INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN, PUNE-411008

Tender No. WS/HVAC-II/

TENDER NOTICE

Director, Indian Institute of Tropical Meteorology, Dr.Homi Bhabha Road, Pashan, Pune- 411 008 invites sealed tenders (Part-I – Technical Bid, Part-II – Commercial Bid) in separate sealed covers from Manufacturers / Suppliers for the Supply, Commissioning and Installation of **"Precision Air conditioners – 4 Nos. & Chiller Plant" – Qty 06 Nos. Manufacturers/Suppliers can bid for either one or both the items. Each of the items Precision Air conditioners and Chiller Plant have to be quoted separately.**

Issuing of Tender Documents : **03 May 2010 at 11.00 hrs. Up to 18 May 2010 at 10.00 hrs**.
Last date of receipt of Tender at IITM, Pune : **24 May 2010 at 13:00 hrs. & Pre –bid on 18 May 2010 at 11.00hrs**
Opening of Tenders (Technical Bids only) : **24 May 2010 at 15:00 hrs.**
Tender documents with specifications can be downloaded from site. For details visit Website: **www.tropmet.res.in**

TENDER DOCUMENTS

(GENERAL SPECIFICATIONS - PART 1)

FOR

AIR CONDITIONING (CHILLER)

AT

INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PASHAN,
PUNE – 411 008

TENDER ISSUED TO :

DUE DATE TO RECEIPT
OF TENDER : 24th May, 2010 / 13.00 HRS.

TECHNICAL BID OPENING : 24th May, 2010 / 15.00 HRS.

I N D E X

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AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

1. DEFINITIONS

In the Contract, as herein defined the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires.

1.1 **OWNER :** Means M/s Indian Institute of Tropical Meteorology, Dr. Homi Bhabha Road, Pashan, Pune – 411 008, who will employ the AC Contractor, and the legal successors in the title to the Owner, including any assignee of the Owner, with notification in writing to the AC Contractor.

1.2 **AC CONTRACTOR :** Means person or persons, firm or company whose Tender has been accepted by the Owner, includes the AC Contractors' personal representatives, successors and permitted assignee's.

1.3 **WORKS :** Shall include all works as specified in the specifications for completion of Air Conditioning services of the building and includes Civil and Electrical works to be done by the Air Conditioning Contractor.

1.4 **THE CONTRACT :** Means Conditions of Contract, Specifications, Drawings, Prices, Bill of Quantities, Schedule of Rates and Prices, if any, Tender, Letter of Acceptance and the Contract Agreement, if completed.

1.5 **CONTRACT PRICE :** Means amount named in the Letter of Acceptance. Any variation to the Contract Price will be only accepted on the written concurrence from the Owners to the effect and such letters will be a part of Letter of Acceptance.

1.6 **ARCHITECT :** Shall mean M/s Madhav Joshi & Associates, 102, Shri Laxmi Villa Apts, Revenue Colony, Shivajinagar, Pune 411 005, or any other person for the time being, or from time to time duly appointed in writing by the Owner to act as an Architect for the purpose of the Contract or in default of such assignment, the Owner.

1.7 **SPECIFICATIONS :** Means the Specifications referred to in the Tender and any modifications thereof or conditions thereto as may from time to time be furnished and approved in writing by the Engineer.

1.8 **DRAWING :** Means the Drawings referred to in the specifications and any modifications of such drawing approved in writing by the Engineer and such other drawings as may, from time to time, be furnished or approved in writing.

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

2. GENERAL CONDITIONS :

2.1 ASSIGNING AND SUBLETTING

AC Contractor shall not sublet any part of the works without prior written consent of the Engineer and such consent when given shall not relieve the AC Contractor from any liability or any obligation under the Contract, he shall be responsible for the acts, defaults and neglects of any Sub-Contractor, his agent, servants or workmen as fully as if they were the acts, defaults, neglects of the AC Contractors. The AC Contractor shall not assign the Contractor the part thereof without prior written consent of the Owner / Engineer.

2.2 LAW AND LANGUAGE

The language of the contract shall be English and the Contract is to be construed in the laws of Local Municipal Corporation, Local State and finally, India.

2.3 WORKING DRAWINGS

Based on Tender Drawings furnished by the IITM, the Contractor shall prepare and submit the details, working Drawings in quadruplicate to the IITM for approval. All these approved drawings shall form the basis of the checks of the 'Work'.

2.4 DISRUPTION OF PROGRESS

The AC Contractor shall give written notice to the Owner whatever planning or the progress of the work, if likely to be delayed or disrupted.

2.5 INSTRUCTIONS

The Architect shall Advice to the AC Contractor from time to time during the progress of the work such further Drawings and instructions as necessary for the purpose of proper and adequate execution and maintenance of the work. The AC Contractor shall carry out and be bound by the same.

2.6 PROGRAMME TO BE FURNISHED

Within the time, as agreed in the conditions of the Letter of Acceptance, the AC Contractor shall submit to the IITM, the programme showing the order of procedure in which he proposes to carry out the works. The AC Contractor shall, whenever required by the IITM, also provide in writing for his information, the general description of the arrangements and methods which the AC Contractor proposes to adopt for the execution of the work. The programme shall be in the form of Detailed BAR or PERT Chart, in MS Project.

The submission to and approval by the IITM of such programme or furnishing such particulars shall not relieve the AC Contractor of any of his duties and responsibilities under the Contract. AC Contractor will furnish Bank Guarantee equal to 10 % of the Contract Value towards performance of the Contract as per schedule, valid till execution of the Contract.

