



SBI INFRA MANAGEMENT SOLUTIONS PVT.LTD.

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

PART – A : TECHNICAL BID

TENDER No.: MUM202003017

PROPOSED AIRCONDITIONING WORKS OF PARTUR BRANCH, PARTUR.

TENDER SUBMITTED BY:

NAME : _____

ADDRESS : _____

DATE : _____



NOTICE INVITING TENDERS

SBIIMS on behalf of SBI invites “online item rate E-tender” from SBIIMS EMPANELLED CONTRACTORS, OEM and their authorized dealers for the captioned work.

(Proof of dealership in relevant AC category/ authorization from manufacturers to participate in this tender should be enclosed)

The details of tender are as under:

S.No.	Description	
1.	Name of work	Proposed Air-conditioning Works at PARTUR BRANCH, PARTUR
2.	Nature of Work	Electrical
3.	Time allowed for completion	3 (Three) Month
4.	Cost of Tender Documents	Rs. 3000/- (Rs. Three thousand only) to be paid through State Bank Collect ONLY as detailed under; 1) login https://www.onlinesbi.com 2) Select SB Collect from Top Menu, click the check box and “Proceed” 3) Select “All India” in “State of Corporate/Institution” & Select “Commercial Services” in “Type of Corporate/Institution” then “Go” 4) Select “SBI Infra Management Solutions pvt. Ltd” in Commercial Services Name and “Submit” 5) Select “Tender Application Fee” in “Payment Category” and enter the “Tender ID” exactly as given in first page top of this tender(characters in uppercase Only). 6) Fill up all fields such as email, GST No., Mobile No, Vendor/Firm Name etc and make payment. 7) Enclose payment receipt having unique reference No. along with EMD.
5.	Earnest Money Deposit	Rs. 15,000/- (Fifteen thousand only) by means of Demand Draft / Pay from any scheduled Nationalized Bank drawn in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.
6.	Initial Security Deposit	2% of contract amount including EMD
7.	Date of issue of tender documents form Bank’s website	13.03.2020 to 21-03-2020 www.sbi.co.in under <Link>procurement news.
8.	Last date & time for submission of Technical bid, EMD and cost of tender document	21-03-2020 by 3.00 PM OPENIG- 3.30PM
9.	Address at which Technical bid (hard copy) along with EMD & Cost of tender document has to be submitted.	Manager (Electrical), SBI, ZONAL OFFICE, SBIIMSPL, N-5,CIDCO, Plot no-72, Aurangabad

10(a)	Start date & time for submission of online price	23-03-2020 at 1.00 PM
10(b)	Last date & time for submission of online price bid.	24-03-2020 at 3.00 PM At: - https://etender/SBI
11.	Last date & time for opening of online price bid.	24-03-2020 at 3.30 PM At: - https://etender/SBI
12.	Place of opening tenders	Vice President & Circle Head, SBI Infra Management Solutions Pvt. Ltd. SBI, Local Head Office, 3 rd floor, C-6, G-Block Synergy Building, Bandra- Kurla Complex, Bandra (East), Mumbai-400 051..
13.	Liquidated Damages	0.50% of contract amount per weeks subject to max. 5% of contract value or final bill value.
14.	Defects liability period	12 Months from the date of Virtual Completion
15.	Validity of offer	90 days from the date of opening of Price-bid
16.	Value of Interim Certificate	Rs. 3 Lakhs. No advance on materials / plant / machinery or mobilization advance shall be paid under any circumstances

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

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

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

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

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

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

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

23. ELIGIBILITY CRITERIA:

Only those contractors who fulfil the following criteria will be considered eligible to Participate:

1. The work is estimated to cost Rs.15, 00,000 lakhs and is to be completed within 30 Days.
2. Minimum 5 years' experience in undertaking similar nature of works.

- Minimum yearly turnover of at least Rs 20 lakhs during last 3 years supported by audited financial statements.
- Three works each costing not less than Rs 6 lakh during last 3 years

OR

(b) Two works each costing not less than Rs. 10 lakh during last 3 years

OR

(c) One work costing not less than Rs 20 lakh during last 3 years

Yours Faithfully,

**MANAGER (ELECTRICAL),
SBIIMSPL,ZO, AURANGABAD**

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

Dear Sir,

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

MEMORANDUM

Description of work	Proposed Air-conditioning Works at PARTUR BRANCH, PARTUR.
Earnest Money	Rs. 15,000/- (Fifteen thousand only) by means of Demand Draft / Pay Order from any scheduled Nationalized Bank drawn in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.
Percentage, if any, to be deducted from Bills and total amount to be retained	10 % from Running Bills, subject to maximum Total 5% of contract amount or actual Final Bill value including EMD&Initial Security Deposit.
Time allowed for completion of the Works from fourteenth day after the date of written order or date of handing over of the site (whichever is later) to commence the work	3 (Three) month

I / We have deposited a sum of **Rs. 15,000/- (Ten thousand Three hundred)** of the total tender amount as Earnest Money with the SBI Infra Management Solutions Pvt.Ltd. amount is not to bear any interest. Should I / We fail to execute the Contract when called upon to do so I / We do hereby agree that this sum shall be forfeited by me/us to SBI Infra Management Solutions Pvt. Ltd.

1) Our Bankers are:

i)

ii)

The names of partners of our firm

are: i)



ii)

Name of the partner of the firm

Authorised to sign

Or

(Name of person having Power of Attorney to sign the Contract.

(Certified true copy of the Power of Attorney should be attached)

Yours faithfully,

Signature of Contractors.

Signature and addresses of Witnesses

i)

ii)

SAMPLE BUSINESS RULE DOCUMENT

ONLINE E-TENDERING FOR PROPOSED AIRCONDITIONG WORKS AT MAIN BRANCH, BRANCH, NANDED.

(A) Business rules for E-tendering:

1. Only **empaneled** contractors with SBIIMS PVT.LTD. under appropriate category who are invited by the project Architect/SBIIMS shall only be eligible to participate.
2. SBIIMS PVT.LTD. will engage the services of anE-tendering service provider who will provide necessary training and assistance before commencement of online bidding on Internet.
3. In case of e-tendering, SBIIMS will inform the vendor in writing, the details of service provider to enable them to contact and get trained.
4. Business rules like event date, closing and opening time etc. also will be communicated through service provider for compliance.
5. Contractors have to send by email, the compliance form in the prescribed format (provided by service provider),before start of E-tendering. Without this the vendor will not be eligible to participate in the event.
6. The Contractors will be required to submit the various documents in sealed Envelope to the office of SBI Infra Solutions Pvt. Ltd. at the address mentioned hereinbefore by the stipulated date i.e. (1) Hard Copy of Technical Bid duly signed and stamped on each page (2) Demand Draft of specified amount of EMD (3) Demand Draft of Cost



of Tender documents (4 Certified copy of A-Class Electrical License). Contractors not submitting any one or more documents shall not be eligible to participate in the on line price bidding.

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

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

(B) Terms & conditions of E-tendering:

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

1. E-tendering shall be conducted by SBIIMS through **E- Procurement Technologies Ltd.**, on pre-specified date. While the Contractors shall be quoting from their own offices/ place of their choice, Internet connectivity and other paraphernalia requirements shall have to be ensured by Contractors themselves. In the event of failure of their Internet connectivity, (due to any reason whatsoever it may be) SBIIMS shall not be held responsible & no-further request by the bidder/ tenderer shall be entitled. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives such as back-up power supply whatever required so that they are able to circumvent such situation and still be able to participate in the E-tendering successfully. Failure of power at the premises of Contractors during the E-tendering cannot be the cause for not participating in the E-tendering. On account of this the time for the E-tendering cannot be extended and SBIIMS Pvt. Ltd. is not responsible for such eventualities.
2. Through E- Procurement Technologies Ltd., shall arrange to train your nominated person(s), without any cost to you. They shall also explain you all the Rules related to the E-tendering. You are required to give your compliance on it before start of bid process.
3. **BIDDING CURRENCY AND UNIT OF MEASUREMENT:** Bidding will be conducted in Indian currency & Unit of Measurement will be displayed in Online E-tendering.
4. **BID PRICE:** The Bidder has to quote the rate as per the Tender Document provided by SBIIMS Pvt. Ltd. their appointed Architects.
5. **VALIDITY OF BIDS:** The Bid price shall be firm for a period specified in the tender document and shall not be subjected to any change whatsoever.
6. Procedure of E-tendering:
 - i. **Online E-tendering** :
 - (a) The hard copy of the Technical as well as Price Bid Document are available on the Bank's website during the period specified in the Notice Inviting Tender (NIT).
 - (b) Online e-tendering is open to the empaneled bidders who receive NIT from the Architect and qualified for participating in the price bidding as provisions mentioned hereinabove through SBIIMS approved Service Provider.
 - (c) The Price-Bid shall be made available online by the Service Provider wherein the contractors will be required to fill-in their Item-wise rates for each item.



- (d) The Contractors are advised not to wait till the last minute to submit their online item-wise quote in the price bid to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.
 - (e) It is mandatory to all the bidders participating in the price bid to quote their rates for each and every item.
 - (f) In case, contractor fails to quote their rates for any one or more tender items, their tender shall be treated as **"Incomplete Tender"** and shall be liable for rejection.
7. LOG IN NAME & PASSWORD: Each Bidder is assigned a Unique User Name & Password by Through E- Procurement Technologies Ltd. The Bidders are requested to change the Password after the receipt of initial Password from Through E-Procurement Technologies Ltd. All bids made from the Login ID given to the bidder will be deemed to have been made by the bidder.
 8. BIDS PLACED BY BIDDER: Bids will be taken as an offer to execute the work as specified. Bids once made, cannot be cancelled / withdrawn and the Bidder shall be bound to execute the work at the quoted bid price. In case the L-1 Bidder backs out or fail to complete the work as per the rates quoted, SBIIMS shall at liberty to take action as deemed necessary including depaneling such contractors and forfeiting their EMD..
 9. At the end of the E-tendering, SBIIMS Pvt. Ltd. will decide upon the winner. SBIIMS Pvt. Ltd. decision on award of Contract shall be final and binding on all the Bidders.
 10. SBIIMS shall be at liberty to cancel the E-tendering process / tender at any time, before ordering, without assigning any reason.
 11. SBIIMS shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.
 12. Other terms and conditions shall be as per your techno-commercial offers and other correspondences till date.
 13. OTHER TERMS & CONDITIONS:
 - The Bidder shall not involve himself or any of his representatives in Price manipulation of any kind directly or indirectly by communicating with other suppliers / bidders.
 - The Bidder shall not divulge either his Bids or any other exclusive details of SBIIMS Pvt. Ltd. to any other party.
 - SBIIMS Pvt. Ltd. decision on award of Contract shall be final and binding on all the Bidders.
 - SBIIMS Pvt. Ltd. reserve their rights to extend, reschedule or cancel any E-tendering within its sole discretion.
 - SBIIMS or its authorized service provider Through E- Procurement Technologies Ltd shall not have any liability to Bidders for any interruption or delay in access to the site irrespective of the cause.



- SBIIMS or its authorized service provider Through E- Procurement Technologies Ltd is not responsible for any damages, including damages that result from, but are not limited to negligence.
- SBIIMS or its authorized service Through E- Procurement Technologies Ltd will not be held responsible for consequential damages, including but not limited to systems problems, inability to use the system, loss of electronic information etc.

N.B.

- All the Bidders are required to submit the Process Compliance Statement (Annexure II) duly signed to Through E- Procurement Technologies Ltd.
- **All the bidders are requested to ensure that they have a valid digital signature certificate well in advance to participate in the online event.**

PROCESS COMPLIANCE STATEMENT (ANNEXURE II)

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

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

AGREEMENT TO THE PROCESS RELATED TERMS AND CONDITIONS FOR THE ONLINE E-TENDERING FOR PROPOSED AIRCONDITIONING WORKS OF SBI MAIN BRANCH,NANDED.

