diffusers shall be of approved make and of aluminium construction, round in shape with flush fixed pattern or adjustable flow pattern. Diffusers for different spaces shall be selected in consultation with the Consultant.
All supply air diffusers shall be equipped with removable key operated volume control dampers. Anti - smudge ring may be required in specific applications. All extruded aluminium diffusers shall be provided with removable central core and concealed key for operating the volume control damper. The main extruded section shall be minimum 15 mm wide . The outer frame shall be made of minimum 1.0 mm thick extruded aluminium section and removable core shall be made of 1.0 mm thick aluminium sheet .
- b. Linear diffusers shall be extruded aluminium construction one or two way blow type. The supply air diffusers shall be provided with volume control dampers to be fitted within the supply air collar.
- c. Slot diffusers shall be extruded aluminium construction multi slot type complete with Hit and Miss volume control damper(to conform to caryaire's catalogue no AG – 290 for construction of all the approved makes) .

1.14 Supply/ return air grills

Grills shall be of extruded aluminium construction having concealed screws for fixing. These shall be duly powder coated in the shade approved by the architects.

The grills shall have horizontal bars at 15/30 deg. inclination and flanges on top and bottom. The grills at the end shall have flange on the side as well as per the site requirement. The size of main extruded section for flanges shall be minimum 15 x 15 mm and the louvers shall be 15 mm deep having thickness of 5 mm in the front and 2.8 mm at the rear . The 150mm / 100 mm grills shall have 10 / 6 louvers respectively .

1.15 Testing and Balancing

After completion of the installation of the complete air distribution system, all ducts shall be tested for air leaks.

Before painting the interiors, air distribution system shall be allowed to run continuously for 12 hours for driving away any dust or foreign material lodged within ducts during installation.

The entire air distribution system shall be balanced using approved anemometer. Air quantities at the fan discharge and at various outlets shall be identical to or less than 5 percent in excess of those specified and quoted. Leakage in each air distribution system shall be tested by pressure testing as per SMACNA . Branch duct adjustments shall be made permanently marked after air balance is complete so that these can be restored to their correct position if disturbed at any time. Complete air balance report shall be submitted to the consultant for scrutiny and approval, and six copies of the approved report shall be provided with completion documents.

1.16 SPIRAL DUCTING

The spiral ducting shall be double walled made of 0.91mm thick aluminium sheet in double skinned construction filled with 25 mm thick polyethylene insulation and will be made with spiral seams complete with duct fittings , standing seams , elbows , reducers , endcaps and offsets . The ducts shall be joined together by slip joint coupling and hung by clamps as per site requirement .

1.17 Testing and Balancing

After completion of the installation of the complete air distribution system, all ducts shall be tested for air leaks.

Before painting the interiors, air distribution system shall be allowed to run continuously for 12 hours for driving away any dust or foreign material lodged within ducts during installation.

The entire air distribution system shall be balanced using approved anemometer. Air quantities at the fan discharge and at various outlets shall be identical to or less than 5 percent in excess of those specified and quoted. Leakage in each air distribution system shall be tested by smoke test using smoke ball machine . Branch duct adjustments shall be made permanently marked after air balance is complete so that these can be restored to their correct position if disturbed at any time. Complete air balance report shall be submitted to the consultant for scrutiny and approval, and six copies of the approved report shall be provided with completion documents.

2. INSULATION

2.1 Scope

The scope of this section comprises the supply and application of insulation conforming to these Specifications.

Material

- 2.1.2 External thermal insulation of ducts and pipes shall be carried out with UV resistant film laminated self adhesive closed cell Polyethylene foam thermal insulation having thermal properties as mentioned above. Duct insulation shall be applied as follows: -

Measure the size of the duct and determine the size of the insulation material sheet required for insulation. Cut the material to the measured size with sharp knife and straight edge. Ensure that the cuts are as accurate as possible with smooth edges to ensure full contact with mating sheets when bonded together. Do not stretch sheets and always apply smooth skin surface facing out. The surface or duct to be insulated should be thoroughly clean , dry, oil free and unheated to ensure proper adhesion. The joints should be covered with the tape of approved make.

AVERAGE PHYSICAL PROPERTIES ON INSULATION					TEST METHOD
Closed cell structure of 0.06-0.10 gm/cm ³ density					ASTM D 1667
Thermal conductivity(W/m.K)	Mean temp	0 deg C	23 deg C	40 deg C	DIN 52612
	k value	.034	.036	.039	
Service Temp. Limit	(-40 Deg. C to 95 Deg. C)				
Water Vapour permeability (Kg/ Pa.s.m)	U> 1,500				DIN 52615
Water absorption (% by wg.)	3				ASTM D 1056
Ozone Resistance	Should be good				
Thermal Stability(% shrinkage)	4 hours at 95 deg. C <5				
Flammability & smoke density	Self extinguishing				ASTM D 635

2.3 Duct Lining

Acoustical lining of the duct wherever specified shall be applied as under :-

- Fix G.S. Sheet channel framework of 24 Gauge 25mm wide X depth equal to thickness of insulation at 600 mm centre screwed to the sheet metal by means of brass metal screws.
- Supply and fix resin bonded fibre glass crown or other approved equivalent 200 material in the G.S. sheet channel framework with joints well butted together.
- Cover insulation with R.P. tissue.
- Finally cover the insulation with 28 SWG perforated aluminium sheet having at least 20% perforation with joints overlapped and screwed to the G.S. Sheet channel frame by means of brass metal screws to produce an even surface.

2.4 Insulation of Pipes Material

Polyethylene as specified above .

The application of insulation on pipes should be carried out in workman like manner as mentioned below :-

For drain pipe sizes of 25 – 50 mm dia ,insulation pipe section of 9 mm thick UV resistant film laminated Polyethylene shall be used. All the insulation shall be butted tightly.