2.7 **AC CONTRACTORS EMPLOYEES**

The Contractor shall provide the employees on the site in connection with the execution and maintenance of the work. Only such technical assistants, as are skilled and experienced in their respective subjects and such sub- agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise, shall be employed by the AC Contractor. The IITM shall be at liberty to object to and require the AC Contractor to remove forthwith any person employed by the AC Contractor for the execution
or maintenance of the Air Conditioning work, who in the opinion of the IITM , misconducts himself or is incompetent or negligent, or persists with improper performance of his duties. Any person so removed from the works shall be suitably replaced by the competent substitute approved by the IITM.

2.8 **THIRD PARTY INSURANCE**

Before the commencement of the execution of the Air Conditioning Works, the AC Contractor shall insure against his liabilities for any material or physical damage or loss, or injury which may occur to any property including that of the Owner or to any person including any employee of the Owner; by or arising out of the execution of the works or in carrying out the AC Contract. The cost of such insurance shall be a part of his prices.

2.9 **ACCIDENTS AND INJURY TO WORKMEN**

The Owner shall not be liable for or in respect of any damage or compensation payable at law in respect of or any consequence for any accident or injury to any workmen employed by the AC Contractor or his subcontractor releasing in any act or default of the Owner, his Agent or Servants. The AC Contractor shall
indemnify and keep indemnified the Owner against any such damages and compensations and against all claims, proceedings, costs, charges and expenses whatsoever in relation thereto. AC Contractor shall insure against any such liability with respect to the extent for his workmen.

2.10 **COMPLIANCE, STATUTES, REGULATIONS ETC.**

AC Contractor shall conform in all respect with the provisions of any such statute assignments or law as aforesaid and the regulations or by laws of the Municipality or State Government or other duly constituted Central Government Authority, which may be applicable for the works.

2.11 **INTERFERENCE WITH TRAFFIC**

All operations necessary for the execution of the works shall, so far as compliance with the requirements of the AC Contract permits, be carried on so as not to interfere necessarily or improperly with the inconvenience of the public use and occupations of the private road and footpaths whether in possession of
the Owner or any person or Municipal Corporations. The AC Contractor shall indemnify the Owner in respect of all claims, proceedings, damages, costs and experiences arising out of or in relation to any such matters.

2.12 **LABOUR**

The AC Contractor shall make his own arrangements for engagement of labour, casual or otherwise and provide for all transport, housing, feeding as applicable under the law, including covering of charges for ESI/PF as required under the law. The AC Contractor shall, if required by the IITM, deliver to the IITM's representative a report in detail in such form and such intervals as the Engineer may prescribe, showing the supervisory staff and number of several class of labour from time to time employed by the AC Contractor at site, and such information representing the constructional plan as the Engineer's representative may required.

2.13 **MATERIALS**

2.13.1 Only approved materials by the Architect shall be used for the installations and all samples shall be supplied by the Contractor at his own cost.

2.13.2 All tests required under the Contract to approve the capacity of Equipment will be carried out by the AC Contractor supervised by the Consultant, and to the entire satisfaction of the IITM, at AC Contractors own cost.

2.14 **COMPONENTS ETC.**

Within two (2) weeks after signing the contract, AC Contractor shall check all the components in the building required for AC services and give his comments on additional requirements, if any. In case the AC Contractor needs any changes or additions over and above those indicated by him as above, the cost of all such components shall be borne by the AC Contractor who also shall make it good.

2.15 **DAMAGES OR DELAY**

If the AC Contractor fails to achieve the completion of works within the time agreed upon by the IITM, then the AC Contractor shall pay to the Owner the sum stated in the Letter of Acceptance for such default as a compensation for everyday or the part of the day which are elapsed between time prescribed by the Letter of Acceptance hereof, and the date of certified completion of work.

The Owner may, without prejudice to any other method of recovery, deduct the amount of such damages from any money in his hands due or which may become due to the AC Contractor. The payment or deduction of such damages shall not relieve the AC Contractor from his obligation to complete his work or from any other of his obligation and liabilities under the Contract.

2.16 **MAINTENANCE AND DEFECTS**

Periodic maintenance for Air Conditioning Plant shall be for period of One Year, or the period as mutually agreed, from the date of handing over, as 'Certified' by the Architect. The complete preventive maintenance shall be taken care of by the AC Contractor at his own cost. The IITM reserves the rights to have his discretion to extend the period of maintenance for such defects for further period from the date of such breakdown. The complete maintenance catalogues and complete spare parts list with prices valid for one year must be given at the time of handing over without which handing over certificate shall not be issued.

2.17 **VARIATIONS**

The Architect in consultation with IITM shall make any variation of the form, quality or quantity of works or any part thereof that may, in his opinion be necessary or desirable. He shall have the power of order for the AC Contractor and AC Contractor shall do all such variations when instructed in writing. The value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Prices.

2.18 **EVALUATION OF VARIATION**

All extra work or additional work done, or work omitted, by the order of PMC shall be evaluated at the rates and prices set out in the Contract, and if in the opinion of the Consultant, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between Architect and the AC Contractor. In the event of disagreement the IITM shall fix such rates or the prices, as shall, in his opinion, be reasonable and proper.

2.19 **CERTIFICATE AND PAYMENTS**

The payment shall be made to the AC Contractor as agreed in the Letter of Acceptance. The Quantities and materials shall be certified by the Architect and only on said Certificates the payment shall be released.