Dear Sir,

This has reference to the Terms & Conditions for the E-tendering mentioned in the Tender document

This letter is to confirm that:

- 1) The undersigned is authorized representative of the company.
- 2) We have studied the Commercial Terms and the Business rules governing the E-tendering as mentioned in RFP of SBIIMS Pvt. Ltd.as well as this document and confirm our agreement to them.
- 3) We also confirm that we have taken the training on the E-tendering tool and have understood the functionality of the same thoroughly.
- 4) We confirm that SBIIMS Pvt. Ltd. and M/s. E-tendering Technologies Ltd. Limited shall not be liable & responsible in any manner whatsoever for my/our failure to access & bid on the e-E-tendering platform due to loss of internet connectivity, electricity failure, virus attack, problems with the PC, any other unforeseen circumstances etc. before or during the E-tendering event.
- 5) We confirm that we have a valid digital signature certificate issued by a valid Certifying Authority.
- 6) We, hereby confirm that we will honor the Bids placed by us during the E-tendering process.

With regards,



Date:

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

Scan it and send to this Document on -----

ARTICLES OF AGREEMENT

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

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

WHEREAS the SBIIMS PVT.LTD. is desirous of

_____ and has caused drawings and specifications describing the work to be done to be prepared by

AND WHEREAS the said Drawings numbered _____ to _____ inclusive, the Specifications and the Schedule of Quantities have been signed by or on behalf of the parties hereto.

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

NOW IT IS HEREBY AGREED AS FOLLOWS:

- 1) In consideration of the said Contract Amount to be paid at the times and in the manner set forth in the said Conditions, the Contractor shall upon and subject to the said Conditions execute and complete the work shown upon the said Drawings and described in the said Specifications and the priced Schedule of Quantities.
- 2) The Employer shall pay to the Contractor the said Contract Amount, or such other sum as shall become payable, at the times and in the manner specified in the said Conditions.



- 3) The said Conditions and Appendix thereto shall be read and construed as forming part of this Agreement, and the parties hereto shall respectively abide by submit themselves to the said Conditions and perform the Agreements on their part respectively in the said Conditions contained.
- 4) The Plans, Agreements and Documents mentioned herein shall form the basis of this Contract.
- 5) This Contract is neither a fixed lump-sum contract nor a piece work contract but a contract to carry out the work in respect of the entire building complex to be paid for according to actual measured quantities at the rates contained in the Schedule of Quantities and Rates or as provided in the said Conditions.
- 6) The Contractor shall afford every reasonable facility for the carrying out of all works relating to civil works, installation of lifts, Telephone, electrical installations, fittings air-conditioning and other ancillary works in the manner laid down in the said Conditions, and shall make good any damages done to walls, floors, etc. after the completion of his work.
- 7) The SBIIMS Pvt. Ltd. reserves to itself the right of altering the drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this Contract.
- 8) Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work soon after the Site is handed over to him or from 14th day after the date of issue of formal work order as provided for in the said Conditions whichever is later and to complete the entire work within **3 (Three Month)** subject to nevertheless the provisions for extension of time.
- 9) All payments by the SBI under this Contract will be made only at Mumbai.
- 10) All disputes arising out of or in any way connected with this Agreement shall be deemed to have arisen at Mumbai and only the Courts in Mumbai shall have jurisdiction to determine the same.
- 11) That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor.

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

SIGNATURE CLAUSE

SIGNED AND DELIVERED by the

_____ By the
(Employer)

hand of Shri _____

(Name and Designation)

(Signature of Employer)



In the presence of:

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

Address _____

(Witness)

SIGNED AND DELIVERED by the

_____ by the
(Contractor)

(Signature of Contractors)

in the presence of :

Shri / Smt. _____ (Signature of Witness)

Address _____

(Witness)

SECTION – 1

INSTRUCTIONS TO THE TENDERERS

1.0 Scope of work

Sealed Tenders are invited SBIIMS PVT.LTD. For **Proposed Air-conditioning of State Bank of India, PARTUR BRANCH, PARTUR**

The proposed work is to be carried out at **PARTUR BRANCH, PARTUR**

2.0 Tender documents

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

Instructions to tenderers

General conditions of Contract

Special conditions of Contract

Additional specifications

Drawings

Priced Bid A



- 2.2 The above documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order given below;
- a) Price Bid
 - b) Additional Specifications
 - c) Technical specifications
 - d) Drawings
 - e) Special conditions of contract
 - f) General conditions of contract
 - g) Instructions to Tenderers
- 2.3 Complete set of tender documents including relative drawings can be downloaded from the website www.sbi.co.in
- 2.4 The tender documents are not transferable.
- 3.0 **Site Visit**
- 3.1 The tenderer must obtain himself on his own responsibility and his own expenses all information and data that may be required for the purpose of filling this tender document and enter into a contract for the satisfactory performance of the work. The tenderer is requested satisfy himself regarding the availability of water, power, transport and communication facilities, the character quality and quantity of the materials, labour, the law and order situation, climatic conditions, local authorities requirement, traffic regulations etc;
- The tenderer will be fully responsible for considering the financial effect of any or all the factors while submitting his tender.
- 4.0 **Earnest Money**
- 4.1 The tenderers are requested to submit the Earnest Money of **Rs. 15,000/- (Fifteen thousand) by means of Demand Draft / Pay order** from any scheduled Nationalized Bank drawn **in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.**
- 4.2 EMD in any other form other than as specified above will not be accepted. Tender not accompanied by the EMD in accordance with clause 4.1 above shall be rejected.
- 4.3 No interest will be paid on the EMD.
- 4.4 EMD of unsuccessful tenderer will be refunded within 30 days of award of Contract.
- 4.5 EMD of successful tenderer will be retained as a part of security deposit.
- 5.0 **Initial/ Security Deposit**
- The successful tenderer will have to submit a sum equivalent to 2% of accepted tender value less EMD by means of DD drawn in favour of SBIIMS Pvt. Ltd. within a period of 15 days of acceptance of tender.
- 6.0 **Security Deposit**



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

6.2 **Additional Security Deposit**

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

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

7.0 **Signing of contract Documents**

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

8.0 **Completion Period**

Time is essence of the contract. The work should be completed in all respect accordance with the terms of contract within a period of **3 (Three Month)** from the date of award of work.

9.0 **Validity of tender**

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

10.0 **Liquidated Damages**

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

11.0 **Rate and prices:**

11.1 **In case of item rate tender**



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

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

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

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

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

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

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

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

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

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

SIGNATURE OF THE CONTRACTOR

WITH SEAL

GENERAL CONDITIONS OF CONTRACT

1.0 Definitions: -

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



- 1.1 In the contract the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.
- 1.1.1 'SBIIMS' shall mean SBI Infra Management Solutions Pvt. Ltd. (Service Provider) having its Head Office, Ground Floor, Raheja Chambers, Free Press Marg, Nariman Point, Mumbai- 400 021 and includes the client's representatives, successors and assigns.
- 1.1.2 'Architects/ Consultants' shall SBIMS.
- 1.1.3 'Site Engineer' shall mean an Engineer appointed by the SBIIMS at site as their representative for day-to-day supervision of work and to give instructions to the contractors.
- 1.1.4 'The Contractor' shall mean the individual or firm or company whether incorporate not, undertaking the works and shall include legal personal representative of individual or the composing the firm or company and the permitted assignees of individual or firms of company.
- The expression 'works' or 'work' shall mean the permanent or temporary work description in the "Scope of work" and / or to be executed in accordance with the contract includes materials, apparatus, equipment, temporary supports, fittings and things of kinds to be provided, the obligations of the contractor hereunder and work to be done by the contractor under the contract.
- 1.1.5 'Engineer' shall mean the representative of the Architect/consultant.
- 1.1.6 'Drawings' shall mean the drawings prepared by the Architects and issued by the Engineer and referred to in the specifications and any modifications of such drawings as may be issued by the Engineer from time to time 'Contract value shall mean value of the entire work as stipulated in the letter of acceptance of tender subject such additions there to or deductions there from as may be made under the provide herein after contained.
- 1.1.7 Specifications' shall mean the specifications referred to in the tender and modifications thereof as may time to time be furnished or approved by the Architect/ Consultant.
- 1.1.8 "Month" means calendar month.
- 1.1.9 "Week" means seven consecutive days.
- 1.1.10 "Day" means a calendar day beginning and ending at 00 Hrs and 24 Hrs respectively.
- 1.1.11 "SBIIMS's Engineer" shall mean The Civil / Electrical Engineer in - charge of the Project, as nominated by the M.D.& CEO, SBI Infra Management Solutions Pvt. Ltd.
- 1.1.12 The following shall constitute the Joint Project Committee (herein under referred to as JPC) for assessing and reviewing the progress of the work on the project and to issue instructions or directions from time to time for being observed and followed by the Architects Site Engineer /PMC and other consultants / contractors engaged in the execution of the project.
- i) Vice President – Circle Head of SBIIMS Pvt. Ltd.



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

CLAUSE

1.0 Total Security Deposit

Total Security deposit comprise of

Earnest Money Deposit

Initial security deposit

Retention Money

a) **Earnest Money Deposit -**

The tenderer shall furnish EMD of **Rs. 15,000/- (Fifteen thousand only)** in the form of Demand draft or bankers cheque drawn in favour of SBIIMS PVT. LTD., on any Scheduled Bank. No tender shall be considered unless the EMD is so deposited in the required form. No interest shall be paid on this EMD. The EMD of the unsuccessful tenderer shall be refunded soon after the decision to award the contract is taken without interest. The EMD shall stand absolutely forfeited if the tenderer revokes his tender at any time the period when he is required to keep his tender open acceptance by the SBIIMS Pvt. Ltd. or after it is accepted by the SBIIMS Pvt. Ltd. the contractor fails to enter into a formal agreement or fails to pay the initial security deposit as stipulated or fails to commence the commence the work within the stipulated time.

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

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

ADDITIONAL SECURITY DEPOSIT / PERFORMANCE GUARANTEE

In case L-1 bidder quotes abnormally low rates (i.e. 10% or more, below estimated project cost), the bank may ask such bidder to deposit additional security deposit (ASD) equivalent to difference of estimated cost vis-à-vis L-1 quoted amount for due fulfillment of contract as performance guarantee. Such ASD could be in the form of FDR / Bank's guarantee in the Bank's name as per format approved by the Bank.

On successful completion of work ASD will be returned to the contractor. In case contractor fails to complete the work in time or as per tender specification or leave the job incomplete, the bank will be at liberty to recover the dues from ASD or to forfeit such ASD as the case may be within its sole discretion.

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

c) **Retention Money: -**

Besides the SD as deposited by the contractor in the above said manner, the Retention money shall be deducted from the running account bill at the rate of 10% of the gross value of work done by the contractor and claimed in each bill provided the total security deposit i.e. ISD plus EMD plus Retention Money shall both together not exceed 5% of the contract value. The 50% of the total security deposit shall be



refunded to the contractor without any interest on issue of Virtual Completion certificate by the Architect/consultant. The balance 50% of the total security deposit shall be refunded to the contractors without interest within fifteen days after the end of defects liability period provided the contractor has satisfactorily attended to all defects in accordance with the conditions of contract including site clearance.

2.0 **Language**

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

3.0 **Errors, omissions and discrepancies**

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

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

4.0 **Scope of Work:**

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

5.0 i) **Letter of Acceptance:**

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

ii) **Contract Agreement:**

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



6.0 Ownership of drawings:

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

7.0 Detailed drawings and instructions:

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

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

7.0 Copies of agreement

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

8.0 Liquidated damages:

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

9.0 Materials, Appliances and Employees

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

10.0 Permits, Laws and Regulations:

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

11.0 Setting out Work:

The contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof and get it approved by the architect / consultant



before proceeding with the work. If at any time any error in this respect shall appear during the progress of the works, irrespective of the fact that the layout had been approved by, the architect / consultant the contractor shall be responsible for the same and shall his own expenses rectify such error, if so, required to satisfaction of the SBIIMS Pvt. Ltd.