The insulation shall be applied as follows :

- a. The pipe to be insulated should be cleaned thoroughly with steel brush for removing dirt, rust and grease (apply chemical solution, if required.)

Apply adhesive compound on pipes for sticking the insulation pipe sections.

Stick Polyethylene pipe sections of specified thickness with longitudinal joints staggered and adjacent sections tightly pressed . Seal all longitudinal / circumferential joints with aluminium insulation tape of 50 mm width of same make as insulation material .

2.5 Valves and Fittings

All valves, fittings, flanges, strainers etc. in the chilled water piping shall be insulated in the same manner as described above. Care should be taken to ensure that no damage would be caused to the insulation when valves or strainers are operated or serviced.

2.6 AHU room acoustic lining

Acoustic lining of AHU room shall be applied as under :

Fix factory pressed G.S. Sheet channel frame work of 24 guage 50 x 50 mm equal thickness of insulation at 600 mm centre to centre forming a grid work of 600x600, screwed to the walls/ ceiling with brass metal screws.

Supply and fix fibre glass 50 mm thick Crown 300 of 32 Kg/ Cum density in the G.S.Sheet channel frame work with joints well butted together.

Cover insulation with RP tissue.

Finally cover the insulation with 24 SWG perforated aluminium sheet having at least 20% perforation with joints overlapped and screwed to the GS sheet channel frame by means of brass metal screws, to produce an even surface. All joints shall be covered with 20 mm wide x 3 mm thick aluminium strip secured with cup washers and brass metal screws.

2.7 Underdeck insulation

Material

UV film faced self adhesive polyethylene of 35 mm thickness .

Application

- Mark the insulation slabs on the ceiling to be insulated
- Stick polyethylene sheets after cleaning the surface .
- Fix insulation slabs with dash fasteners and black powder coated washers .
- Seal all joints with 50 mm thick black coloured insulation tape .

3. PROPELLER FAN

Propeller fan shall be direct driven, three or four blade type , mounted on a steel mounting plate with orifice ring.

- a. Mounting plate shall be of steel construction, square with streamlined venturi inlet (reversed for supply applications) coated with baked enamel paint. Mounting plate shall be standard size, constructed of 12 to 16 guage sheet steel depending upon the fan size. Orifice ring shall be correctly formed by spinning or stamping to provide easy passage of air without turbulence and to direct the air stream.
- b. Fan blades shall be constructed of aluminium or steel . Fan hub shall be of heavy welded steel construction with blades to the hub. Fan blades and hub assembly shall be statically and dynamically balanced at the manufacturers work.
- c. Shaft shall be of steel, accurately ground and shall be of ample size for the load transmitted and shall not pass through first critical speed thru full range of specified fan speeds.
- d. Motor shall be standard (easily replace) permanent split capacitor or shaded pole for small sizes, totally enclosed with pre lubricated sleeve or ball bearings , designed for quiet operation with a maximum speed of 1000 rpm for fans 60 cm dia or larger and 1440 rpm for fans 75 cm dia and smaller. Motors for larger fans shall be suitable for 415 +/- 6% volts, 50 cycles , 3 phase power supply, and for smaller fans shall be suitable for 220 +/- 6% volts, 50 cycles aingle phase power supply. Motors shall be suitable for either horizontal or vertical service as indicated on drawings and in BOQ.
- e. Accessories : The following accessories shall beprovided with propeller fans :
 - i) Wire guard on inlet side and birdscreen at the outlet
 - ii) Fixed or gravity louvers built into a steel frame at the outlet
 - iii) Regulator for controlling fan speed for single phase fan motor
 - iv) Single phase preventors for 3 phase fans.

4. INLINE FANS

RECTANGULAR INLINE FAN

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Inline fan shall incorporate SISW direct driven Centrifugal Fan with TEFC(IP-44) motor. The fan assembly shall be encased in a sheet metal housing of GSS and with necessary inspection cover and proper gasket assembly. The fan material shall be galvanized sheet. Flanges shall be provided on both sides of the Inline fan to facilitate easy connection. Flexible anti-vibration joints shall be provided to arrest vibration being communicated to other equipment connected to the Inline fan. Motor shall be single phase/three phase as per duty conditions.

All single phase fans shall be provided with speed regulator while all three phase fans shall be provided with opposed blade damper in GSS construction at fan outlet for air balancing.

CIRCULAR INLINE FAN

Circular Inline Fan shall incorporate backward curved impeller directly driven with external rotor sturdy motor suitable for continuous operation. The Inline Fan construction shall be such that it is possible to install the assembly in any position. The impeller shall be engineering plastic / galvanized steel while the casing shall be of galvanized sheet.

The fan motor shall be suitable for single-phase electric supply. The motor shall be complete with motor protection through built-in thermal contact & TEFC (IP-54) enclosure. The motor construction shall be such that it is possible to regulate the speed.

The fan assembly shall be reliable for continuous operation.

INSULATED DUCT FANS

Insulated duct fan shall incorporate directly driven forward/backward curved impellor. The casing shall be constructed out of rigid out of rigid galvanized steel having 50mm thick sound and fire insulation of mineral wool. The assembly should have detachable access panel.

The duct fan shall have Single / Three phase external rotor motor having maintenance free ball bearing. Duct fan with single phase motor shall be of speed controllable type. All duct fans shall be supplied fully wired and ready to fit at site.

The motor and impellor assembly shall be of swing out type design for easy inspection and cleaning.

All duct fans shall be fitted with thermo-contact protector

5 AXIAL FLOW FANS

Fan shall be complete with motor, motor mount , belt driven (or direct driven) and vibration isolation type. Suspension arrangement as per approved for construction shop drawings

- a. Casing shall be constructed of heavy gauge sheet steel. Fan casing, motor mount and straightening vane shall be of welded steel construction . Motor mounting plate shall be minimum 15 mm thick and machined to receive motor flange.