2.20 **DEFAULT OF CONTRACTOR**

2.20.1 If the AC Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall make an arrangement with or assignment in favor of his creditors, or shall agree to carry out the Contract under a committee of inspection of his creditors, or being a corporation, shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction) , or if the Contractor shall assign the Contract, without consent in writing of the Owner first obtained, or shall have an execution levied on his goods, or if the PMC shall certify in writing to the Owner that in his opinion the AC Contractor :

a) Has abandoned the Contract or

b) Without reasonable excuse has failed to commence the works or has suspended the progress of the works for twenty-eight days after receiving from the PMC a written notice to proceed, or

c) Has failed to remove materials from the site or to pull down and replace work for twenty eight days after receiving from Consultant written Notice that the said materials or work had been condemned & rejected by the Engineer under these conditions,or

d) Despite previous warnings by the PMC, in writing, is not executing the works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or

e) Has, to the detriment of good workmanship, or in defiance of the IITM's instructions to the contrary, sub-let any part of the Contract. Then the Owner may, after giving fourteen days notice in writing to the AC Contractor, enter upon the site and the works and expel the AC Contractor therefrom without thereby voiding the Contract, or releasing the AC Contractor from any of his obligations or liabilities under the contract, or affecting the rights and powers conferred on the Owners by the Contract, and may himself complete the works or may employ other AC Contractor to complete the works. The Owner or such other AC Contractor may use for such completion so much of the constructional plant, temporary works and materials, which have been deemed to be reserved exclusively for the execution of the works, under the provisions of the Contract, as he or they may think proper, and the owner may, at any time, sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

2.20.2 **VALUATION AT DATE OF FORFEITURE**

The Architect shall, as soon as may be practicable after any such entry and expulsion by the Owner, fix and determine ex-parte, or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the contractor in respect of work, then actually done by him under the Contract and the value of any of the said unused or partially used materials, any constructional plant and any temporary works.

2.20.3 **PAYMENT AFTER FORFEITURE**

If the Owner shall enter and expel the AC Contractor under this clause, he shall not be liable to pay to the AC Contractor any money on account of the

contract until the expiration of the period of maintenance, damages for delay in completion, if any and all other expenses incurred by the owner have been ascertained and the amount thereof certified by the Architect. The AC Contractor shall then be entitled to receive only such sum or sums, if any, as the Architect may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the AC Contractor on due completion by him, then the AC Contractor shall upon demand, pay to the Owner the amount of such excess and it shall be deemed a debt due by the AC Contractor to the Owner and shall be recoverable accordingly.

2.21 **URGENT REPAIRS**

If, by reason of any accident, or failure, or other event occurring to in or in connection with the works, or any part thereof, either during the execution of the works, or during the period of maintenance any remedial or other work or repair shall, in the opinion of the PMC & Architect or the Architect's representative, be urgently necessary for the safety of the works and the AC Contractor is unable or unwilling at once to do such work or repair, the Owner may employ and pay other persons to carry out such work or repair as the Owner or the Owner's representative may consider necessary with due intimation to the Contractor. If the work or repair so done by the Owner is work which, in the opinion of the IITM, the AC Contractor was liable to do at his own expense under the contract, all expenses properly incurred by the owner in so doing shall be recoverable from the AC Contractor by the Owner, or may be deducted by the Owner from any money due or which may become due to the AC Contractor, shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the AC Contractor thereof in writing.

2.22 **CONTRACT**

The Contract shall in all respects be constituted and operate as Indian Contract and in conformity with Indian Law and all payments there under shall be made in Indian Currency.

2.23 **SETTLEMENTS**

All disputes arising out of this contract shall be referred to for Arbitration. Notice for such arbitration must be given in writing by the party seeking the same specifying all the points in disputes for arbitration. Preferably, there shall be a sole arbitrator agreed to, by both parties out of a panel of five selected by Institution of Engineers, India, failing which each party should choose its own arbitrator out of this panel. Arbitrators before proceeding with the arbitration nominate an umpire. The arbitration shall be governed by the Arbitration and Conciliation Act, 1996 and any further amendments thereafter.

However, the AC Contractor shall not start arbitration proceedings until after completion of the work unless the AC Contractor undertakes to continue to work in usual way in the meantime.

2.24 **NOTICES**

All certificates, notices, or written orders be given by the Owner or by the Architect to the AC Contractor under the Terms of Contract shall be certified by sending by registered post to or delivering the same to the AC Contractors principal place of business or such other address as the AC Contractor shall nominate for this purpose. All the notices to be given to the Owner or to the Engineer under the Terms of Contract shall be served by sending by registered post or delivering the same to the respective addresses nominated for this purpose. Either party may change the nominated principals to another principals in India by prior written notice to the other party may do so by prior written notice to the both parties.

2.25 **CO-OPERATION**

The work shall be carried out in conformity with the Specifications, Tender Drawings and with the complete coordination of the general Architectural and Structural plans and after the approval by the IITM. The Contractor shall be responsible for taking actual measurements at site and varying the work in detail, if required, to meet the site conditions. Such deviations shall however, be subject to the approval of the Architect. The AC Contractor shall also cooperate with the Owners, and other Contractors, Contractors' specifications and time schedule of his and other Contractors so that there will be no interference. The AC Contractor shall forward to the Engineer copies of all correspondence and the drawings so exchanged. Failure to check plans and site conditions shall render the AC Contractor responsible for bearing the cost of any subsequent changes found necessary.

2.26 **REDUCTION IN THE SCOPE OF WORK**

If, at any time, after the acceptance of the Tender the Owner shall, for any reasons whatsoever, not require any part of the work to be carried out, he shall give notice in writing to the AC Contractor who shall have no claim of payment or compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the execution of the whole works. The AC Contractor shall be paid at Contract Rate for the full amount of the work executed and in addition following cost shall be paid. The cost of all materials, collected and surplus, at site (already approved) for the incorporation in the deleted work which the AC Contractor does not wish to retain and which shall thereafter become the property of the Owner.

2.27 **PRICES**

The prices quoted shall be firm until the completion and handing over of the Works and not subject to any variations. The prices shall include all packing and unpacking, all freight charges, loading and unloading, Customs Duties, Octroi Duties any other Taxes and Insurance for the Equipments during transit

and proper storage. The prices also shall take care of any damages during installations during the Contract and maintenance period. The prices shall also include delivery of the equipment at site of the work and all other taxes in force shall be include and so confirmed. No claim for extra or otherwise on account of the foregoing shall be entertained as the rates quoted shall be deemed to be

inclusive of all taxes and duties and considered as delivered and completely installed and maintained basis. Further, no out of pocket expenses incurred by the Tenderer in submitting his Tender shall be reimbursed whether his Tender is accepted or not.