12.0 Protection of works and property:

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

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

13.0 Inspection of work:

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

14.0 Assignment and subletting

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

15.0 Quality of materials, workmanship & Test

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

ii) Samples

All samples of adequate numbers, size, shades & pattern as per specifications shall be supplied by the contractor without any extra charges. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site



detailed literature / test certificate of the same shall be provided to the satisfaction of the Architect/consultant. Before submitting the sample / literature the contractor shall satisfy himself that the material / equipment for which he is submitting the sample / literature meet with the requirement of tender specification. Only when the samples are approved in writing by the architect / consultant the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall be signed by the Architect / Consultant for identification and shall be kept on record at site office until the completion of the work for inspection / comparison at any time. The Architect/Consultant shall take reasonable time to approve the sample. Any delay that might occur in approving the samples for reasons of its not meeting the specifications or other discrepancies inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment etc. shall be to the account of the contractor.

iii) **Cost of tests**

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

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

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

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

16.0 **Obtaining information related to execution of work**

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

17.0 **Contractor's superintendence**

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

18.0 **Quantities**

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

19.0 **Works to be measured**

The Architect/Consultant may from time to time intimate to the contractor that he require the work to be measured and the contractor shall forthwith attend or send a



quantity representative to assist the Architect in taking such measurements and calculation and to furnish all particulars or to give all assistance required by any of them. Such measurements shall be taken in accordance with the Mode of measurements detail in the specifications. The representative of the Architect / Consultant shall take measurements with the contractor's representative and the measurements shall be entered in the measurement book. The contractor or his authorised representative shall sign all the pages of the measurement book in which the measurements have been recorded in token of his acceptance. All the corrections shall be duly attested by both representatives. No over writings shall be made in the M book should the contractor not attend or neglect or omit to depute his representative to take measurements the measurements recorded by the representative of the Architect / consultant shall be final. All authorized extra work, omissions and all variations made shall be included such measurement.

20.0 Variations

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

21.0 Valuation of Variations

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

- a)
 - (i) The net rates or prices in the contract shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced herein.
 - (ii) Rates for all items, wherever possible should be derived out of the rates given in the priced BOQ.
- b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions do not vary the conditions under which any remaining items of Works are carried out, otherwise the prices for the same shall be valued under sub-Clause 'c' hereunder.
- c) Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items or works are carried out, then the contractor shall within 7 days of the receipt of the letter of acceptance inform the Architect/ consultant of the rate which he intends to charge for such items of work, duly supported by analysis of the rate or rates claimed and the Architect/ consultant shall fix such rate or prices as in



the circumstances in his opinion are reasonable and proper, based on the market rate.

- d) Where extra work cannot be properly measured or valued the contractor shall be allowed day work prices at the net rates stated in the tender, of the BOQ or, if not, so stated then in accordance with the local day work rates and wages for the district; provided that in either case, vouchers specifying the daily time (and if required by the Architect/Consultant) the workman's name and materials employed be delivered for verifications to the Architect /consultant at or before the end of the week following that in which the work has been executed.
- e) It is further clarified that for all such authorized extra items where rates cannot be derived from the tender, the Contractor shall submit rates duly supported by rate analysis worked on the 'market rate basis for material, labour hire / running charges of equipment and wastages etc. plus 15% towards establishment charges, contractor's overheads and profit. Such items shall, not be eligible for escalation.

22.0 Final measurement

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

23.0 Post Completion requirements & Virtual Completion Certificate (VCC)

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

- a) Clear the site of all scaffolding, wiring, pipes, surplus materials, contractor's labour equipment and machinery.
- b) Demolish, dismantle and remove the contractor's site office, temporary works, structure including labour sheds/camps and constructions and other items and things whatsoever brought upon or erected at the site or any land allotted to the contractor by the SBIIMS Pvt. Ltd. not incorporated in the permanent works.
- c) Remove all rubbish, debris etc. from the site and the land allotted to the contractor the SBIIMS Pvt. Ltd. and shall clear, level and dress, compact the site as required by the SBIIMS Pvt. Ltd.
- d) Shall put the SBIIMS Pvt. Ltd. in undisputed custody and possession of the site and all land allot by the SBIIMS Pvt. Ltd.
- e) Shall hand over the work in a peaceful manner to the SBIIMS Pvt. Ltd.
- f) All defects / imperfections have been attended and rectified as pointed out by the Architects to the full satisfaction of SBIIMS Pvt. Ltd.

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



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

24.0 **Work by other agencies**

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

25.0 **Insurance of works**

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

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

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

25.2 **Indemnification against Damage to persons and property**

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

- a) The permanent use or occupation of land by or any part thereof.
- b) The right of SBIIMS Pvt. Ltd. to execute the works or any part thereof on, over, under, in or through any lands.



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

25.3 Contractor to indemnify SBIIMS Pvt. Ltd.

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

25.4 Contractor's superintendence

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

25.5 Third Party Insurance

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

25.5.2 Minimum amount of Third Party Insurance

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

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

25.7 Accident or Injury to workman:



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

25.7.2 Insurance against accidents etc. to workmen

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

25.7.3 Remedy on contractor's failure to insure

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

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

26.0 Commencement of Works:

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

27.0 Time for completion

Time is essence of the contract and shall be strictly observed by the contractor. The entire work shall be completed within a period of **2 calendar month** from the date of commencement. If required in the contract or as directed by the Architect / consultant. The contractor shall complete certain portions of work before completion of the entire work. However, the completion date shall be reckoned as the date by which the whole work is completed as per the terms of the contract.



28.0 Extension of time

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

29.0 Rate of progress

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

30.0 Work during nights and holidays

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

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

31.0 No compensation or restrictions of work

If at any time after acceptance of the tender SBIIMS Pvt. Ltd. shall decide to abandon or reduce the scope of work for any reason whatsoever and hence not required the



whole or any part of the work to be carried out. The Architect / consultant shall give notice in writing 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 Architect / Consultant shall have in such cases the option of taking over all or any such materials at their purchase price or a local current rate whichever is less.

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

32.0 Suspension of work

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

33 Action when the whole security deposit is forfeited

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

- a) To rescind the contract (of which rescission notice in writing to the contractor by - Architect / consultant shall be conclusive evidence) and in which case the security, deposit of the contractor shall be forfeited and be absolutely at the disposal of SBIIMS Pvt. Ltd..
- b) To employ labour paid by the SBIIMS Pvt. Ltd. and to supply materials to carry out the work, or part of the work, debiting the contractor with the cost of the labour and



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

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

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

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

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

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

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

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

- a) has abandoned the contract; or
b) has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for 14 days after receiving from the SBIIMS Pvt. Ltd. through the Architect / consultant written notice to proceed, or
c) has failed to proceed with the works with such diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
has failed to remove the materials from the site or to pull down and replace work within seven days after written notice from the SBIIMS Pvt. Ltd. through the Architect



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

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

35.0 Certificate of payment

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

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

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

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

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

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



The Contractor shall not submit interim bills when the approximate value of work done by him is less than Rs.3.5 Lakh.

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

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

36.0 A. Settlement of Disputes and Arbitration

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

- i) If the contractor considers that he is entitled to any extra payment or compensation in respect of the works over and above the amounts admitted as payable by the Architect or in case the contractor wants to dispute the validity of any deductions or recoveries made or proposed to be made from the contract or raise any dispute, the contractor shall forthwith give notice in writing of his claim, or dispute to The M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office, Raheja Chambers, Free Press Journal Marg, Mumbai And endorse a copy of the same to the Architect, within 30 days from the date of disallowance thereof or the date of deduction or recovery. The said notice shall give full particulars of the claim, grounds on which it is based and detailed calculations of the amount claimed and the contractor shall not be entitled to raise any claim nor shall the SBIIMS Pvt. Ltd be in any way liable in respect of any claim by the contractor unless notice of such claim shall have been given by the contractor to the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office in the manner and within the time as aforesaid. The Contractor shall be deemed to have waived and extinguished all his rights in respect of any claim not notified to the M.D.& C.E.O. SBIIMS Pvt. Ltd., Head Office in writing in the manner and within the time aforesaid.

B. Settlement of Disputes and Arbitration

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

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



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

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

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

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

It is also a term of the contract that if any fees are payable to the Arbitrator these shall be paid equally by both the parties. However, no fees will be payable to the arbitrator if he is a SBIIMS Pvt. Ltd. Officer.

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

37.0 **Water supply**

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

- i) That the water used by the contractor shall be fit for construction purposes to the satisfaction of the Architect / consultant's.
- ii) The contractor shall make alternative arrangements for the supply of water if the arrangement made by the contractor for procurement of water in the opinion of the Architect / consultant is unsatisfactory.
- iii) In case contractor is permitted to use SBIIMS's source of water i.e. Municipal connection, Bore well (existing or new) etc., the SBIIMS Pvt. Ltd may consider recovering @1% of contract amount from the final bill of contractor.



- 37.1 The contractor shall construct temporary well / tube well in SBIIMS Pvt. Ltd land for taking water for construction purposes only after obtaining permission in writing from the SBIIMS Pvt. Ltd. The contractor has to make his own arrangements for drawing and distributing the water at his own cost. He has to make necessary arrangements. To avoid any accidents or damages caused due to construction and subsequent maintenance of the wells. He has to obtain necessary approvals from local authorities, if required, at his own cost. He shall restore the ground to its original condition after wells are dismantled on completion of work or hand over the well to the SBIIMS Pvt. Ltd. without any compensation as directed by the architect / consultant.
- 38.0 **Power supply**
The contractor shall make his own arrangements for power and supply / distribution system for driving plant or machinery for the work and for lighting purpose at his own cost, The cost of running and maintenance of the plants are to be included in his tender prices, He shall pay all fees and charges required, by the power supply and include the same in his tendered rates and hold the owner free from all such costs. He has to obtain necessary approval from the appropriate authorities, if required.
- 39.0 **Treasure trove etc.**
Any treasure trove, coin or object antique which may be found on the site shall be the property of SBIIMS Pvt. Ltd. and shall be handed over to the bank immediately.
- 40.0 **Method of measurement**
Unless otherwise mentioned in the schedule of quantities or in mode of measurement, the measurement will be on the net quantities or work produced in accordance with up to date rules laid down by the Bureau of Indian Standards. In the event any dispute / disagreement the decision of the Architect / consultant shall be final and binding on the corrector.
- 41.0 **Maintenance of registers**
The contractor shall maintain the following registers as per the enclosed perform at site of work and should produce the same for inspection of SBIIMS Pvt. Ltd/Architect / consultant whenever desired by them. The contractor shall also maintain the records / registers as required by the local authorities / Govt. from time to time.
- i) Register for secured advance
 - ii) Register for hindrance to work
 - iii) Register for running account bill
 - iv) Register for labour
- 42.0 **Force Majeure**
- 42.1 Neither contractor nor SBIIMS Pvt. Ltd. shall be considered in default in performance of the obligations if such performance is prevented or delayed by events such as but not war, hostilities revolution, riots, civil commotion, strikes, lockout, conflagrations, epidemics, accidents, fire, storms, floods, droughts, earthquakes or ordinances or any act of or for any other cause beyond the reasonable control of the party affected or prevents or delayed. However a notice is required to be given within 30 days from the happening of the event with complete details, to the other party to the contract, if it is not possible to serve a notice, within the shortest possible period without delay.
- 42.2 As soon as the cause of force majeure has been removed the party whose ability perform its obligations has been affected, shall notify the other of such cessation and the actual delay incurred in such affected activity adducing necessary evidence in support thereof.



- 42.3 From the date of occurrence of a case of force majeure obligations of the party affected shall be suspended during the continuance of any inability so caused. With the caused itself and inability resulting there from having been removed, the agreed time completion of the respective obligations under this agreement shall stand extended a period equal to the period of delay occasioned by such events.
- 42.4 Should one or both parties be prevented from fulfilling the contractual obligations by state of force majeure lasting to a period of 6 months or more the two parties, shall each other to decide regarding the future execution of this agreement.

43.0 Local laws, Acts Regulations:

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

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

- vii) Personal injuries (Compensation insurance) act 1 963 and any other modifications
- viii) Employees' provident fund and miscellaneous provisions Act 1952 and amendment thereof
- ix) Shop and establishment act
- x) Any other act or enactment relating thereto and rules framed there under from time to time.
- xi) Prevailing Indian Electricity rules & act.