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- An inspection door with handle and neoprene gasket shall be provided. Casing shall have flanged connection on both ends for ducted applications. Support brackets for ceiling suspension shall be welded to the casing for connection to hanger bolts. Straightening vanes shall be aerodynamically designed for maximum efficiency by converting velocity pressure to static pressure potential and minimising turbulence. Casing shall be bonderized, primed and finish coated with enamel paint.
- b. Rotor : hub and blades shall be cast aluminium or cast steel construction. Blades shall be die-formed aerofoil shaped for maximum efficiency and shall vary in twist and width from hub to tip to effect equal air distribution along the blade length. Fan blades mounting on the hub shall be statically and dynamically balanced. Extended grease leads for external lubrication shall be provided. The fan pitch control may be manually readjusted at site upon installation , for obtaining actual air flow values, as specified and quoted.
- c. Motor : Shall be energy efficient squirrel cage, totally-enclosed, fan cooled, standard frame, constant speed, continuous duty, single winding , suitable for 415 +/- volts, 50 cycle , 3 phase AC power supply, provided with class F insulation and of approved make. Motor name plate horsepower shall exceed brake horse power by a minimum of 10%. Motor shall be designed specially for quiet operation and motor speed shall not exceed 1440 rpm. The fan and motor combination selected for the particular required performance shall be of the most efficient so that that sound level is lowest. Motor conduit box shall be mounted on exterior of fan casing , and lead wires from the motor to the conduit box shall be protected from the air stream by enclosing in a flexible metal conduit.
- d. Drive to fan shall be provided through belt, with adjustable motor sheave and a standard belt guard with vented front for heat dissipation.. Belts shall be of oil resistant type.
- e. Vibration isolation : The assembly of fan and motor shall be suspended from the slab by vibration isolation suspension of rubber – in –shear type.
- f. Accessories : The following accessories shall be provided with all fans :
 - i) Outlet cone for static pressure regain
 - ii) Inlet cone
 Fan silencers may be provided where specifically called for in schedule of quantities. Fans shall be factory assembled and shipped with all accessories factory mounted.
- 7. Jet Vent Fan Jet fans should be supplied as completely assembled before dispatched to the job site having characteristics as of high performance ventilation with small air volume . Each unit shall consist of fan having inlet cones , protective screen , tow silencers , terminal box & mounting arms or brackets.

Fan : Fan shall be axial flow type balanced dynamically and statically . The fans shall have adjustable aluminum impeller or shall be fully welded for high temperature applications 250 Deg. C for 2 hours operation.

Casing : The Casing of Jet Fans shall be made of Galvanized steel with flanges at both ends .

Motor : The Motor shall run on the electrical power suitable for 50 Hz. The type of motor shall be suitable for 2 speed unless otherwise specified in the BOQ.

Protective Guards : The Fans shall have protection guards at inlet side.

Silencers : The Jet Fans shall have silencers manufactured from Galvanized steel length approximately 900 mm.

Inlet Cone : Jet fans shall have inlet cone made of Galvanized steel.

Terminal Box : The pre – wired Terminal box is mounted at the outer fan Casing.

Mounting Arms / Brackets : The unit shall be with mounting brackets for ceiling suspension .

8. VARIABLE REFRIGERANT VOLUME SYSTEM

SCOPE

The scope of this section comprises the supply, erection testing and commissioning of Variable Refrigerant Volume System conforming to these specifications and in accordance with the requirements of Drawing and Schedule of Quantities

TYPE

Units shall be air cooled, variable refrigerant volume air conditioner consisting of one outdoor unit and multiple indoor units. Each indoor units having capability to cool or heat independently for the requirement of the rooms.

It shall be possible to connect minimum 10 indoor units on one refrigerant circuit. The indoor units on any circuit can be of different type and also controlled individually. Following type of indoor units shall be connected to the system:

- Ceiling mounted cassette type (Double flow)
- Ceiling mounted cassette type (Multi flow)
- Ceiling mounted Low static Duct type
- Ceiling mounted Built In Ductable type
- Ceiling mounted Duct type
- Ceiling suspended type
- Wall mounted type
- Floor standing type

Compressor installed in outdoor unit shall be equipped with at least one inverter compressor up to 16HP and minimum two inverter compressors in bigger machines for higher reliability, improved life, better backup and duty cycling purpose. The system shall be capable of changing the rotating speed of inverter compressor by inverter controller to follow variations in cooling and heating load. Outdoor unit shall be suitable for mix match connection of all type of indoor units.

The refrigerant piping between indoor units and outdoor unit shall be possible to extend up to 150m with maximum 50m level difference without any oil traps.

Both indoor units and outdoor unit shall be factory assembled, tested and filled with first charge of refrigerant (410 a) before delivering at site.

The VRV units shall be BMS compatible including provision of interface card , integrator , router / converter if required to integrate them with BMS on modbus / bacnet / lonworks protocol (to be intimated on selection of BMS vendor) .The function of sequencing and operation on equal run hour basis including switching the standby unit on in the event of working unit getting switched off for any reason or when the inside temperature tends to rise beyond the design limit, would be performed by the VRV unit / centralized controller.

OUTDOOR UNIT

The outdoor unit shall be factory assembled, weather proof casing, constructed from heavy gauge mild steel panels and coated with baked enamel finish. The unit should be completely factory wired, tested with all necessary controls :

All outdoor units shall have minimum two scroll compressors and be able to operate even in case one of compressor is out of order.