2.28 **TAXES AND DUTIES**

The Tenders are invited on the basis of 'Works Contract' and as such this Contract being an Indivisible Works Contract, all Taxes and Duties applicable on such Contract shall be deemed to be included in the Prices.

Contractors shall give break up of Excise Duty and Taxes separately along with the Bid, for the Owners to avail of MODVAT, if applicable.

2.29 **TENDER DOCUMENT**

The Original Tender Document duly Filled, Signed and Stamped is to be returned along with the Covering Letter. Offers without the Original Document are liable to be rejected.

2.30 **PERFORMANCE GUARANTEE**

2.30.1 All equipment shall be guaranteed to perform as given in specifications for a period of THREE (3) years from the date of Commissioning and Acceptance. Contractor should bind his suppliers accordingly.

2.30.2 Contractor shall guarantee system performance for a period of one year. Contractor shall have access to all Architect's drawings and System Design Data, and all queries on Specifications and Design shall be discussed with the Engineer. Designed system shall be consensious design after Contractors involvement and Contractor shall guarantee the System as well.

2.31 **SITE ENGINEER**

The AC Contractor shall appoint a Full Time Site Engineer for Co-ordination of their work at site and with other agencies, to ensure quality work as well as completion on time. The Site Engineer shall be authorized to take decisions at Site without referring back to the Head Office.

3.0 GENERAL PROVISIONS

3.1 WORK INCLUDED

The Specification shall be read in conjunction with the Drawings and Technical Data and Schedules. The Drawings as listed in the Schedule are representative of the work to be carried out and when read in conjunction with the Specifications, provide information for purposes of preparing the Drawings by the AC Contractor which will be suitable for execution. The Drawings are to be read in conjunction with the Drawings included in the Tender. These are not working/shop drawings. The same will be prepared by the AC Contractor. The approval of the Engineer will be obtained prior to commencement of Works.

3.2 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

3.2.1 As used in the drawings and this section of the specification, certain non-technical words shall be understood to have specific meanings as follows :

"Furnish" Purchase and deliver to the project site complete with every necessary appurtenance and support.

"Install" Unload at the delivery point at the site and perform every operation including rigging that is necessary to establish secure mounting and correct operation at the proper location in the project.

"Provide" "Furnish" and "Install"

3.2.2 Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specification or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

3.2.3 It shall be understood that the specifications and drawings are complimentary and are to be taken together for a complete interpretation of the work. Exceptions are that notes on the drawings, which refer to an individual element of work, take precedence over the specifications where they conflict with the same.

3.2.4 No exclusions from or limitations in the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted.

3.2.5 The drawings, out of necessity, utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended

installations. The work shall be installed, in accordance with the diagrammatic intent expressed on the drawings; and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.

3.2.6 No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

3.2.7 Certain details appear on the drawings, which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the indicated work.

3.2.8 Information as to the general construction shall be derived from structural and architectural drawings and specifications only.

3.2.9 The use of works in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

3.3 **CLAIMS**

If items, which are to be installed but not purchased as part of the work of the Heating, Ventilating and Air-conditioning trade shall be carefully examined by this trade upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the work of the Heating, Ventilating and Air-conditioning trade will be considered only if presented in writing within one week of the date of delivery to the project site of the items in question. The work of the Heating, Ventilating and Air-conditioning trade shall include all procedures, regardless of how extensive, necessary to put into satisfactory operation, all items for which no claims have been submitted as outlined above.

3.4 **TECHNICAL DEFINITIONS**

Specific items of terminology, as used herein shall have the following meanings :

"Piping"	Pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation, vents and items customarily required in connection with the transfer of fluids.
"Concealed"	Embedded in masonry or other construction, installed behind wall furring, within double partitions or huge ceilings, in crawl spaces, in shafts.
"Exposed"	Not concealed.

"By By persons or parties responsible for work at the other project other than the party or parties who have been duly awarded the contract for the work of this trade. In the event that this document is other used to acquire work as part of the general construction contract, the works “By Other Trades”

Trades” shall mean by persons or parties who are not anticipated to be the sub-contractor for this trade, working together with the general Contractor. In this context the words "by other trades" shall not be interpreted to mean not included in the overall Contract.

3.5 **MATERIALS, DESIGNS AND INSTALLATIONS**

3.5.1 Unless otherwise specified and approved, all materials and designs shall comply with the current issue of the relevant Indian or International Standard Specifications and their installation shall comply with the relevant current Indian / International Standard Codes of Practices.

3.5.2 Materials, designs and installations shall comply with the building regulations, local authority regulations and by-laws, Gas Safety Regulations, National Electric Codes for the Electrical Equipment of buildings, insurance company requirements and other statutory rules. All equipment and materials shall be products, which shall meet with the acceptance of authorities having jurisdiction over the work.

3.6 **MATERIALS SPECIFIED**

3.6.1 Materials to be supplied by a specific manufacturer as detailed in this specification or drawings are intended as a standard of quality. Tenders shall be based on the materials specified but alternatives may be accepted, according to the requirements of the particular Contract. Such alternative shall be approved in writing by the Engineer before being used.

3.6.2 All equipment and materials required for installations shall be new and without blemish.

3.6.3 It is the intent of these specifications that wherever a manufacturer of a product is specified and the terms "other approved" or "approved equal" or "equal" are used, the substituted item must conform in all respects to the specified item. Consideration shall not be given to the claims that the substituted item meets the performance requirements with lesser construction (such as lesser heat exchange surface, etc.) performance as delineated in schedules and in the specifications shall be interpreted as minimum performance. In many cases, equipment is oversized to allow for pick-up loads, which cannot be delineated under the minimum performance.