44.0 Accidents

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

SPECIAL CONDITION OF CONTRACT

Scope of work

- 1.0 The scope of work is to carry out for the Air-conditioning of SBI, **PARTUR BRANCH, PARTUR.**

2.0 Address of site

The site is located at **SBI PARTUR BRANCH, PARTUR.**

3.0 Dimensions and levels



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

4 Notice of operation

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

5.0 Construction records

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

6.0 Safety of adjacent structures and trees

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

7.0 Temporary works.

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

8.0 Water power and other facilities

- a) The rate quoted by the contractor shall include all expenses that are required for providing all the water required for the work and the contractor shall make his own arrangements for the supply of good quality water suitable for the construction and good quality drinking water for their workers If necessary the contractor has to sink a tube well / open well and bring water by means of tankers at his own cost for the purpose The SBIIMS Pvt. Ltd. will not be liable to pay any charges in connection with the above
- b) The rate quoted in the tender shall include the expenses for obtaining and maintaining power connections and shall pay for the consumption charges
- c) The contractors for other trades directly appointed by the SBIIMS Pvt. Ltd. shall be entitled to take power and water connections from the temporary water and power supply obtained by the contractor However, the concerned contractor shall make



their own arrangements to draw the supply and pay directly the actual consumption charges at mutually agreed rates between them. All municipal charges for drainage and water connection for Construction purposes shall be borne by the contractor and charges payable for permanent connections, if any, shall be initially paid by the contractor and the SBIIMS Pvt. Ltd. will reimburse the amount on production of receipts

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

9.0 **Facilities for contractor's employees**

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

10.0 **Lighting of works**

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

11.0 **Firefighting arrangements**

- i) The contractor shall provide suitable arrangement for firefighting at his own cost. This purpose he shall provide requisite number of fire extinguishers and adequate number of buckets, some of which are to be always kept filled with sand and some with water these equipment shall be provided at suitable prominent and easily accessible place and shall be properly maintained.
- ii) Any deficiency in the fire safety or unsafe conditions shall be corrected by the contractor at his own cost and, to the approval of the relevant authorities. The contractor make the following arrangements at his own cost but not limited the following:
- a) Proper handling, storage and disposal of combustible materials and waste.
 - b) Work operations which can create fire hazards.
 - c) Access for fire-fighting equipments.
 - d) Type, number and location of containers for the removal of surplus materials and rubbish.
 - e) Type, size, number and location of fire extinguishers or other tire fighting equipment.
 - f) General house keeping

12.0 **Site order book**

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



from the site order book and one copy will be handed over to the party against proper acknowledgment and the second copy will be retained for their record.

13.0 Temporary fencing/ barricading

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

14.0 Site meetings

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

15.0 Disposal of refuse

The contractor shall cart away all debris, refuse etc. arising from the work from the site and deposit the same as directed by the architect / consultant at his own cost. It is the responsibility of the contractor to obtain from the local authorities concerned to the effect that all rubbish arising out of contractor's activities at the construction site or any other off-site activities borrow pits has been properly disposed off.

6.0 Contractor to verify site measurement

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

17.0 Displaying the name of the work

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

18.0 As built drawings

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

The contractor will modify the drawing prepared by him wherever the changes made by the SBIIMS Pvt. Ltd. / architect / consultant. And submit two copies of such



modified drawings to the architect/ consultant for approval. The architect / consultant will return one copy of the approved drawing to the contractor.

19.0 Approved make

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

20.0 Procurement of materials

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

21.0 Excise duty, taxes, levies etc.;

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

22.0 Acceptance of tender

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

23.0 Photographs:

- The Contractor shall at his own expense supply to the SBIIMS with duplicate hard copies of large photographs not less than 25 cm. x 20 cm. (10" x 8") of the works, taken from two approved portions of each building, at intervals of not more than one months during the progress of the work or at every important stage of construction.
- In addition to above, the contractor shall be bound to submit adequate no. of site photographs along with their each Running Bill for the project clearing showing major progress of work measured and claimed therein failing which the Architect/ SBIIMS Pvt. Ltd. may consider returning the Bill to the contractor and no claim for delay on this account will be entertained.

SAFETY CODE

1. First aid appliances including adequate supply of sterilized dressing and cotton wool shall be kept in a readily accessible place.
2. An injured person shall be taken to a public hospital without loss of time, in cases when the injury necessitates hospitalization.



3. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from the ground.
4. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30 cm. (clear) and the distance between two adjacent runnings shall not be more than 30 cm. When a ladder is used an extra mazdoor shall be engaged for holding ladder.
5. The excavated material shall not be placed within 1.5 meters of the edge of the trench half of the depth of trench whichever is more. All trenches and excavations shall be provided with necessary fencing and lighting.
6. Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one meter.
7. No floor, roof or other part of the structure shall be so overloaded with debris or material as to render it unsafe.
8. Workers employed on mixing and handling material such as asphalt, cement, mortar, concrete and lime shall be provided with protective footwear and rubber hand gloves.
9. Those engaged in welding works shall be provided with welders' protective eye shield and gloves.
10. (i) No paint containing lead or lead products shall be used except in the form of paste readymade paint.
(ii) Suitable facemasks should be supplied for use by the workers when the paint applied in the form of spray or surface having lead paint dry rubbed and scrapped.
11. Overalls shall be supplied by the contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during cessation of work.
12. Hoisting machines and tackle used in the works including their attachments anchor and supports shall be in perfect condition.
13. The ropes used in hoisting or lowering material or as a means of suspension shall be durable quality and adequate strength and free from defects.

APPENDIX HEREINBEFORE REFERRED TO

- 1) Name of the organization Offering Contract: To,
The Vice President and Circle Head,,
SBI Infra Management Solutions Pvt.
Ltd, State Bank of India,
3rd Floor, Local Head Office,
Synergy Building, Bandra Kurla
Complex, Bandra (E),
Mumbai- 400 051.
- 2) Consultants : -----
- 3) Site Address : **PARTUR BRANCH, PARTUR**



- 4) Scope of Work : **Proposed Air-conditioning Of " SBI, PARTUR BRANCH, PARTUR**
- 5) Name of the Contractor : -----

- 6) Address of the Contractor : -----

- 7) Period of Completion : 3 (Three)month from the dated of Commencement
- 8) Earnest Money Deposit : **Rs. 15,000/- (Fifteen thousand) by means of Demand Draft / Pay Order** from any scheduled Nationalized Bank drawn **in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.**
- 9) Retention Money : As per clause no. 11(a) of general Conditions
- 10) Defects Liability Period : Twelve Months from the date of Virtual Completion.
- 11) Insurance to be undertaken by the Contractor at his cost : 125% of Contract Value (Contractor's all risk policy)
- 12) Liquidated damages : 0.5% of the Contract amount shown in the tender per week subject to max. 5% of the contract value or actual final bill value.
- 13) Value of Interim Bill (Min.) : Rs. 3 Lakhs.
- 14) Date of Commencement letter : 15 days from the date of acceptance

is issued to the Contractor/ or the day on which the Contractor is instructed to take possession of the site whichever is earlier.
- 15) Period of Final Measurement : 3 Months from the date of Virtual Completion.
- 16) Initial Security Deposit Tender. (Clause No. 22) : 2% of the Accepted Value of the
- 17) Total Security Deposit : As per clause No. 11 a
- 18) Refund of initial Security Deposit Comprising of EMD and ISD. : 50% of the Security Deposit shall be refunded to the Contractor on completion of the work and balance



refunded only after the Defect Liability Period is over.

- 19) Period for Honoring Certificate :
1. One Month for R.A. Bills
 2. The final bill will be submitted by the Contractor within one month of the date fixed for completion work and the Bill shall be Certified within 3 months from the date of receipt of final bill provided the bills are submitted with all pre-requisite documents/test reports etc. prescribed in the tender.

Signature of Tenderer.

Date:

LETTER OF DECLARATION

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

Dear Sir,

Proposed Electrical Works of "PARTUR BRANCH, PARTUR".

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

MEMORANDUM

(a)	Description of work	Proposed Air-conditioning SBI, PARTUR BRANCH, PARTUR
(b)	Earnest Money	Rs. 15,000/- (Fifteen thousand only) by means of Demand Draft / Pay Order from any scheduled Nationalized Bank drawn in favour of SBI Infra Management Solutions Pvt. Ltd. and payable in Mumbai.



(c)	Time allowed for completion of work from the date of issue of work order.	3 (Three) month from the date of commencement as per tender.
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Should this tender be accepted, I/we hereby agree to abide by and fulfill the terms and provisions of the said conditions of Contract annexed hereto so far as they may be applicable or in default thereof to forfeit and pay to SBIIMS PVT.LTD., the amount mentioned in the said conditions.

I/we have deposited Demand Draft / Banker's Cheque / FDR for a sum of **Rs. 15,000/- (Fifteen thousand only)** as Earnest money deposit with the SBI Infra Management Solutions Pvt. Ltd. Should I/we do fail to execute the contract when called upon to do so, I/we hereby agree that this sum shall be forfeited by me/us to SBI Infra Management Solutions Pvt. Ltd.

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

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

Yours faithfully,

Signature of contractor
With Seal

INDEX
PROFORMAS OF VARIOUS TESTS

TABLE NO.	DESCRIPTION	PAGE NO.
1.	Record of Cement/Received/Used/Balance.	
2.	Proforma of Paint/Lead/CICO Register.	
3.	Bank for Reinforcement Bars Received.	
4.	Proforma for Register of Material of Site Account.	
5.	Proforma for Account of Secured Advance Register.	
6.	Proforma for Bulkage Test of Sand Register.	



7. Proforma for Silt Test Register.
8. Proforma for Sieve Analysis of Fine Aggregate Register.
Proforma for Sieve Analysis of Coarse Aggregate Register.
9. Proforma for Slump Test Register.
10. Proforma of Cube Test Register.
11. Proforma for Hindrance to Work.
12. Proforma for Running A/c. Bill.
13. Account of Secured Advance if Admissible on Materials Held at Site by the Contractors
14. Memorandum for Payment.

TABLE-I

RECORD OF CEMENT RECEIVED / USED / BALANCE

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

TABLE-II

RECORD OF PAINT / LEAD / CICO REGISTER

Name of work :

Name of the Contractor :

Agreement No. :

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



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

BANK FOR REINFORCEMENT BARS RECEIVED

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

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

TABLE-IV

PROFORMA FOR REGISTER OF MATERIAL AT SITE ACCOUNT

Name of Work : Name of Article :
 Name of Contractor : Estimated Requirement :
 Agreement No. : Issue Rate :

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



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TABLE-V

PROFORMA FOR REGISTER OF MATERIAL AT SITE ACCOUNT

Name of Work :

Name of Contractor :

Agreement No. :

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

TABLE-VI



PROFORMA FOR BULKAGE TEST OF SAND REGISTER

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

TABLE-VII

PROFORMA OF SILT TEST REGISTER

S. No.	Date of Test	Height of Sand in Cylinder innundated & stirred	Height of Silt	Max percenta ge of silt as specified	Percentag e of silt obtained	Signat ure of Site Engin eer	Signatur e of Contract or	Initial of Bank's / Representa tive (Periodical)
1	2	3	4	5	6	7	8	9



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TABLE-VIII

PROFORMA SIEVE ANALYSIS OF FINE AGGREGATE REGISTER

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



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TABLE-IX

PROFORMA OF SIEVE ANALYSIS OF COARSE AGGREGATE REGISTER

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



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TABLE-X

PROFORMA FOR SLUMP TEST REGISTER

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



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TABLE-XI

PROFORMA OF CUBE TEST REGISTER

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



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TABLE-XII

PROFORMA FOR HINDRANCE TO WORK

Name of Work : Date of Start of work :
 Name of Contractor : Period of Completion :
 Agreement No. : Dt. of Completion of work :

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



PROFORMA FOR RUNNING A/C BILL

- i. Name of Contractor / Agency :
- ii. Name of Work :
- iii. Sl.No. of this Bill :
- iv. No. & Date of previous Bill :
- v. Reference to Agreement No. :
- vi. Date of Written order to commence :
- vii. Date of Completion as per Agreement :

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

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

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

Net Value since previous bill



CERTIFICATE

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

Signature and
date of Contractor

Signature and
date of Architects
Representative (Seal)

Signature and
date of Site Engineer

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

Architect

Signature and
date of Site Engineer

TABLE - XIV

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

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

Total value of materials at Site.

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

CERTIFIED:



- (i) That the materials mentioned above have actually been brought by the Contractor to the site of the work and on advance on any quantity of any of this item is outstanding on their security.
- (ii) That the materials (are of imperishable nature) and are all required by the Contractor for use in the work in connection with the items for which rates of finished work have been agreed upon.

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

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

Dated Signature of
the Contractor

TABLE - XV

MEMORANDUM FOR PAYMENT

R/A BILL NO.