□

In case of outdoor units above 16HP, the outdoor unit shall have compulsorily at least 2 separate inverter compressors so that the operation is not disrupted with failure of any inverter compressor and if one inverter compressor malfunctions, other continues to provide emergency operation smoothly till repair is effected.

It should also be provided with duty cycling for multiple inverter compressor switching starting sequence for better stability and prolonging equipment life.

The outdoor unit shall be modular in design and should be allowed for side by side installation

The unit shall be provided with its own microprocessor control panel.

The outdoor units should have anti-corrosion paint free gal barium base plate for easy mounting of unit.

The machine must have a sub cool feature to use coil surface more effectively thru proper circuit/bridge so that it prevents the flushing of refrigerant from long piping due to this effect thereby achieving energy savings.

The outdoor unit should be fitted with low noise, aero spiral design fan with aero fitting grill for spiral discharge airflow to reduce pressure loss and should be fitted with DC fan motor for better efficiency. The unit should also be capable

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to deliver 55 Pa external static pressure to meet long exhaust duct connection requirement.

The condensing unit shall be designed to operate safely when connected to multiple fan coil units.

NOTE : The Outdoor machines shall be preferably compact machines for purpose of space saving and smaller foot print shall be preferred.

COMPRESSOR

The compressor shall be highly efficient scroll type and capable of inverter control. The inverter compressor shall change the speed in accordance to the variation in cooling or heating load requirement:

All outdoor units shall have multiple steps of capacity control to meet load fluctuation and indoor unit individual control. All parts of compressor shall be sufficiently lubricated stock. Forced lubrication may also be employed.

Oil heater shall be provided in the compressor casing.

The Inverter compressor shall preferably be Reluctance DC inverter compressor for higher efficiency and improved reliability .

HEAT EXCHANGER

The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross fin coil.

The aluminum fins shall be covered by anti-corrosion resin film.

The unit should be with e-pass heat exchanger to optimize the path of heat exchanger and for better efficiency of condenser.

The unit shall be provided with necessary number of direct driven low noise level propeller type fans arranged for vertical discharge. Each fan shall have a safety guard.

REFRIGERANT CIRCUIT

The refrigerant circuit shall include liquid & gas shut-off valves and a solenoid valves at condenser end.

The equipment must have inbuilt refrigerant stabilization control for proper refrigerant distribution.

All necessary safety devices shall be provided to ensure the safely operation of the system.

SAFETY DEVICES

All necessary safety devices shall be provided to ensure safe operation of the system. Following safety devices shall be part of outdoor unit; high pressure switch, fuse, fan drive overload protector, fusible plug, over load relay, overload protection for inverter.

OIL RECOVERY SYSTEM

Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigeration piping lengths.

The system must be provided with oil balancing circuit to avoid poor lubrication.

INDOOR UNIT

This section deals with supply, installation, testing, commissioning of various type of indoor units confirming to general specification and suitable for the duty selected. The type, capacity and size of indoor units shall be as specified in detailed Bill Of Quantities

GENERAL

Indoor units shall be either ceiling mounted cassette type, or ceiling mounted ductable type or floor standing type or wall mounted type or other as specified in BOQ. Each unit shall have electronic control valve to control refrigerant flow rate respond to load variations of the room.

a) The address of the indoor unit shall be set automatically in case of individual and group control

b) In case of centralized control, it shall be set by liquid crystal remote controller

The fan shall be dual suction, aerodynamically designed turbo, multi blade type, statically & dynamically balanced to ensure low noise and vibration free operation of the system. The fan shall be direct driven type, mounted directly on motor shaft having supported from housing.

The cooling coil shall be made out of seamless copper tubes and have continuous aluminium fins. The fins shall be spaced by collars forming an integral part. The tubes shall be staggered in the direction of airflow. The tubes shall be hydraulically/ mechanically expanded for minimum thermal contact resistance with fins. Each coils shall be factory tested at 21kg/sqm air pressure under water.

Unit shall have cleanable type filter fixed to an integrally moulded plastic frame. The filter shall be slide away type and neatly inserted.

Each indoor unit shall have computerized PID control for maintaining design room temperature. Each unit shall be provided with microprocessor thermostat for cooling or cooling and heating.

Each unit shall be with wired LCD type remote controller(BMS compatible with interface card, I-manager). The remote controller shall memorize the latest malfunction code for easy maintenance. The controller shall have self-diagnostic features for easy and quick maintenance and service. The controller shall be able to change fan speed and angle of swing flap individually as per requirement. The auto sequencing operation to attain the required configuration and equal run hour of

- indoor & outdoor units should be programmed in the controller as per the attached data sheet.

CEILING MOUNTED DUCTABLE TYPE UNIT

Unit shall be suitable for ceiling mounted type. The unit shall include pre filter, fan section & DX coil section .The housing of unit shall be light weight powder coated galvanized steel. The unit shall have high static fan for Ductable arrangement.

HIGH WALL MOUNTED UNITS

The units shall be wall-mounted type. The unit includes pre filter, fan section & DX coil section. The housing of unit shall be light weight powder coated galvanized steel.

Unit shall have an attractive external casing for supply and return air.

CENTRALIZED CONTROL SYSTEM

(Option if specified in BOQ)

A multifunctional centralized control System shall be provided with the VRV system.

The centralized control system(BMS compatible with interface card I manager must act as an advanced air-conditioning management system to give complete control of VRV air-conditioning Equipment.

It shall be able to control up to 128 groups of indoor units with the following functions :-

Starting / stopping of Air conditioners as a zone or group or individual unit. Temperature settling for each indoor unit or zone.

Switching between temperature control modes, switching of fan speed and direction of airflow, enabling/disabling of individual remote controller operation.

Monitoring of operation status such as operation mode & temperature setting of individual indoor units, maintenance information, trouble shooting information.

Display of air conditioner operation history.