3.6.4. All equipment of one type (such as fans, pumps, coils etc.) shall be the products of one manufacturer.

3.6.5 Substituted equipment or optional equipment where permitted and approved, must conform to space requirements. any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems as a result of substitutions shall be made at the Contractor's expense.

3.6.6 The approval of working and shop drawings, or other information submitted, in accordance with the requirements, herein before specified, does not assure that the Engineer or any other owner's representative attests to the dimensional accuracy or dimensional suitability of the material or equipment involved. Approval of shop drawings does not invalidate the plans and specifications if in conflict; unless a letter requesting such change is submitted and approved on the Engineer's letterhead.

3.6.7 Substitutions of mechanical equipment for that shows on the schedules or designated by model number in the specifications will not be considered if the item is not a regular catalogued item, shown in the current catalogue of the manufacturer.

3.7 **INSTALLATION LIAISON**

3.7.1 The AC Contractor is responsible for the coordination of all installation work on site. The AC Contractor shall plan his installation before the work is commenced and to ensure correct installation to the design intent during the course of construction. Any work, which has to be re-done due to negligence in this respect, will not constitute an extra to the Contract. Particular care shall be taken to prevent obstruction of Electrical Service positions, Cable Routes, Switch Positions, Access positions and construction of Sanitary Engineering Services, Roding Positions, etc. services installed in Ducts, i.e. Cables etc. shall be so arranged to permit maximum access along the Ducts and all services equipment and plant shall be readily accessible for maintenance.

3.7.2 All Plant, Equipment etc. are shown in approximate positions on the Tender Drawings, their exact location shall be determined from the installation drawings to be prepared by AC Contractor.

3.7.3 The AC Contractor where work includes the installation of large items of equipment such as Tanks, Cylinders, Duct work, Switchgear or long lengths of Pipe or Cable, shall coordinate the work in good time when access is required.

3.7.4 Particular care shall be taken to obtain uniform and tidy arrangements of wall and ceiling mounted equipment. the precise position of piece of equipment shall be determined as follows :

1. Single items of equipment, which are visually remote from other electrical or mechanical equipment, shall be erected at the mounting height stated in the general specification or on the drawings.

2. Two or more items of Equipments, whether electrical or mechanical or both, which are to be erected on the same wall or ceiling, or which will be otherwise visually close to each other, shall be arranged in a neat and symmetrical group. Symmetry of arrangement shall be obtained by horizontal and vertical alignment through the center lines and not the edges of the equipment, and for this purpose the mounting heights stated in the general specifications or on the drawings may be varied slightly.

3.8 **NOISE AND DISTURBANCE**

The use of noisy mechanical tools or equipment will only be permitted by prior arrangement. Should any request for such use be declined or specified instructions be issued that such noise cannot be accepted, this decision shall be accepted and alternative arrangements made at no additional contractual cost.

3.9 **PROTECTION OF MATERIALS AND WORK**

3.9.1 Piping stored on site shall be supported clear of the ground in storage racks and together with all other stored ferrous materials shall be suitably protected against the weather.

3.9.2 All equipment, plant, motors and materials, fixed or unfixed shall be protected against ingress of dirt or moisture into working parts by means of Polythene covers or other equivalent measures.

3.9.3 Precautions against mechanical damage by other trades shall be provided.

3.9.4 Precautions shall be taken and all necessary protection provided to safeguard the work during bad weather.

3.9.5 The inlet and discharges of all fan coil, and other terminal units shall be kept covered until all local Plastering, Purging, etc. is completed and the units are ready to run.

3.9.6 Equipment and material if left in the open and damaged shall be repainted, or otherwise refurnished at the discretion of the Owners.

Equipment and material is subject to rejection and replacement, if in the opinion of the Engineer, or in the opinion of the manufacturer's engineering

department, the equipment has deteriorated or been damaged to the extent that its immediate use is questionable, or that its normal life expectancy has been curtailed.

3.10 CIVIL WORK
(Unless otherwise specifically deleted)

3.10.1 The construction for concrete bases, the base frames in steel work, foundation bolts and metal inserts, making chases and cutting away and making good, will be done by the AC Contractor and the AC Contractor shall mark out in advance and shall be responsible for the accuracy of sizes and positions of all items required.

3.10.2 AC Contractor shall drill and plug holes in Floors, Walls, Ceilings and Roofs for securing services & Equipments requiring screw or bolt fixings.

3.10.3 The depth of wall chases shall be equal to the external diameter of pipe plus lagging to be installed to allow the plaster cover to be of normal thickness.

3.10.4 Timely indication shall be given of any difficulties likely to be encountered in accommodating plant or equipment in the spaces available.

3.10.5 The strength of floors across which the AC Contractor intends to move any heavy load shall be checked in good time before the load is applied so that is the strength of any floor is found to be inadequate, arrangements for supporting the load can be made without delaying its movement. The AC Contractor shall inform the Engineer immediately such an occasion arises.

3.10.6 Plant and materials shall not be deposited on roadways or footpaths, in corridors or rooms unless prior permission has been obtained in writing.

3.10.7 The AC Contractor shall be responsible for any damage caused by the off-loading and movement of his material.

3.11 FOUNDATION BOLTS AND ALIGNMENTS

Foundation bolts of the correct diameter and length of the straight shank type, threaded at each end, with a nut and a square mild steel holding down plate at the lower end and an approved type of self securing lock-nut at the upper end, shall be supplied for each item of equipment fixed to a concrete floor or base. The foundation bolts shall be carefully positioned and grouted in to the floor or base and each item of equipment shall be aligned and leveled using steel shims. Where grouting is included in another Contract it will be the responsibility of the Contractor to ensure correct positioning of the bolts by superintending the grouting in.