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

OBJECTIONS:

i)	Secured Advance paid in the previous R/A	Rs. -----
----	--	-----------



ii)	Retention money on value of works as per accepted tenders upto date amount Rs.	Rs. -----
	Less already recovered	Rs. -----
	Balance to be recovered	Rs. -----
iii)	Mobilization Advance, if any	
(a)	Outstanding amount (principal + interest) as on date	Rs. -----
(b)	To be recovered in this bill	Rs. -----
iii.	Any other Departmental materials cost to be recovered as per contract, if any	Rs. -----
iv.	Any other Departmental service charges to be recovered if any, as per contract (water, power etc.) enclose statement.	Rs. -----
	Total Deduction as per contract (F)	Rs. -----
	Adjustments, if any ----- Amount less received by Contractor in ----- R/A Bill (as per statement of Contractor)	Rs. -----
	P.V.A.	Rs. -----
	Total amount payable as per contract (E+F+G)	Rs. -----
	(Rupees ----- in words)	

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

Date: -----

Signature of Architect
with Seal

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



Date : -----

Signature of Owners
Engineer

STATUTORY DEDUCTION:

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

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

Date: -----

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

TECHNICAL SPECIFICATIONS FOR AIRCONDITIONING INSTALLATION WORK

SCOPE OF WORK:-

The AC Contractor's scope of work covers the following:-

1. Supply of split AC 1.0/1.5 TR. (5 star):-

Sr.	Specification	Values
1	Power Supply	1Phase, 230-240Volts,50HZ
2	Cooling Capacity rated full/half	5.28-5.3/2.65KW
3	Rated Power Consumption	1014Watts
4	Power Consumption full/half	1295-1350/448-470
5	Annual Power Consumption	781-786units
6	Indian Seasonal energy ratio(ISEER)	5.2
7	Star Rating	5Star
8	Voltage Range	187-265Volts
9	Operating Current	5.9-605amps
10	Compressor Type	Hermetic Rotary DC inverter
11	Refrigerant	R290 or R410A
12	Operating Range CDB	16/18-52
13	Maximum Length if refrigerant pipe	5m
14	Operating sound indoor	48-52db
	Operating sound out door	55-58db
15	Comprehensive product Warranty	1years
16	Compressor Warranty	5years
17	AMC	5years

Wall mounted air conditioner shall have 1.0 i.e. nominal 12,000 BTU/capacity per Hour and 1.5 TR i.e. nominal 18,000 BTU/capacity per hour at the ambient of 40 degree centigrade capacity. Unit shall have maximum 45/46 dB noise level at the distance of 1 MT for outdoor/indoor units. The unit shall be suitable for 230 volts power supply. With temperature indicator and remote for operation. (5- Start AC high wall type split A/C). The air filter shall be easy to maintain and preferable showing the status of choking. Every unit shall be supported by warrantee of one year however sealed unit warrantee must be given for 5 years from the manufacturer. CONDENSOR MUST BE OF COPPER METAL.

2. Installation of split 1 & 1.5 TR:-

Total work comprising of unpacking till commissioning of each units indoor as well as outdoor. Connecting the pipes & electrical cables/wires. With necessary support & fabricating for hanging the unit from ceiling. Installation shall be done with the Control panel.

The installation of A/C. charging towards installation testing and commissioning of

Split and cassette A/C. this includes nitrogen flushing, pressure testing, attending leakages, loading, unloading, gas charging and panel fittings.

3. Extra copper pipe:

- a) The contractor shall have to provide extra length of copper pipe with proper lagging to make the perfect job of insulation. All the copper pipe shall be without joints and proper flare-up shall be done with tools and tackles for excellent workmanship. No dent shall be allowed while bending the pipe or laying it on connecting it to machine/evaporator/condenser. High grade of foam insulation shall be provided. Entire piping shall be done over the false ceiling and do not compromise any aesthetic look. THIS IS THE LENGTH OTHER THAN SUPPLIED for 1.0 & 1.5 TR. A/C with manufacturer kit.
- b) **Note-In case of High wall split type AC (1/1.5 TR) unit, the 5.0 RMT of Electrical cabling, Copper Refrigerant Piping and Drain water piping shall not be considered in the measurement.**

4. Drain water piping:-

Condensed water in the interior of the banking hall shall be drained outside/toilet Block through gravity-slop. The entire piping shall be 25 M.M. ISI approved pipes to carry condensed water. All the piping shall be maintainable and testing shall be done before connecting.

4. Wiring:-

SPLIT/CASSET UNIT TO OUTDOOR UNIT

All the wiring shall be of approved make only. The wiring shall pass through ISI approved conduits as mentioned in approved list of materials. Any drilling of the wall for getting copper pipe or wiring shall be sealed and finished by the A.C contractor. Size of the wires shall be 3x 2.5 sq. m. m. for A.C contractor for each & every A.C unit. Minor civil work like opening in the walls for piping and cables and finishing the same. pipes & cables between through wall shall be taken through sleeves and plugged to avoid leakages, condenser mounting with all accessories vibration mounting pads etc., piping and cabling connections at indoor.

5. Civil work:

The A/C contractor has to complete the zari work in the wall and coordinate with the civil contractor while doing flooring to run the drainage pipe etc. finishing has to be done by the A/C contractor with required labour & materials.

6. SPECIFICATIONS FOR INDOOR UNITS

a. Cassette type indoor units.

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

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

The unit shall be pre charged with first charge of R 407 / R 410 refrigerant.



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

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

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

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

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

The unit shall be supplied with suitable decorative panel.

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

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

Operation Manual

Installation Manual

Paper pattern for installation

Drain hose/ Clamp metal/ Washer fixing plate/ Sealing pads/ Clamps/

Screws/ Washer for hanging bracket/ Insulation for fitting

b. Wall Mounted Units.

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

The unit shall be pre charged with first charge R 410 refrigerant.

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

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

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

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

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

The unit grille must be washable with soap solution.

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



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

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

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

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

a – 1: COPPER TUBING.

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

1. Material composition should be conforming to C-1220 (JIS-H-3300) or C-12200 (ASTM). It should have a minimum Copper content of 99.9 % and Phosphorus content between 0.015 % and 0.040 %. It should have low residue (below 0.038 gm / sq mtr). The material should also be as per the RoHS norms specified by EU; that is, Mercury, Chromium and Lead contents below 1000 ppm, and Cadmium content below 100 ppm.
2. Physical properties of the material should conform to JIS-H-3300 or ASTM-B-68 & B-75, should be tested for Tensile / elongation / hardness / grain size tests as per ASTM B –280.
3. Dimensional tolerance should be as per JIS-H-3300 or ASTM-B-251. The tubes should be tested using non-destructive Eddy current test before the final anneal, as per JIS- H-3300 or ASTM-E-243.
4. Heat treatment should be carried out in non-oxidizing atmosphere to ensure oxygen free and Cuprous oxide-free surface.
5. Proper certificates describing composition and results of all tests carried out must be supplied with each consignment. These certificates, along with check results for dimensional and thickness accuracy are recommended to be carried out for every delivered lot, should be maintained till handing over of the project.
6. Tubes should have 360 degree concentric wall thickness along their entire length.
7. Wall thickness for soft tubes (bright annealed mirror finish) should be 0.8 mm for ¼”, 3/8” & ½” tubes, 1.0 mm for 5/8” tubes, 1.2 mm for ¾” tubes. Wall thickness for hard tubes should be 1 mm for 7/8”, 1” and 1.1/8” tubes, 1.1 mm for 1.1/4”, 1.2 mm for 1.3/8” and 1.3 mm for 1.5/8” tubes.
8. Wall thickness for elbows and fittings should be minimum 0.2 mm more than corresponding tube / tube size.
9. For 1/4” to sizes up to ¾”, pulley type benders should be used for soft tubes and brazed joints should be avoided as far as possible. Similarly, for half hard tubes of size 3/4” or more, one side expanded tubes must be used and use of couplings should be avoided as far as possible.



a -2 : TUBING DESIGN:

1. Contractor should study the tender / GFC drawings carefully, and should carry out detailed survey of site, relating the drawings with site, and understand the system design and site limitations.
2. Contractor should also collect final architectural and reflected ceiling plans from client and study the drawings for any mismatches with the HVAC drawings received.
3. Contractor should discuss any such mis- matches and any doubts regarding system design with the consultant and get all doubts clarified.
4. Before commencement of tubing work, proper shop drawings must be generated by the contractor, and same should be got approved from the consultant. The drawings must clearly indicate schematic flow diagrams for various circuits, tube sizes, description and quantities for refrigerant joints, indoor and outdoor unit models and room / block /floor names, tube routes, levels for horizontal tubes, details regarding insulation type and thickness and surface treatment for insulation, typical and critical sections and any other details to explain the entire tubing layout to the installer.
5. Tube sizing and routing must be carried out taking into consideration various site constraints and system manufacturer's recommendations.
6. Care should be taken to design tubing as per the manufacturer's recommendation for maximum tubing total length, maximum tubing length after first tapping, vertical height difference between outdoor and indoor units etc. and necessary corrections should be carried out in outdoor unit capacity if required.

a- 3 : REFRIGERANT TUBING INSTALLATION WORK:

1. The installer must first study the shop drawings in detail with respect to the site condition and point out any fouling / alternatives to the agency prepare shop drawing and necessary revisions must be carried out in the drawings, to be approved by consultant.
2. The layout must be marked on the true ceiling and any civil openings required should be marked and got done from concerned agency.
3. Supports as described in BOQ / specifications should be installed, leaving adjustable free length for supports.
4. Before installation, the tubes and tubes must not be removed from their original packing. Proper storage of tubing is a must to maintain the temper of the tubes / tubes. Any abrasion on ends / surface, or any in grace of dirt / dust must be avoided. Proper Polyethylene sheets should be used for covering the tubes and tubes, while wooden pellets and soft expanded Polyethylene / rubber sheets should be used as floor supports.
5. Necessary loops / slopes must be followed as recommended by system manufacturer.
6. Tubes must be cut to required sizes using cutting tools recommended by system manufacturer.



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

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

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

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

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

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

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

a – 4: RECOMMENDATIONS FOR PRESSURE TESTING:

Refrigerant tubes carry refrigerant at pressures different from atmospheric pressure. When pressure inside tubes is more than atmospheric pressure, refrigerant may escape to the atmosphere, causing commercial loss due to loss of refrigerant, inefficient system performance or even system breakdown and contamination of surroundings. When pressure inside the tubes is less than atmospheric pressure, such as in case of suction tubes of some low temperature refrigeration machines, or during pump-down cycle of normal air-conditioning systems, leakages in tubes leads to ingress of air and moisture, causing severe system damage. Therefore, it is a must that the refrigerant tubing is thoroughly tested for leakages. Pressure testing for any tubing must be carried out at a pressure higher than the maximum operating pressure within the system. It is



recommended that the pressure recommended by manufacturer be followed very strictly. Testing at lower pressures may lead to non-detection of some small leakages, while testing at higher pressures may lead to damage to some factory manufactured components within the system. Generally, for R-410 systems a pressure of around 650psig is used. Nitrogen is the most common gas used for carrying out pressure testing. It has numerous advantages, some of which are listed below:

1. Nitrogen is easily available as a commercial gas packed in easy to handle cylinders.
2. Nitrogen, being the most abundant component of the atmosphere, is safe for leaking out without contaminating the atmosphere.
3. Nitrogen is less costly as compared with other gases.
4. Nitrogen is safe for handling and testing.
5. Nitrogen does not readily react with system components Pressure gauge/s used for testing must be calibrated and a calibration certificate with traceability to a Government(National) Physical Laboratory must be documented. The gauge should be capable of measuring pressure at least 10% above the reading to be recorded.

a – 5 : PROCEDURE FOR CARRYING OUT PRESSURE TEST

- 1) Ensure that the tubing to be tested is properly secured/supported and the openings have been sealed off as per manufacturer's recommendation.
- 2) Install pressure gauge/s at strategic location/s where it shall not be tampered with, at the same time, should be easily visible.
- 3) Install a valve and connecting tubing so that the open end of the tube reaches the cylinder outlet without moving the cylinder.
- 4) Connect the tube to the cylinder and after ensuring proper connection, crack open the cylinder valve, keeping an eye on the pressure gauge. Let the pressure rise to around 10 psig.
- 5) Check for proper sealing of all flanged / flare nut joints or valves/ valve glands looking for noise of escaping Nitrogen and seal same.
- 6) Open the cylinder valve again and raise the pressure to 200 psig.
- 7) Check the tube line for major leakages at brazed joints, elbows, valve glands, equipment end connections and tube seams with the help of soap water. Make up the leaks by tightening nuts. If the leaks are in brazed joints, flush out Nitrogen and carry out necessary re-brazing.
- 8) Open the cylinder valve again and increase the pressure to 150 psig less than the final test pressure. Repeat leak check as above.
- 9) Open the cylinder valve again and slowly raise the pressure to the manufacturer recommended pressure. Carry out a thorough leak check.