Daily management automation through yearly schedule function with possibility of various schedules.

The auto sequencing operation to attain the required configuration and equal run hour of indoor & outdoor units should be programmed in the controller as per the attached data sheet.

The control system shall be connected to personal computer and can be wired by a non polar 2 wire transmission cable to a distance of 1 km. away from indoor unit.

REFRIGERANT PIPING

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

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

All refrigerant piping for the air conditioning system shall be constructed from soft seamless up to 19.1mm and hard drawn copper refrigerant pipes for above 19.1mm with copper fittings and silver-soldered joints. The refrigerant piping arrangements shall be in accordance with good practice within the air conditioning industry, and are to include charging connections, suction line insulation and all other items normally forming part of proper refrigerant circuits.

All joints in copper piping shall be sweat joints using low temperature brazing and or silver solder. Before jointing any copper pipe or fittings, its interiors shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently, it shall be thoroughly blown out using nitrogen.

After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at pressure of 20Kg per sq.cm and 10 Kg per sq.cm (lowside). Pressure shall be maintained in the system for 24 hours. The system shall then be evacuated to minimum vacuum if 700mm hg and held for 24 hours.

The air-conditioning system supplier shall be design sizes and erect proper interconnections of the complete refrigerant circuit.

The thickness of copper piping shall not be less than 20gauge for pipes upto 19.1mm and 18gauge for bigger sizes

The suction line pipe size and the liquid line pipe size shall be selected according to the manufacturers specified outside diameter. All refrigerant pipes shall be properly supported and anchored to the building structure using steel hangers, anchors, brackets and supports which shall be fixed to the building structure by

means of inserts or expansion shields of adequate size and number to support the load imposed thereon.

Tube material Specification :

1. De-oxidized High Phosphorized copper (DHP grade) raw material, with Chemical Composition
of Copper = 99.9 % ; Phosphorus = 0.015 to 0.040 %
2. RoHS Compliant
3. 360 degree concentric Wall thickness along the entire length of the tubes
4. Half hard drawn copper tubes should confirm to ASTM B75/ASTM280 (C12200) / JIS H:3300
(C1220) / BS2871 part 3 (C106). Use Half Hard Temper Type for tube sizes above 19.1 mm.
5. Soft copper tubes, bright annealed (mirror finish) should confirm to ASTM B68 / JIS H:3300
6. Super clean quality with low residual content below the permissible levels of 0.038 g/m² for compatibility with use of R410A CFC-free refrigerant.
7. 100 % Eddy Current Tested Tubes are to be used
8. Proper packaging, Storage and Traceability of the tubes.

Copper tube and Fittings Sizes and Insulation Specifications for R410A Refrigerant

Sr. No.	OUTER DIAMETER IN INCH & (MM)	WALL THICKNESS IN GAUGE & (MM)	LENGTH IN FEET & (MTRS.)	TEMPER	WEIGHT PER METER (kg.)	SOCKET AND ELBOW THICKNESS IN SWG & (MM)	RUBBER INSULATION THICKNESS
1	1/4" (6.4 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.1265	18 (1.2mm)	15mm
2	3/8" (9.5 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.199	18 (1.2mm)	15mm
3	1/2" (12.7 mm)	21 (0.8 mm)	50' (15.24)	Soft	0.2714	18 (1.2mm)	15mm
4	5/8" (15.9 mm)	19 (0.99 mm)	50' (15.24)	Soft	0.4241	18 (1.2mm)	15mm
5	3/4" (19.1 mm)	19 (0.99 mm)	50' (15.24)	Soft	0.5147	18 (1.2mm)	20mm
6	1/4" (6.4 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.1265	18 (1.2mm)	15mm
7	3/8" (9.5 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.199	18 (1.2mm)	15mm
8	1/2" (12.7 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.2714	18 (1.2mm)	15mm
9	5/8" (15.9 mm)	19 (0.99 mm)	12' (3.658)	Half Hard	0.4241	18 (1.2mm)	15mm
10	3/4" (19.1 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.4164	18 (1.2mm)	20mm
11	7/8" (22.2 mm)	21 (0.8 mm)	12' (3.658)	Half Hard	0.489	18 (1.2mm)	20mm
12	1.0" (25.4 mm)	20 (0.88 mm)	12' (3.658)	Half Hard	0.6054	18 (1.2mm)	20mm
13	1 1/8" (28.6 mm)	19 (0.99 mm)	12' (3.658)	Half Hard	0.7865	18 (1.2mm)	20mm

14	1 1/4" (31.8 mm)	18.5 (1.1 mm)	12' (3.658)	Half Hard	0.843	16 (1.6mm)	20mm
15	1 3/8" (34.9 mm)	18 (1.21 mm)	12' (3.658)	Half Hard	1.155	16 (1.6mm)	20mm
16	1 1/2" (38.1 mm)	17.5 (1.3 mm)	12' (3.658)	Half Hard	1.340	16 (1.6mm)	20mm
17	1 5/8" (41.3 mm)	17 (1.43 mm)	12' (3.658)	Half Hard	1.594	16 (1.6mm)	25mm

REFRIGERANT/DRAIN PIPE INSULATION

a. Refrigerant Pipe Insulation

The whole of the liquid and suction refrigerant lines including all fittings, valves and strainer bodies, etc. shall be insulated with 19mm /13 mm thick UV film laminated Polyethylene as specified in BOQ.

b. Drain Pipe Insulation

Drain pipes carrying condensate water shall be insulated with 9 mm thick UV film laminated Polyethylene insulation.

For proper drainage of condensate, U Trap shall be provided in the drain piping (wherever required). All pipe supports shall be of pre fabricated & pre painted slotted angle supports, properly installed with clamps etc.