3.12 SHOP DRAWINGS AND OTHER INFORMATION REQUIRED

3.12.1 Prior to purchasing any equipment or materials, a list of their manufacturers shall be submitted for approval.

3.12.2 Prior to commencement of works or assembling or installing the equipment the following shall be submitted for approval.

1. Scale drawings (indicating insert and sleeve locations) of all equipment and their respective placements, hookups etc.

2. Drawings showing all piping and duct runs/connections.

3. Catalogue information, factory assembly drawings and field installation drawings as required for a complete explanation and description of all items of equipment.

3.12.3 Documents will not be accepted for approval unless :

1. They comply as to number of copies and type of paper with the requirements of the general conditions.

2. They include complete information pertaining to appurtenances and accessories.

3. They are submitted as a package where they pertain to related items.

4. They are properly marked with service or function identifications as related to he project, where they consist of catalogue sheets displaying other items, which are not applicable.

5. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.

6. Drawings shall be in four (4) copies.

3.12.4 All the Shop Drawings shall be prepared on Computer through Autocad System. The Contractor shall furnish for the approval of the Architect / Consultants, two sets of detailed shop drawings of all Equipment and materials including layouts for Plant Rooms, AHU Rooms, Equipment Rooms, Piping, Drain, Duct and Wiring Routing, Control Wiring schematics, Cable trays, supports and terminations, etc. These shop

Drawings shall contain all information required to complete the Project as per the specifications and as required by the Architect / Consultant / Project Manager. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of Equipment / Materials / works and progressive

cumulative totals from other related drawings to arrived at a variation - in - quantity statement at the completion of all shop drawings.

Each item of Equipment / Material proposed shall be a standard catalogue product of an established manufacturer strictly from the manufacturers listed in the list of approved makes.

When the Architects makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated, for approval. The contractor shall submit further **twelve sets** of shop drawings to the Project Manager for the exclusive use by the Owners / Architect / Project Manager and other agencies. No material or equipment may be delivered or installed at the job site the contractor has in his possession the approved shop drawings for the particular material / equipment / Installation.

Shop drawings shall be submitted for approval sufficiently in advance of planned delivery and installation of any material to allow Architect / Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.

Manufacturer's drawings catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each item in each set shall be properly labeled indicating the specific services for which material or equipment is to be used giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall be accepted.

Samples of all materials like Controls, Grills, Diffusers, Louvers, Paint Shades, Wires, MCBs distribution boards and switches shall be submitted to the Construction Manager or Consultant prior to procurement. These will be submitted in triplicate for approval and retention by Project Manager and Architect and shall be kept in their site office for reference and verification till the completion of the Project.

Approval of shop drawings shall be considered as a guarantee of measurements or of building dimensions. Where drawings are approved,

said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the AC Contractor of the responsibility or requirement to furnish material and perform work as required by the Contract.

Where the Contractor proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesignof the structure, partition, foundation, piping, wiring or any other part of the

Mechanical, Electrical or Architectural layouts: all such redesign and all new drawing and detailing required therefore shall be prepared by the Contractor at his own expenses and gotten approved by the Architect / Consultant / Project Manager.

Where the work of the Contractor has to be installed in co-ordination with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Construction Manager the Contractor shall prepare composite working drawings and section at a suitable scale not less than 1:50, clearly showing how his work is to be installed in relation to the work of other trade. If the contractor installs his work before coordinating with other trades or so as to cause any interference with work of other trades, he shall make all the necessary changes without extra cost to the Owners.

Within four weeks of approval all the relevant shop drawings, the contractor shall submit four copies of a comprehensive variation in quantity statement and itemized price list of the recommended (by manufacturers) imported and local spare parts and tools covering all equipment and material in his contract. The Project Manager or Consultant shall make recommendation to Owner for acceptance of anticipated variation in Contract Amount, and also advise Owner to initiate action for procurement of spare parts and tools at the completion of project.

3.13 RECORD DRAWINGS

3.13.1 During the progress of the works, the information necessary for preparing the installation record drawings shall be recorded on drawings in an approved manner. The marked up drawings shall be made available for inspection and checking upon request.

Installation Record Drawings shall indicate the following :

1. The positions of all plant and apparatus.
2. The size, types and routes of all Pipe works, Ducts, Cables and Conduits.
3. The exact routes and invert levels and the sizes, types and dates of installation of all underground pipe work.
4. The exact routes and invert levels and the sizes, types, makes and underground cables.
5. The lengths of all underground cables between joint buses and terminations.

6. The locations of any other services or obstructions in the routes of underground pipe work and cables.

7. The positions and reference numbers of all valves. For Plant room and boiler room layouts, additional valve diagrams shall be provided where necessary for clarity. Reference number on drawings shall correspond with the numbers on valve labels.

8. The reference numbers of all Electrical Circuits. Each circuit reference number shall be carefully checked against the installation.

3.13.2 Record drawings shall also be provided for all Plant and Equipment which together with the printed instructions provided shall be sufficient to enable the plant and equipment to be operated, maintained, dismantled, re-assembled and adjusted. All Record Drawings shall be submitted to the Engineer for approval. On receipt of approval, the following sets of record drawings shall be provided.

1. One complete set of negative drawings on tracing paper.

2. Two sets of Drawings on CD.

3. One set of prints of those drawings showing plant, boiler and switch room layouts together with their associated valve diagrams and diagrams of main electrical connections. Each of these prints shall be mounted on a glazed frame and hung in the room housing the relevant equipment.

3.13.3 The relevant marked up installation drawings shall be completed by the date of practical completion or sectional completion. The final Record Drawings of the installation, together with any required Record Drawings and installations relating to plant and equipment, shall be provided not more than one month later.