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

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

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

a – 6 : DOCUMENTATION RECOMMENDED FOR ENSURING PROPER QUALITY ASSURANCE:

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

GENERAL:

ACR GRADE COPPER TUBES AND FITTINGS : SIZES AND SPECIFICATIONS

Tube material Specification:

(CFC- free refrigerant compatible tubes produced using Total loss lubricants)

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

Copper tube and Fittings Sizes and Insulation Specifications for CFC-free Refrigerant. S. 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)	20mm



Use Soft tube only for Indoor Unit Connection

INSULATION TO REFRIGERANT PIPING:

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

11. COMMUNICATION CABLE AND CONTROL CABLING:

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

E.01 Unless otherwise mentioned in the Technical specifications, the equipment and materials shall conform to the following standards:

E.01.01 IS 3615 – Glossary of terms used in refrigeration and air conditioning

E.01.02 IS 325 – Three phase induction motors

E.01.03 IS 1822 – Motor starters of voltages not exceeding 1000 V

E.01.04 IS 996 – Single phase small AC and universal motors

E.01.05 IS 1239 – Mild steel tubes, tubulars and other wrought steel fittings

E.01.06 IS 3589 – Electrically welded steel pipes for water, gas and sewage

E.01.07 IS 6392 – Steel pipe flanges

E.01.08 IS 778 – Gun metal gate, globe and check valves for general purposes

E.01.09 IS 277 – Galvanised steel sheets

E.01.10 IS 737 – Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes

E.01.11 IS 655 – Metal air ducts

E.01.12 IS 732 – Code of practice for electrical wiring and fittings for buildings

E.01.13 IS 2516 – AC circuit breakers for voltages not exceeding 1000 V

E.01.14 IS 900 – Code of practice for installation and maintenance of induction motors

E.01.15 IS 1248 – Direct acting electrical indicating instruments

E.01.16 IS 4047 – Heavy duty air break switches and composite units of air break switches and fuses for voltages not exceeding 1000 V.

E.01.17 IS 8183 – Specification for bonded glass/ mineral wool

E.01.18 IS 660 – Safety code for mechanical engineering

E.01.19 IS 659 – Safety code for air conditioning

E.01.20 IS 5216 – Code for safety procedures and practices in electrical works

E.01.21 IS 3016 – Code of practice for fire precautions in welding and cutting operations



12. DRAIN PIPING:

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

13. DX AHU TYPE AIR CONDITIONING SYSTEM

i. Scope of Work:

The scope of work covered under this tender includes design, supply, installation, testing & commissioning of the HVAC system for the application mentioned, and shall be generally as per the schedule of quantities and scope/tender drawings.

ii. LIST OF WORKING DRAWINGS TO BE SUBMITTED BY CONTRACTOR

The following is an indicative List of Working Drawings to be submitted by the Contractor. List of Drawings applicable for the present project shall be prepared by the HVAC Contractor on award of work and approved by the Engineer In-Charge:

- AIR DUCTING LAYOUT INCLUDING DIFFUSERS/GRILLES COORDINATED WITH LIGHTING, FALSE CEILING & EQUIPMENT LAYOUT, OTHER SERVICES, ETC.
- A/C EQUIPMENT LAYOUT INCLUDING INDOOR/OUTDOOR UNITS, ACCESS DOORS, DUCTS & PIPES, FRESH AIR/EXHAUST AIR, HVAC POWER PANELS, CONTROL PANELS, ETC.
- OUTDOOR UNIT LAYOUT WITH PLATFORM/STRUCTURE/STANDS
- HVAC SECTIONS
- INDOOR & OUTDOOR EQUIPMENT DIMENSIONS & CONNECTION DETAILS
- GA DRAWING OF PANEL BOARDS
- INSTALLATION DETAILS FOR GRILLES/DIFFUSERS, PIPING, DUCTING, PIPE TRAYS, ETC

ANY OTHER DRAWINGS REQUIRED DURING EXECUTION

iii. EQUIPMENTS & OTHER SPECIFICATIONS

ITEM DESCRIPTION

DX TYPE DOUBLE SKIN AIR HANDLING UNITS (DSAHUs):

Scope: The scope of this section comprises the supply, installation, testing and commissioning of Direct Expansion Type Air Handling unit with controls, equipments and instruments conforming to these Specifications and in accordance with the requirements of Drawings and Schedule of Quantities.

- a. **TYPE:** The Air Handling Units shall be in double skin construction with sandwiched insulation between the outer and inner skins. The sections of the DSAHU shall be as described in the Schedule of Quantities. In general, these include: mixing section for return and fresh air module and RA damper, pre filter and secondary bag filter sections, cooling coil section with DX coil having specified number of rows (minimum 6 row or as specified in **Schedule of Quantities**), centrifugal blower section with DIDW blower fan with driver squirrel cage induction motor and suitable drive, common base frame with spring type vibration isolation for Motor Blower Assembly, eliminators, fine filters, suitable inspection doors for filter, coil & blower sections, etc. (as applicable and as mentioned in Schedule of Quantities). The capacity of the DSAHU viz. air-flow and pressure shall be as shown on Drawings/ described in Schedule of Quantities. AHU Drawing and data sheet as per the vendor's equipment should be submitted with quotation. The units shall conform to latest applicable Indian standards and shall also comply with all applicable statutory regulations and safety codes in the premises where the equipment shall be installed. Air Handling Units shall be selected for the lowest operating noise level. Fan performance rating and power consumption data, with operating points clearly indicated shall be submitted along with the quotation, and verified at the time of testing and commissioning of the installation.
- b. **Construction:** Unless otherwise specified, the outer/inner skin shall be made of **20/22** gauge pre- plasticised/ plastic-coated/ powder-coated galvanised steel; and the main frame of self-supporting hollow extruded thermal break aluminium profiles/sheet steel channel with aluminum joiners & self- adhesive gaskets. Insulation shall be of **43/50** mm thick injected polyurethane foam (PUF)/ rigid slabs. The maximum „K“ factor shall be 0.02 Watt/m Deg C. The panels shall be mounted using SS screws onto 1.6 mm thick extruded aluminium-alloy box section/channel frame or galvanised steel frame with suitable height legs for adequate U-trap for the AHU static pressure rating. Where specified in Schedule of Quantities, Thermal break should be provided in the central core of extrusions and there should be no metal to metal contact between inner and outer surfaces of thermal break structural frame work. The frame work shall be joined together with extrusions cut at 45° and joined together with corner plates. All the panels shall be detachable or cast aluminium hinged with stainless steel pivots. The handles shall be made of hard nylon with cam type adjustable seating arrangement to ensure perfect sealing. DSAHUs shall be suitable for easy on-site assembly. Length of each section of the DSAHU shall be adequate to ensure uniform & streamlined air flow; facilitate access, maintenance & replacement of the internal components; and allow proper distance between successive components for satisfactory operation & performance.
- c. **Condensate Pan:** Sandwich insulated Condensate drain pan shall be fabricated from minimum 18G stainless steel sheet (SS 304) with all corners welded with uniform slope from all sides leading to drain point ensuring no stagnation of condensate water. Drain point/pipe coming out from AHUs should be also of SS 304. It should be isolated from bottom floor panels through 25 mm heavy duty TF expanded polystyrene or polyurethane foam. Drain plug shall be provided in the bottom of the coil section.

- d. **Fresh Air & Return Air Damper:** DSAHUs with mixing box shall be complete with fresh and return air dampers if mentioned in **Schedule of Quantities**. All dampers shall be low-leakage, opposed blade type. Blades shall be made of double skin aerofoil design extruded aluminium alloy frame. All linkages and supporting spindles shall be made of aluminium or nylon, turning in Teflon bushes. Manual dampers shall be provided with a Bakelite knob for locking the damper blades in position. Linkages shall be extended wherever required for motorised operation. Damper frames shall be sectionalised to minimise blade warping. Air leakage through dampers in the closed position shall not exceed 1.5% of the maximum design air volume flow rate at the maximum design air total pressure. Proper SS filter/wire mesh and a factory assembled pre-filter section containing 50 mm thick washable synthetic type air filters assembled in anodised aluminium/ SS frame shall be provided at fresh air intake with cowls type arrangement. The percentage controlled while working of damper shall be written on upper side of damper.
- e. **Blower fan:** Fan shall be draw-through type, high efficiency, dynamically balanced, centrifugal, BACKWARD-curved type (as called for by the application); in class II construction. Fan Casing shall be made of galvanised steel sheet. Fan wheels shall be made of galvanised steel. Fan shaft shall be of ground C40 carbon steel and supported in pre-greased ball bearings operating at less than 75% of the first critical speed. Fan wheels and pulleys shall be individually tested and precision balanced dynamically.
- f. **Fan Motor:** Fan motors shall be high-efficiency, 4-pole, 415+/-10% volts, 50 Hz, three phases, totally enclosed fan-cooled, with class F insulation and IP-55 protection. Motors shall be specially designed for quiet operation. Motor shall be mounted inside the AHU casing on slide rails for easy belt tensioning. Drive arrangement shall be with dynamically balanced, constant pitch pulleys and oil-resistant belts, with the drive selected at 110% of motor horsepower. Fan should be driven through standard V Belt/s
- g. **Interlock:** Interlocking arrangement shall be provided to stop the fan motor when the access doors in the fan section or adjoining sections are opened, with a manual overriding provision.
- h. **Motor Blower Assembly:** Both fan and motor assemblies shall be mounted on aluminium alloy or galvanised steel of suitable common base frame. Isolation of fan from the unit casing shall be provided by spring and rubber anti vibration mounts; and flame retardant, waterproof neoprene impregnated flexible connection on the fan discharge. Motor blower assembly should be mounted with suitable spring type vibration isolator.
- i. **Glands:** Suitable compression glands for cable entry and nozzles for pressure measurement/filter testing shall be provided with closure for unused nozzles.
- j. **DX type Cooling Coil:** DX Type cooling coils shall be of suitable dia copper tubes and 20G or suitable thick with sine wave aluminium fins firmly bonded to copper tubes assembled in zinc coated steel frame with minimum 6-row deep as specified in **Schedule of Quantities**. Cooling coil shall be AHRI approved. Each coil shall

be factory tested air / N2 pressure under water. Tube shall be hydraulically/mechanically expanded for minimum thermal contact resistance with fins. The cooling coil assembly shall be on aluminium rails and nylon rollers for easy withdrawal from either side.

- k. **Filters:** Each unit shall be provided with a factory assembled pre-filter section containing 50 mm thick washable synthetic type air filters assembled in anodised aluminium/ SS frame. The media shall be supported with HDP mesh on one side and aluminium/SS mesh on other side. Filter banks shall be easily accessible and designed for easy withdrawal and replacement of filters. Filter framework shall be fully sealed and constructed from aluminium alloy. Filter face velocity shall not exceed 450 FPM. The panel filters shall be 90% / 92% ASHRAE 52/76 GRAVIMETRIC (Grade-IV EUROVENT 4/5) unless otherwise specified.
- l. **Access Door:** DSAHUs shall have adequate nos. of air tight, hinged, quick operating access doors, with nylon hinges and locks openable from both inside and outside in the fan and filter sections and in all other sections as required and/or as shown on the drawings. Access doors shall also be insulated, double skin type. The location & dimensions of access doors shall be suitable for the duty. Doors shall be provided on the accessible side of the DSAHU keeping in view the installation layout.
- m. **Painting:** Shop coats of paint that become marred during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas; and then coated with paint to match the finish over the adjoining shop painted surface.

AIR COOLED CONDENSING UNITS (OUT DOOR UNITS):

SCOPE: The scope of this section comprises the supply, installation, testing and commissioning of air cooled condensing unit with controls, equipments and instruments conforming to these Specifications and in accordance with the requirements of Drawings/ Schedule of Quantities.