10 . HEAT RECOVERY VENTILATION UNITS

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 %) . The recovery of sensible and latent shall be equal .Necessary computerized selection of the wheel should be provided alongwith the bid to justify the same. The wheel shall be made of pure aluminium foil coated with molecular sieve desiccant .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 non contact labyrinth seals for effective sealing between the two air streams.

Heat Recovery Wheel specifications :

The substrate: The substrate or wheel matrix should be only of pure aluminum foil so as 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.

Non metallic substrates made from paper, plastic, synthetic or glass fibre media, will therefore, not be acceptable.

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

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.

Pressure drop :

The pressure drop across the rotary heat exchanger shall not exceed 0.1 inch for every 100 FPM face velocity, or part thereof, for the minimum stated / required latent recoveries / efficiencies

NECESSARY SOFTWARE SELECTION OF THE WHEEL HAS TO BE ENCLOSED TO JUSTIFY THE PRESSURE DROP AND EFFICIENCY CALCULATIONS.

The Desiccant : The desiccant should be water molecule selective and non-migratory.

The desiccant should be molecular sieve 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 vapour 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 so as to allow quick and easy uptake and release of water vapour. A confirmation has to be provided by manufacturer of wheel to this effect. A matrix with desiccants impregnated in non metallic substrates, such as synthetic fibre, glass fibre, 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 so as to ensure equal recovery of both sensible and latent heat over the operating range. Accordingly, a rotor matrix which has an etched or oxidised 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 fibre matrix which result 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 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 upto 2800 mm shall have spokes to reinforce the matrix. 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 2000 mm in diameter.

The surface of the wheel/rotor should be highly polished to ensure that the vertical run out does not exceed + 1 mm for every 1 metre 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 minimising the leakage/drag on the radial seals, and minimise the fluctuation in the tension of the drive belt.

The number of wraps (of alternative corrugated and flat foil) for every inch of rotor radii shall be very consistent so as 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 upto 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.

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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 non contact 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.

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MODE OF MEASUREMENT

A. DUCTS

Unless otherwise specified, measurements for ducting for the project shall be on the basis of centre-line measurements described herewith :

- a. Duct work shall be measured on the basis of external surface area of ducts. Duct measurements shall be taken before application of the insulation. The external surface area shall be calculated by measuring the perimeter comprising overall width and depth, including the corner joints, in the centre of each duct section, multiplying with the overall length from flange face to flange face of each duct section and adding up areas of all duct sections. Plenums shall also be measured in similar manner.

For tapered rectangular ducts, the average width and depth shall be considered for perimeter, whereas for tapered circular ducts, the diameter of the section midway between large and small diameter shall be adopted, the length of tapered duct section shall be the centre line distance between the flanges of the duct section.

For special pieces like bends, tees, reducers, branches and collars, mode of measurement shall be identical to that described above using the length along the centre line.

The quoted unit rate for external surface of ducts shall include wastage allowances, flanges and gaskets for nuts, joints, bolts, hangers and angles with double nuts for supports, rubber strip 3 mm thick between ducts, vibration isolator suspension where specified or required, inspection chamber/ access panel, splitter damper. These accessories shall NOT be separately measured nor paid for.

- b. Special items for air distribution shall be measured by the cross-section area perpendicular to air flow, as identified herewith :
 - i. Grilles and registers – width multiplied by height, excluding flanges. Volume control dampers shall form part of the unit for registers and shall not be separately accounted unless appearing as separate item in the BOQ

- ii. Diffusers – cross section area for air flow at discharge area, excluding flanges. Volume control dampers shall form part of unit rate for supply air diffusers and shall not be separately accounted for.
- iii. Linear Diffusers – shall be measured by cross sectional areas and shall exclude flanges for mounting of linear diffusers. The supply air plenum for linear diffusers shall be measured with ducting as described earlier.
- iv. Fire dampers – shall be measured by their cross sectional area perpendicular to the direction of air flow. Quoted rates shall include the necessary collars and flanges for mounting, inspection/ access door, electrical actuators and panel. No special allowance shall be payable for extension of cross section outside the air stream.

B. INSULATION

- a. Duct insulation and acoustic lining – shall be measured on the basis of surface area of bare duct. Thus the surface area of externally thermally insulated or acoustically lined duct shall be based on the perimeter comprising and depth of the cross section of bare duct , multiplied by the centre line length including tapered pieces, bends,tees, branches etc. as measured for bare ducting.

b. PIPE / PIPE INSULATION

Measurement for uninsulated piping shall be made on the basis of linear measurement including all materials and labour for installed pipe. The linear rate per meter/ feet for each nominal diameter shall include all pipe fittings, flanges, unions, gaskets for joints , bolts and nuts, pipe supports and hangers, vibration isolation devices or suspenders, flexible connections and any other item required to complete the pipe installation except valves of any kind and strainers. The length of the pipe section with flanges shall be from flange face to flange face.

For fitting like bends, elbows, branches and tees etc. same principle of linear measurement as for pipe sections shall be adopted except for bends, the length of which shall be the average of the lengths of inner and outer periphery along the curvature.

SAFETY CODE

1. First aid appliances including adequate supply of sterilised dressing and cotton wool shall be kept in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases where the injury necessitates hospitalization.
3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground.
4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm (Clear) and the distance between two adjacent rungs shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding ladder.
5. Every opening in the floor of a building or in a working platform be provided with suitable means to prevent to fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one meter.
6. No floor, roof or other part of the structure shall be so overloaded with debris or materials as to render it unsafe.
7. Workers employed on mixing and handling material such as asphalt, cement mortar or concrete and lime mortar shall be provided with protective footwear and rubber hand-gloves.
8. Those engaged in welding works shall be provided with welder's protective eye-shields and gloves.
9. I) No paint containing leads or lead products shall be used except in the form of paste or readymade paint.
ii) The workers should supply suitable facemasks for use when the paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.
10. Overalls shall be supplied by the contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the periods of cessation of work.
11. Hoisting machines and tackle used in the works, including their attachments, anchorage and supports shall be in perfect condition.
12. The ropes used in hoisting or lowering material or as a means of suspension shall be of durable quality and adequate strength and free from defects.