3.13.4 If the marked up drawings as required during the progress of the works are not produced and approved within one month of the date of practical or sectional completion, then such drawings may be produced by others and expenses chargeable to AC Contractor.

3.13.5 **COMPLETION DRAWINGS** :
On completion of the work in all respects, the Contractor shall supply two sets of floppies and four portfolios (300 X 450 mm) each containing complete set of drawings on approved scale indicating the work as - installed. These drawings shall clearly indicate complete Plant, Equipment Layouts and all Routings, location of wiring and sequencing of automatic controls, location of all concealed piping, wiring and other services. Each portfolio shall also contain consolidated control diagrams and technical literature on all controls.

3.14 **TYPE OR MODEL**

Where specific type or model numbers for plant items or equipment are given in the technical schedules which do not incorporate all the requirements specified in the specification then these requirements shall be included unless these requirements are specifically deleted in the schedules.

3.15 **BACTERIAL FREE MATERIALS**

All materials supplied shall be of a type that will not support bacteria. No Acoustic insulation or sound deadening materials shall be manufactured with any form of animal hair.

3.16 **ELECTROLYTIC ACTION**

At all connections between copper pipe work and ferrous pipe work or equipment, insulating materials in the form of non-metallic fittings or joint rings, shall be incorporated in order to prevent direct contact between the two metals and the setting up of electrolytic action.

3.17 **EQUIPMENT**

3.17.1 All service connections shall conform with the items of equipment to which connections are to be made.

3.17.2 Details of operation, working pressures and temperatures of equipment shall be checked and written confirmation obtained from the manufacturers before any service is first operated.

3.18 **WELDING OF STEEL PIPE LINES**

3.18.1 Welding of steel pipe work shall be oxy-acetylenes or metal arc. All pipes of 125 mm bore and above shall be welded by metal arc. Where metal arc welding is employed at site, all flanges on mild steel pipes irrespective of size shall be so welded.

3.18.2 The names of such welders shall be submitted before any welding is executed on site and the appropriate certificate shall be submitted for the approval at the same time. The certificate will be returned after inspection.

3.18.3 The Engineer may, at his sole discretion, request any welder to be site tested with welding executed in site then out for examination, mechanical and metallurgical testing.

3.18.4 Where diesel generators are used the contractor shall be responsible for the supply of diesel fuel and lubricating oil for the generators, wiring and for all hire charges, maintenance and insurance. Where rotary converters, transformers etc. are used, the Contractor shall be responsible for the metering of the primary electricity supply, the payment of all electricity accounts concerned with the equipment and for all the hire charges, maintenance and insurance.

3.18.5 If any test specimen is unsatisfactory, two further weld specimens for re-test shall be selected from the production welds and subjected to test. In the event of failure of any of the retest specimens, the production welds carried out by this welder subsequent to the previous tests shall be replaced at no extra charge in an approved manner.

3.19 **BRONZE WELDING AND BRONZING**

3.19.1 The manufacturer's name for fitting and brazing materials shall be submitted for approval before any materials are ordered.

3.19.2 The Engineer reserves the right to vary the raw materials to be utilized after consultation with the manufacturers of the fittings and rods.

3.19.3 If any specimen proves unsatisfactory, two further specimens performed by the same operative shall be selected for testing. If either of the additional test specimens prove unsatisfactory all joints made by the operative concerned shall be replaced.

3.20 **MACHINE GUARDS**

3.20.1 Wire guards shall be fixed over the drives and moving parts of all machinery supplied. The guards shall be substantial construction. The guards shall be so constructed that the rotation of shafts and the movement of drive belts may be readily observed without removal of the guard.

3.20.2 All guards shall be removable and provision shall be made so that easy access can be obtained to the ends of the motors and shafts.

3.21 **INTERCHANGEABILITY**

Where equipment and layout permit, parts of items of plant, pipe work connections etc., shall be interchangeable with corresponding parts etc., in similar items of plant.

3.22 **REMOVAL OF RUBBISH**

All rubbish and materials not required shall be cleared on a regulated basis, as instructed by the Engineers, from the site as they accumulate and the whole of the installation and working areas left in a clean and tidy condition.

3.23 **VALVE IDENTIFICATION**

3.23.1 All valves in Plant Rooms, Tank Rooms and Ceiling and Floor Voids, Ducts and Chases shall be fitted with oval metal labels engraved in black lettering to indicate the valve number and service it controls.

3.23.2 The Contractor shall :

i. Securely fasten valve labels to valve spindle or handle.

ii. Approved ceiling tile markers, in areas where removable ceilings occur to indicate location of valves or other devices, shall be provided under the general construction division of these specifications.

3.23.3 Each label shall be secured to the valve by means of a key ring.

3.24 **MOTOR CONTROL IDENTIFICATION**

Mount black nameplates on each motor controller identifying primary control function and individual position indication such as pump No. 1, etc. Name plates shall be cut through to white background and have beveled edges, and will be mounted with chromium-plated/brass head screws.

3.25 **SCHEDULES AND CHARTS**

Furnish to Owners three (3) complete framed plastic laminated valve label schedules. Schedules shall indicate label number, valve location by floor and nearest column number, valve size and service controlled.

3.26 **IDENTIFICATION OF PLANT**

3.26.1 All Boilers, AC Equipment, Pumps, Fans and other Plant items, Switches and Control items of equipment shall be supplied with white labels engraved in black lettering. The labels shall be mounted on equipment and in the most convenient positions. Care shall be taken to ensure labels can be read without difficulty.

3.26.2 Details of the lettering of the labels and the method of mounting or supporting shall be forwarded for approval prior to manufacture.

3.26.3 Operating positions of dampers, levers and handles shall be suitably indicated.

3.27 **IDENTIFICATION OF PIPELINES**

3.27.1 Unless otherwise specified all insulated and uninsulated pipelines shall be identified in accordance with this clause.