GENERAL: The Condensing 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. Air-cooled condensing unit of suitable capacity with Scroll/Rotary compressor of reputed make complete with copper piping, refrigerant gas, HP and LP cut-outs, microprocessor based control panel, temperature controller, Thermostatic expansion valves, suitable insulation of the suction line, suitable size of fan etc. Microprocessor controller should be loaded with features like auto switch on or off compressors, auto restart after power failure, runtime equalization of the compressor & time delay between compressor starts in case of multi compressor units, anti-recycle time delay to protect compressors from instant start/restart. The condensing units shall be mounted on suitable supporting MS structure.

- n. **Compressor:** Compressor shall be of the hermetically sealed scroll/rotary type with Gas cooled motor, balance and mounted on vibration absorber to provide

quite, free floating operation. Compressor shall be protected against overload protection and single phasing protection. Refrigerant should be **R410 / R407**

- o. Control:** Unit shall be completely factory wired internally. Electrical characteristics of unit shall be 415+/-10% volts, 50 Hz, three phase AC. Compressor and fan motor shall be served by separated thermal and electrical over load protection. High-Low pressure-stat shall be provided to protect compressor against excessively high and too low pressure. Control thermostat shall be located in unit return air stream / room. Control circuit shall be such that compressor cannot restart without manual resetting when it trips due to any reason other than thermostat tripping. Compressor shall be interlocked with blower fan so that it cannot start unless fan is on. All necessary safety devices shall be provided to ensure safe operation of the system.
- p. Condensing coil:** The Condensing coils shall be constructed out of copper tubes mechanically bonded to aluminum fins. Adequate surface area shall be offered.
- q. Refrigerant Charge:** Initial charging of refrigerant & oil shall be supplied with the unit, within the same price till final commissioning and handing over system to IPR.
- r. Painting:** All the equipment including base frame shall be painted with two coats of the suitable paint of enamel colour over a rust resistant primer.

REFRIGERANT AND CONDENSATE DRAIN PIPING:

- Copper tubes of approved brand shall be used for refrigerant piping. Hard pipes must be used above 16mm (5/8") dia. All pipes shall be insulated with **minimum 19mm** thick insulation for the entire length; and flexible braided pipe (for external runs of pipe). Insulation shall be nitrile rubber covered with glass-cloth having density of 200GSM. All exposed piping insulation shall be with UV Protection/UV Coating with glass cloth fabric. Pipes should be installed in an accessible position wherever possible. Exposed to sun & visible piping shall be covered by braided PVC pipes/sleeves for mechanical protection and aesthetics.
- Necessary filters, driers, gauges, sight glass, safety cut-outs, etc. shall be provided in each refrigerant circuit as per the manufacturer's standards. Number of joints shall be kept to a minimum, and all joints must be located in the accessible runs of the pipes. Continuous, joint-less pipes must be used for all concealed/buried/inaccessible piping. Adequate extra length of pipes shall be left during piping work to avoid unnecessary joints during installation of indoor & outdoor units.
- Provide high-density insulated pipe supports (e.g. Armafix-T) supplied by the insulation manufacturer, at each pipe support and clamp to prevent insulation compression, thermal bridging and condensation. Alternatively provide PVC pipe sleeves over the normal insulation at all support cable ties & clamps to prevent insulation compression.
- All joints in copper piping shall be sweat joints using low temperature brazing and / or silver solder. Before joining 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 carbon dioxide / nitrogen. Refrigerant line shall be insulated with as mentioned in SOQ.

- Horizontal suction line shall be pitched towards suction of the compressor for proper oil return. The refrigerant line sizing should be designed to achieve minimum pressure drop and avoid oil return problem.
- After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at a pressure of 20 kg per sq.cm (high side) and 10 kg/cm² (low side). Pressure shall be maintained in the system for a minimum of 24 hours. The system shall then be evacuated to a minimum vacuum. Vacuum shall be checked with a vacuum gauge.
- Pipes or ducts entering into the building through external wall cutouts should slope away from the building cutout, to stop rain water entering the building along through any gap between duct/pipe and the closed cutouts.
- Pipe and duct ends shall be kept closed at all times before and during installation to prevent ingress of moisture, dust and construction debris.
- All pipe supports shall be strong enough to withstand bending stresses in the pipes and shall be spaced not more than 1800mm apart.
- Each support shall be isolated from the supported pipe or fitting by anti-vibration springs or durable, non-deteriorating liner of rubber or neoprene.
- Wherever pipes are laid in two layers, an additional strip/support to be provided between the two layers so the pipes do not rest on each other.

- Before gas charging, the entire piping system should be vacuumised and pressure tested with nitrogen at 10 Kg/sqm (or as required for the system pressure rating) for 24 hours.
- Air tight factory supplied rigid insulation should be provided on all Ref-Net Joints / Y-Joints after pressure testing. Each Ref. Joint / Y-Joint should be properly supported to keep it in perfectly horizontal position.
- All copper pipes except 6mm diameter shall be insulated with minimum 19mm thick Nitrile Rubber insulation for the entire length. Pipes up to and including 6mm may be insulated with 13mm thick Nitrile Rubber insulation
- PVC sleeves or high-density insulation sleeves to be provided wherever pipes pass through cutouts in walls or wooden partitions to avoid compression of insulation.
- Avoid installing pipes directly above the A/C machines.
- All exposed insulation on terrace or in open shafts should be protected with UV paint / UV coating & glass cloth having density of 200GSM (Arma Chek GC or equivalent), and finally covered with removable GI sheet cover for mechanical protection. UV protection must be applied immediately after installation of insulation to prevent damage from sun-light.
- **Drain piping:** The drain piping shall be made out of rigid C-PVC/ U-PVC pipes of sizes as specified in Schedule of Quantities. The piping shall be supported by clamping on MS angle 25mm x 3mm running continuously below the pipe. Some places it required to make slot in floor/wall for laying drain pipes. The piping shall be insulated with 9 mm thick closed cell nitrile rubber sleeves. U trap shall be provided in the drain connection of each indoor unit. All MS pipes support/clamps shall be painted with red oxide primer followed by two coats of synthetic enamel finish paint.

- Drain piping shall be provided from each cooling unit to a designated drain point; using insulated 10/20 Kg/SqCM grade rigid PVC pipes or CPVC pipes as specified in Schedule of Quantities. Drain pipes shall be insulated with minimum 8mm insulation; and sealed with leak proof sealant at joints & fittings. Makes of PVC pipes & fittings shall be Finolex/ Supreme/Prince. Diameter of pipe should be at least 25 mm for individual cooling unit, and suitably higher for more than one units. Screw-on type plastic/PVC vermin net shall be provided at the outer end of drain pipe to prevent vermin/rodents from entering the pipe where required. Ends of the drain pipe must be plugged during execution to prevent cement, dust, etc. from entering and choking pipes.
- Where refrigerant & drain pipes and electric conduits are buried in the wall/floor, the trenching should be sufficiently deep so that plaster cover of minimum 25 mm is available after insulated pipes/conduits. Buried/encased pipes must be suitably insulated as specified to prevent sweating on the surface of wall.
- Drain pipe connection from each A/C unit should be connected with the drain header from top of the header to prevent back-flow from header to individual tapping. Each section of drain piping, including header and individual connections should have adequate slope, minimum 1:100.
- Drain outlet must have U-trap before terminating to NT/GT. End point of Drain pipe is to be temporarily closed with end cap during installation.

DUCTING WORK:

The contractor shall provide and neatly erect all sheet metal work as directed by IPR Engineer In- Charge as may be required to carry out the intent of these specification and drawing.

Duct fabrication:

- s. Ducts shall be straight and smooth and shall have neatly finished joints. All joints shall be made air tight using 5mm neoprene rubber gaskets, and/or RTV-sealed, or soldered as specified. The gasket will be fixed with a suitable adhesive to the flange.
- t. Changes in dimensions and shape of ducts shall be gradual. Curved elbows, unless otherwise approved, shall have a centre line radius equal to one and a half times the width of the duct. Air turns shall be installed in all abrupt elbows and shall consist of curved metal blades or vanes, arranged to permit the air to make the turn without appreciable turbulence. Turning vanes shall be invariably provided at all turns and grille-collars. Splitters and dampers shall be provided at all branches/tappings whether shown on the drawings or not.
- u. All ducts shall be rigid and shall be adequately supported and braced. Where required, standing seams, tees or angles of ample size to keep the ducts true to shape and to prevent buckling, vibration, etc. shall be provided.

- v. At all connections between ducts & fans; fire-retardant, lint-free double canvass/rexin connections of heavy gauge shall be provided. One set of canvas connection include required quantity of canvas for one evaporator indoor unit.

Duct installation:

Ducts shall be supported on hangers as per following specifications:

Round Duct Size (mm)	Spacing of Supports (m)	Size of Angle (mm)	M.S. Dia. of Hanger Rod (mm)
Up to 500	1.5	40 x 40 x 6	12
501 to 1200	1.5	40 x 40 x 6	12
1201 to 2250	1.5	50 x 50 x 6	15

Thickness of sheets shall be as given below:

Normal Ducting:

Larger duct-dimension	Spacing of Supports (m)	Sheet thickness, SWG (mm)
Up to 750 mm	1.5 - 2	24 G (0.63 mm) (25x25 GI flanges acceptable)

51 to 1500 mm	1.5 - 2	22 G (0.80 mm) (25x25x3 MS flanges up to 1000mm; 40x40x5 MS flanges beyond 1000mm)
1501 mm to 2250 mm	1.5 - 2	20 G (1.00 mm) (40x40x5 MS flanges)
Above 2250 mm	1.5 - 2	18 G (1.20 mm)(50x50x6 MS flanges)

Soldered/Sealed Ducting (High Static):

Larger duct-dimension	Spacing of Supports (m)	Sheet thickness, SWG (mm)
Up to 300 mm	1.5 - 2	24 G (0.63 mm) (25x25x3 MS flanges)
301 to 1000 mm	1.5 - 2	22 G (0.80 mm) (25x25x3 MS flanges)
1001 mm to 2250 mm	1.5 - 2	20 G (1.00 mm) (40x40x5 MS flanges)
Above 2250 mm	1.5 - 2	18 G (1.20 mm) (50x50x6 MS flanges)

- a. All ducts shall be installed generally as per the Tender Drawings and in strict accordance with approved working drawings prepared by the contractor as per actual site conditions & building dimensions. The contractor shall follow the instructions of Consultant/Engineer-in-charge, and erect all sheet metal work neatly.
- b. All duct work shall be independently supported from the building construction. All horizontal ducts shall be rigidly and securely supported in an approved manner on MS hangers provided at sufficiently close intervals to avoid sag in the duct. All supports shall be painted with primer & synthetic paint on installation.

- c. Ducts shall be supported by means of GI/ painted rod (minimum 10 mm dia.) taken from the slab using anchor expansion fasteners (minimum 12 mm dia.) and MS cleats. Chipping of the slabs shall not be permissible. During fabrication and installation, ends of all ducts shall be kept closed to prevent dirt & dust. All ducts shall be thoroughly cleaned before installation. All MS rod or angle should be painted with one coat of red oxide and two coats of enamel paints. All work should be carried out in supervision and indication of IPR Engineer In-charge.
- d. Ducting installed over the false ceiling shall be supported from the slab above or from the beams, etc. But in no case should it rest on the false ceiling or be supported from the false ceiling hangers. If MS hooks are provided at bottom of slab, hanger supports shall be provided by the contractor from these hooks. Bottom level of all ducts should be maintained as shown in the drawing. Leveling of ducts should be checked with a PVC tube water level from a reference point.
- e. All ducts shall be totally free from vibration under all conditions of operations. Duct work connected to fans, air handling units, etc. that may cause vibration in the duct shall be provided with flexible connections close to the unit. Flexible connections shall be constructed of fire resistant double canvass sleeve securely bonded and bolted at both the ends. All hardware shall be hot-dip galvanised or coated with 2 coats of rust preventive primer. At all connections between ducts & fans; fire-retardant, lint-free double canvass/rexin connections of heavy gauge shall be provided. One set of canvas connection include required quantity of canvas for one evaporator indoor unit.

Note:

All necessary allowances and provision shall be made by the contractor for beams, pipes or other obstructions in the hall whether or not the same on the drawing. Where necessary to avoid beams or other structural work or other pipes or conduits or cables, the ducts shall be transformed, divided or curved to one side the required area being maintained. All ducts may be fabricated at site (or) manufacture"s place.