PROFORMA FOR RUNNING ACCOUNT BILLS**C E R T I F I C A T E**

The measurements on the basis of which the above entries for the Running Bill _____ were made have been taken jointly on _____ and are recorded at pages _____ of Measurement Book No. _____.

Date & Signature of
Contractor.

Date & Signature of
Consultant's Representative
(Seal).

Date & Signature
of Site Engineer

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

CONSULTANT

SITE ENGINEER / BANK's ENGINEER

RUNNING A/C BILL

Name of Contractor/Agency: _____

Name of Work: _____

Sr. No. of this Bill: _____

No. and Date of Previous Bill. _____

Reference to Agreement No. _____

Date of Written Order to Commence. _____

Date of Completion as per Agreement. _____

Sr. No.	Item description	Unit	Rate (Rs.)	As per Tender		Upto Previous R/A Bill		Upto Date (Gross)		Present Bill		Remarks
				Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	Qty.	Amt. (Rs.)	
1.	2.	3.	4.	5.		6.		7.		8.		9.

Note: 1. If Part Rate is allowed for any Item, it should be
Indicated with reasons for allowing such a Rate.

2. If Adhoc Payment is made, it should be mentioned specifically.

Net value since
Previous Bill.

Date & Signature of Contractor.

PERFORMA FOR APPLICATION BY CONTRACTOR FOR EXTENSION OF TIME

1. Name of the Contractor
2. Name of the Work as given in the Agreement
3. Agreement W O
4. Tender Amount
5. Date of Commencement of Work
6. Period allowed for Completion as per Agreement
7. Date of Completion as per Agreement
8. Period for which Extension of Time has been given

- | | <u>Date</u> | <u>Month</u> | <u>Year</u> |
|--|--------------------|---------------------|--------------------|
| a) 1 st Extension vide Bank's Letter No | | | |
| b) 2 nd Extension vide Bank's Letter No | | | |
| c) 3 rd Extension vide Bank's Letter No | | | |
9. Reasons for which extensions have been previously given (Copies of the previous applications should be attached)
 10. Period for which extension is applied for and the reasons thereof including hindrances, time for extra work assigned, if any etc.

Signature of Contractor & Seal

PERFORMA OF HINDERANCE REGISTER

Name of Work : Date of State of Work :

Name of Contractor : Period of Completion :

Agreement No : Date of Completion :

Sr No	Nature of Hindrance	Date of occurrence of Hindrance	Date of which Hindrance was removed	Period of Hindrance	Signature SE / PE	Remarks
1	2	3	4	5	6	7

SE = Site
PE = Project

Engineer
Engineer

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

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

Total Value of Materials at Site

Secured Advance @.....% of above Value

B

CERTIFIED (I) That the materials mentioned above have actually been brought by the contractor to the site of the work and no advance on any quantity of any of this item is outstanding on their security, (ii) that the materials are of imperishable nature and are all required by the contractor for use in the work in connection with the items for which rates of finished work have been agreed upon.

Dated Signature of
Site Engineer
preparing the Bill

Designation_____

Dated Signature of
Bank's Consultants

(Name of the Consultants)

Dated signature of Contractor

LIST OF APPROVED BRANDS / MAKES

One of the following make of the material shall be used. The contractor will have to get the sample approved from the Consultant/ Bank's Engineer whose decision shall be binding on the contractor. The condition is also applicable for any material, not mentioned in the specification or schedule of work. No deviations are allowed in these even during/ after Tender.

LIST OF APPROVED MAKES OF EQUIPMENTS/ MATERIALS/As given in BOQ

1	VRV UNITS	:	DAIKIN/Carrier/Voltas/ Midea Blue star/Hitachi
2	VIBRATION ISOLATION PADS	:	RESISTOFLEX / DUNLOP
3	FHP MOTORS	:	ALSTOM
4	PROPELLER FANS	:	ALSTOM
5	FIBRE GLASS	:	OWENS CORNING/ KIMMCO
6	EXPANDED POLYSTYRENE	:	STYRENE PACKINGS / BEARDSSELL
7	EXTRUDEDALUMINI UMGRILLS/DIFFUSE RS/DAMPERS	:	CARYAIRE/ TRISTAR/ DYNACRAFT
8	INLINE FANS	:	GST/ KRUGER / GREENHECK
9	G.P. SHEETS	:	SAIL/ TATA/JINDAL/BHUS HAN
10	FIRE DAMPERS	:	CARYAIRE/DYNACR AFT /TRISTAR
11	POLYETHYLENE INSULATION	:	SUPREME / THERMOBREAK
12	FLEXIBLE DUCT CONNECTOR FABRIC	:	DURODYNE
13	FACTORY FABRICATED DUCTS	:	ZECO / DUCTOFAB
14	SOUND ATTENUATORS	:	CARYAIRE /TRISTAR
15	DASH FASTENERS	:	HILTI / FISCHER
16	FLEXIBLE DUCTS	:	GLOBAL DUCT / ATCO
17	ALUMINIUM TAPE	:	3 M / MAGIC
18	FACTORY FABRICATED PLENUMS / SPIGOTS	:	TRISTAR / CARYAIRE / DYNACRAFT
19	REF COPPER PIPING	:	MANDEV
20	DIFFUSER SUPPORTS	:	GRIPPLE / DUCTMATE

21	PRECISION AC UNITS	:	STULZ / BLUEBOX / UNIFLAIR
22	VAV BOXES	:	JOHNSON / TRANE/COMOS

NOTE: Above makes of equipment are approved subject to their meeting the specifications. The contractor however shall seek approval of specific make from Consultant/ Bank's Engineer before commencing the work. The decision of Consultant/ Bank's Engineer shall be binding on the contractor in this respect. Any other make of the equipment not specified shall be got approved by the Bank's Electrical engineer.

BILL OF QUANTITY

PREAMBLE:

TO BE READ ALONG WITH DRAWINGS.

1. RATES TO BE QUOTED BOTH IN FIGURES AND WORDS.
2. ALL PAGES TO BE SIGNED AND STAMPED BY THE TENDERER.
3. THE RATE OF THE ITEMS SHALL BE APPLICABLE FOR ANY FLOOR LEVEL/ ANY NUMBER OF FLOORS, OR ANY QUANTITY.
4. THE SPECIFICATION OF THE ITEMS SHALL BE AS PER LATEST INDIAN STANDARD CODES UNLESS OTHERWISE SPECIFIED.
5. ALL MATERIALS SHALL BE AS PER APPROVED LIST AND SHOULD BE OF 1st QUALITY UNLESS OTHERWISE SPECIFIED.
6. THE RATES ARE INCLUSIVE OF ALL DUTIES AND TAXES (EXCEPT GST) OF ALL GOVERNMENT, MUNICIPAL OR ANY OTHER STATUTORY BODY APPLICABLE FROM TIME TO TIME.
7. RATES SHALL BE FOR ITEMS COMPLETE IN ALL RESPECTS AS PER DRAWING, INSTRUCTIONS AND APPROVAL OF THE CONSULTANT/ BANK'S ENGINEER.
8. THE QUANTITIES ARE APPROXIMATE AND TENTATIVE WHICH MAY VARY DURING COURSE OF EXECUTION. THE RATES QUOTED AGAINST PARTICULAR ITEM SHALL NOT BE CHANGED WITH VARIATION IN QUANTITIES.
9. MAKING OF ANY CUTOUT / OPENING FOR ELECTRICAL / AIR – CONDITIONING WIRING / FITTING IN ANY OF THE ITEM OF FALSE CEILING, PARTITIONS, PANELING MASONRY WORK ETC. AND FINISHING EDGES JAMBS / CILLS / SOFFITS OF THE OPENING SHALL NOT BE PAID EXTRA.
10. THE TENDERER SHALL VISIT THE SITE AND SHALL SATISFY HIMSELF AS TO CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. HE SHALL ALSO CHECK, ASCERTAIN THE LOCATIONS OF ANY EXISTING STRUCTURES OR EQUIPMENT OR ANY OTHER SITUATION WHICH MAY AFFECT THE WORK. NO EXTRA CLAIM AS A CONSEQUENCE OF IGNORANCE OR ON GROUND OF INSUFFICIENT DESCRIPTION WILL BE ALLOWED AT A LATER DATE.
11. THE QUOTED PRICE FOR ITEMS SHALL INCLUDE ALL ACCESSORIES, CONSUMABLES ETC. AS REQUIRED TO MAKE THE ITEM COMPLETE IN ALL RESPECTS, COMPATIBLE WITH OTHER RELATED / ASSOCIATED ITEMS AND FULLY FUNCTIONAL.
12. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY ERROR, DIFFICULTY IN EXECUTION / DAMAGES INCURRED OWING TO DISCREPANCY IN DRAWINGS WHICH HAS BEEN OVERLOOKED BY HIM AND HAS NOT BEEN BROUGHT TO THE NOTICE OF THE CONSULTANT.
13. THERE ARE NUMBER OF ITEMS GIVEN IN THE TENDER WHERE IN BASIC RATES INCLUDING ALL TAXES EXPECTED HAS BEEN MENTIONED IN THE TENDER. THESE ITEMS SHALL BE PURCHASED BY THE CONTRACTOR FROM THE MARKET ONLY AFTER THE APPROVAL OF QUALITY AND RATES BY THE CONSULTANT.
14. ALL HIDDEN SURFACES OF BOARD / PLY / WOOD WORK TO BE PAINTED WITH ANTI BACTERIAL PAINT FROM NAV AIR INTERNATIONAL FR 881 (VIPER) (WHITE COLOUR AS PER MANUFACTURER'S SPECIFICATIONS ON WOOD / BOARD).

15. CONTRACTOR SHALL APPOINT TECHNICALLY QUALIFIED FULL TIME SITE SUPERVISOR TO MONITORING THE DAY TO DAY PROGRESS OF WORK AT SITE ON THEIR OWN COST.

(Refer Annexure-E /section in e-tender portal for detailed Bill of Quantities)

PLEASE NOTE THAT THIS IS A COMPOSIT TENDER i.e. THE WORKS INCLUDE ELECTRICAL WORKS.

A) THE ELECTRICAL & ALLIED WORK IS TO BE GOT EXECUTED THROUGH BANK'S EMPANELLED ELECTRICAL VENDOR ONLY

FOR DIFFERENT CATEGORIES OF WORKS, SEPARATE BILL TO BE SUBMITTED BY THE VENDOR CATEGORY WISE. THE L1 CONTRACTOR HAS TO ADVISE NAME OF THE BANK'S EMPANELLED ELECTRICAL/ AIR CONDITIONING / INTERIOR CONTRACTOR BEING ENGAGED BY THEM FOR THE SPECIFIED WORK IN WRITING BEFORE THE AWARD OF WORK.

AGREED AND ACCEPTED ALL THE TERMS & CONDITIONS.

SIGNATURE OF CONTRACTOR

DATE:

SEAL:

TENDER DRAWINGS

(Refer Annexure-F /section in e-tender portal for Tender Drawings)