If a duct cannot be run as shown from drawing the contractor shall install the duct between the required points by any path available subject to the approval of the Engineer- in- charge of IPR.

Grilles:

- a. Grilles shall be made out of Aluminium and anodized or powder coated (as specified in the schedule of quantities). All supply air grilles (as also return air grilles - where specified) shall be equipped with front operable volume control dampers. The frames/supports/members for installing grilles and diffusers shall be of anodized aluminium angles, and provided by A/C contractor and not by civil/false ceiling agencies (unless otherwise specified elsewhere). Grilles shall have vertical and horizontal deflection louvers to adjust the air-direction as per requirement.
- b. The grilles shall be one-way/two-way, flush/step/half-step type and linear/conventional design as specified in the schedule of quantities and drawings, and as called for. Return air grilles/diffusers shall be without volume control

dampers unless otherwise specified. These shall be externally identical to supply air grilles/diffusers.

- c. Return air grilles/diffusers shall be without volume control dampers unless otherwise specified. These shall be externally identical to supply air grilles/diffusers.
- d. Suitable GI or Aluminium rodent screen shall be provided behind unducted return air grilles. Where required, a cowl or similar arrangement shall be provided to block view behind unducted return air grilles.
- e. Supply & return air collars, as well as visible surfaces of ducts behind grilles shall be painted black to stop reflection of light.
- f. Quantity of grilles, diffusers & dampers shall be calculated and paid as per actual dimensions. Effect of any "minimum measurements" charged by grille supplier to HVAC contractor for smaller sizes shall be included in HVAC Contractor's unit rates and not in measurements.
- g. Rain louvers with SS insect screen / bird screen should be provided for all external fresh air / exhaust air openings. GI Cowls are not acceptable unless specifically approved. Colour shade of louvers shall be as approved by Architect.

Dampers:

- a. All dampers shall be opposed-blade, multi-louver dampers of robust construction and tightly fitted. The design, operating method and hand control shall be suitable for the location and service required.
- b. Damper blades shall be fabricated out of 16 gauge galvanized sheet steel and damper frame, lever, link, etc. shall be hot dip galvanized steel. Damper shall be provided with suitable links, levers, etc. as required for proper operation and control with ON & OFF positions clearly marked.
- c. Straightening vanes, guide vanes or splitter damper shall be provided in the ducts at every supply and return air duct connection, whether or not indicated on the drawings, for proper volume control and balancing of the system.
- d. All Low Leakages Dampers Shall be of Aluminium construction.

Fire Dampers:

Fusible link type or motorised fire dampers and/or fire & smoke damper (as applicable and as specified in SOQ), complying with all the applicable specifications of volume control dampers, shall be provided at initial duct piece/s; whether or not shown on the drawing/specified in Tender. Fire dampers shall be approved by CBRI/TAC. Fire dampers shall also comply with the relevant UL specifications including specified temperature/time rating & sealing efficiency. Interlocking shall be provided between fire dampers and the respective air handling unit/s to stop the fan in case of operation of fire damper.

CANVASS CONNECTION AND SA COLLARS:

Double canvass-connection and GI collar of suitable length shall be provided at the outlet of each FCU type and ducted cooling unit. A zipper shall be provided in the canvass connection to facilitate measurement of supply air temperature of ducted units. GI collars should be lined from inside with black expanded polyethylene for noise reduction. SA duct shall be acoustically lined and/or thermally insulated as specified. Part of the duct, acoustic lining & thermal insulation shall be painted black to prevent reflection of light through SA/RA grilles. All duct support shall be black painted. All hardware shall be galvanized.

TECHNICAL SPECIFICATIONS FOR DUCT INSULATION, DUCT LINING & EQUIPMENT ROOM INSULATION

DUCT PAINTING

Painting for visible ducts (Supply and Return Air Duct)

Duct should be painted with enamel / metallic at-least two coat of approved shade & finish, approved by EIC. Before painting, ETCH primer should be applied on the duct.

DUST ACOUSTIC LINING:

- Duct acoustic lining using **25mm** thick fibreglass rigid boards of 48 kg/cu m density shall be carried out for a minimum distance of 6 m from the outlet of each air handling unit, or as specified. Entire length of fan coil unit discharge duct shall be acoustically lined.
- Fibreglass rigid boards shall be covered with minimum 60 GSM RP Tissue Paper and perforated Aluminium sheets of 28 gauge with 3 mm dia holes at 5 mm staggered centres.
- Fibre glass rigid boards shall be friction fitted to the sheet metal duct with GI angle grid-work.
- Alternatively, for ducts of small cross section, with prior permission of the Engineer In-Charge, fibreglass and perforated sheet may be mechanically attached to the sheet metal with galvanised bolts and large washers. Bolts shall be at least 35mm from all corners.
- External insulation need not be applied where internal duct lining is provided unless otherwise specified.
- The above specification is for guidance. Contractor should also carry out necessary acoustical analysis and provide suitable alternative/additional insulation/lining to effectively reduce the noise level of the system to within acceptable limits.

INSULATION OF PACKAGED UNIT AND AIR HANDLING UNIT ROOMS & WALL & SLAB AROUND CEILING SUSPENDED UNITS:

- Where specified the equipment room walls shall be provided with insulation to be applied as follows:
 - Fix GI angles/tee grid-work at 0.6 m x 0.9 m centres to the wall and slab of the room, by means of crawl plugs and GI/brass screws & large washers.
 - Friction-fit one layer of 25 mm thick fibreglass Acoustic Board having density of 48 kg/cu mt factory- laminated with Black Woven Glass Cloth, between the GI angles.
 - Secure the Acoustic Board with adequate no. of GI wires.
 - Room acoustic lining shall be terminated approximately 150 mm above the floor level to prevent damage due by water.
 - Particle or fiber-shedding material (including fibreglass) is not to be used for insulation/lining of ducts or for insulation of AHU rooms; on installations having fine filters.

8.1 Measurement of Works:

- **For all payment purposes physical measurements will be taken by contractor as per respective method as specified in the tender, in presence of IPR representative, in units indicated in SOQ. Payment shall be made on actual measurements.**
- **Measurement of weights will be in metric tons corrected to the nearest kilogram.**
- **Linear measurement will be in Meters corrected to the nearest Centimeter.**
- **Measurement for supply of items shall be made as per units and quantities indicated item-wise in SOQ.**

All materials / equipments issued by the owner shall be stored properly. Any damage to free issue material shall be recovered from the contractor.

Duct work:

Duct length shall be measured along the centre line from flange face to face unless otherwise stated. Duct work shall be measured on the basis of external surface area (length as measured above, multiply by duct perimeter) of ducts including the joints for each duct section. Duct measurement shall be taken before application of the insulation. For taper section average perimeter shall be used for measurement. For special pieces like bends, reducers, branches, and collars, mode of measurement shall be identical to as described above using the length along the centre line. The quoted unit rate for external surface of ducts shall include all wastage allowances, flanges and gaskets for joints, nuts and bolts, hangers and angles, and angles/flats with double nuts for supports, felt strip between duct and support, vibration isolation, inspection chamber / access panel, splitter damper with quadrant and lever for position indication, turning vanes, straightening vanes, and all other accessories required to complete the duct installation as per the specifications. These accessories shall not be separately measured nor paid for.

Duct accessories:

Measurement will be done by the cross section area perpendicular to air flow.

- Grilles and diffusers: width multiplied by height, excluding flanges, volume control dampers shall form part of the unit rate for registers and shall not be separately accounted.
- Diffusers: cross section area for air flow at discharge/capture area, excluding flanges. Volume control dampers shall form part of unit rate for supply air diffusers and shall not be separately accounted.
- Linear diffusers: shall be measured by linear measurements only, not 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.

Refrigerant piping/ drain piping:

Measurement of refrigerant/Drain pipe shall be taken along the centre line of the pipes.

2. DOCUMENTS AND DRAWINGS:

Buildings drawing with indoor unit and duct layout are attached here only for reference. For actual site condition and any details party are advised to visit the site.

Following documents and drawing to be submitted by the vender in well advance to take the approval from IPR Engineer In-charge.

- a) General arrangement drawing.
- b) Ducting drawing.
- c) Drawing showing mounting details of canvass connection, details of supply volume control dampers. Also submit the electrical drawings.
- d) Drawing for IDU & ODU mounting work.
- e) Leaflet and literatures.
- f) Test certificates of equipments.

3. LIST OF IS STANDARDS:

The following IS specifications and standards will be applicable for the work.

- IS : 659 - 1964 Safety code for Air conditioning
- IS : 8148 Specification for packaged air conditioning units.
- IS : 660 - 1963 Safety code for Mechanical Refrigeration IS : 732 III - 1982 Inspection and testing of installation
- IS : 4894 Test code for Centrifugal fan
- IS : 1239 I & II - 1982 MS tube , GI pipes, tubular and other wrought steel fittings IS : 823 - 1964 Code of procedure for manual metal arc welding of MS
- IS : 3589 Electrically welded steel pipe for water, gas and sewage.
- IS : 5111 - 1969 Code of practice and measurement procedure for testing Refrigerant Compressors IS : 732 Code of practice for electrical wiring and fitting for building
- IS : 694 - 1977 PVC insulated(HD) electric cable for working up to of including 1100 volts IS : 1248 Direct acting electrical indicating instruments
- IS : 1822 Motor starters and voltage not exceeding 1000 Volts
- IS : 8544 - I to IV 1979 Starters
- IS : 2208 - 1979 HRC fuse and links, up to 650 Volts
- IS : 655 - 1963 Ducting work
- IS : 277 Galvanized steel sheets
- IS : 4671 - 1984 Expanded polystyrene for thermal insulation purpose

IS : 7240 - 1981 Code for practice for application and finishing of thermal
 IS : 7413 - 1981 Insulation material at temp. from -80°C to 40°C & 40°C to 700°C IS :
 8183 - 1976 Specifications for Bonded Mineral Wool

LIST OF MAKES FOR EQUIPMENT AND MATERIAL

Sr. No	Details of Materials / Equipment	Approved Makes
1.	DX AHU	CARYAIRE/CITIZEN/SYSTEMAIR/ZECO
2.	Fan	COMEFRI/ KRUGER/NIKOTRA / PUNKER
3.	Fan Motor	ABB/ BHARAT BIJLEE/ CGL/ NGEF/ SIEMENS / HAVELLS/ KIRLOSKAR /Marathon
4.	Air Cooled Condensing Unit	BLUE STAR / CARRIER / HITACHI / DAIKIN / MITSUBISHI / TOSHIBA / O`GENERAL
5.	Compressor	DANFOSS / EMERSON/Copland
6.	VFD	ABB/Siemens/Danfoss/L&T/ SCHNEIDER
7.	Heaters with factory-supplied Housing & Control Panel	Khokhar/Escorts/Daspas/Sushma
8.	Grilles/Diffusers	AIR MASTER / CARYAIRE / COSMOS / DYNACRAFT / RAVISTAR / DYNAMIC
9.	GI Sheets	TATA / JINDAL /SAIL/SURYA/NECO
10.	Insulation acoustic	ARMAFLEX/K-FLEX/ARMACELL/ TWIGA INSUL / BIRSAL / Supreme
11.	C-PVC/ U-PVC Pipes	ASTRAL/ DUTRON/ SUPREME
12.	Voltmeter/Ammeter / Circuit Breaker / Switch / Starter/ Contactors, Relays & Single Phasing Preventers	SIEMENS/ABB/ SCHNEIDER/ AE / MECO
13.	Controllers, Controls & Sensors	JOHNSON / SAUTER / STAEFA / SIEMENS / HONEYWELL / SCHNEIDER/ABB
14.	HP/ LP Switch	DANFOSS / RANCO / INDFOSS
15.	Electrical Items	SIEMENS / ABB / SCHNEIDER
16.	Digital Ammeter/Voltmeter	AE/MECO/ SCHNEIDER/SIEMENS/ABB
17.	Cables	FINOLEX/ POLYCAB /GLOSTER/UNIVERSAL/AVOCAB/ ICC
18.	Copper piping	MANDEV / NIPPON / NISSAN / TOTALINE / RAJCO/Maxflow
19.	MS Structure/beam/gurdar/channel	SAIL/TATA/JINDAL/ESSAR/IPR APPROVED