3.27.2 Identifying colour bands shall be positioned at

a. Both sides of each valve
b. At both sides of any wall or partition through which the pipe passes.
c. At each bend in the pipeline.
d. At maximum intervals of 2.5 m on straight lengths of pipe.

3.27.3 Identification bands should be provided on all service lines, except those exposed within occupied areas. Bands shall be applied by painting or by wrapping coloured adhesive strip around the pipe.

3.28 **PAINTING**

3.28.1 All plant and pipe work and iron work including pipe supports and welded joints other than that with galvanized, stainless steel, chromed or vitreous enameled surfaces or that fabricated from copper, brass and gunmetal, shall be given protective coats of paint at the manufacturer's works or immediately after site manufacture and a second coat after erection, of approved Paints.

3.28.2 In addition to the above all exposed metalwork in plant rooms other than that which is given the requisite number of coats of paint at the manufacturer's works shall be given one coat of undercoat and two finishing coats to approved colours of approved Paints.

3.28.3 Metal surfaces shall be wire brushed and thoroughly cleaned and given the appropriate undercoating and treatment before the final finishing coats are applied. Paint applied to heated surfaces shall be suitable for the appropriate temperature.

3.28.4 Bright or machined surfaces, which have become pitted or marked by rust, shall be replaced.

3.28.5 Damaged paintwork on all equipment supplied shall be made good to the manufacturer's finish.

3.28.6 Insulation shall be painted to approved colours.

3.28.7 All Pipes, Equipment etc. shall be painted as per colours specified for Identification as per ASHRAE.

3.29 **RESPONSIBILITY FOR WORKS**

Until each section of the works has been formally taken over, the responsibility for each section of the works whether under construction, or during test, or in service use will not change (save as provided in the Conditions of Contract).

3.30 **MAINTENANCE MANUAL**

3.30.1 Upon practical completion of the works three copies of a maintenance manual shall be provided. This manual shall be of loose leaf type A4 size, having stiff covers clothbound cardboard sub-divisions for each section a ready means of reference and a detailed index.

3.30.2 The manual shall contain full operating and maintenance instructions for each item of equipment presented in a form to deal systematically with each system and shall include the following :

a. Plant with name plate details.
b. Valves
c. Automatic control items and systems and control settings.
d. Type of lubricant required for each item and frequency of lubrication.
e. Legend for colour coding of all services.
f. Internal wiring diagrams of equipment and panels.
g. Procedure for fault finding.
h. Procedure to adopt in an emergency should any item fail in its operation.
i. Itemized lists of essential and secondary spares for all plant and equipment.

j. Index of record drawing numbers and titles.
k. Records of performance tests.

3.30.3 The manual may contain manufacturer's standard operating and maintenance instructions and leaflets where these are applicable. Where the equipment is non-standard then information for the manual shall be obtained from the manufacturer.
Standard ''Hand-Out Cards' supplied by manufacturers with the equipment shall be fixed to plant room walls and adjacent to the equipment.

3.31 **OPERATION AND MAINTENANCE**

Contractor shall carry out the operation of the HVAC installation for a period of Three years from the date of commissioning and handing over the entire system, i.e. during the defects liability period. Further, he shall also carry out all inclusive maintenance of the entire system for a period of Two years beyond the defects liability period.

A. Operation Contract (HVAC System)
- i) 24 hrs. a day, year round.
- ii) All standby equipment to be operated as per mutually agreed program.
- iii) Proper entry and upkeep of relevant log books.
- iv) Maintain complaints register. Submit weekly report.
- v) Proper housekeeping of all areas under the contract.
- vi) Prepare daily oil and energy consumption report and summary of operation.

B. Terms of Payment
Supplied separately.

C. All inclusive Maintenance Contract

1. Routine preventive Maintenance Schedule to be submitted
   - i) Schedule to cover manufacturer’s recommendation and/or common engineering practice (for all sub-station and DG Set under Contract.)
   - ii) Plant and Machinery history card giving full details of equipment and frequency of checks and overhaul.
   - iii) Monthly status report.

2. Uptime during Maintenance Contract
   - i) 100% uptime of all Systems with standbys under contract.
   - ii) Uptime shall be assessed every month and in case of shortfall during any month, the contract shall be extended by a month.
   - iii) There shall be no reimbursement for the extended period.
   - iv) Break-downs shall be attended to within two hours of reporting.

3. Manpower

i) Adequate number of persons to the satisfaction of Panchashil Group shall be provided including relievers
ii) Statutory requirements of other applicable labour legislation to be complied with; and monthly certification to that effect to be submitted.
iii) Duty allocation and Roaster control shall be contractor's responsibility.
iv) No overtime shall be payable by Panchashil Group for any reason whatsoever.

4. Shut Downs
i) Routine shut downs shall be permitted only during winter season.
ii) Contractor shall be at liberty to carry out maintenance as and when required but with prior permission.

3.32 **TOOLS AND ACCESSORIES**

All tools and accessories required for the proper running and maintenance of the plant, together with the spare tin of oil and grease of each type necessary, will be supplied along with the manuals.

3.33 **ACCESS DOORS IN FINISHED CONSTRUCTION**

3.33.1 Access doors as required for operation and maintenance of concealed Equipment, Valves, Controls etc., will be provided by another trade.

3.33.2 This trade is responsible for access door location, size and its accessibility to the valves or Equipment being served.

3.33.3 Coordinate and prepare a location, size and function schedule of access doors required and deliver to a representative of the installing trade.

3.33.4 Access doors in Ducting shall be provided for maintenance and settings by the AC Contractor only.

3.34 BALANCING, TESTING AND COMMISSIONING

Balancing of all Air and Water Systems and all Tests as called for in the Specifications shall be carried out by the AC Contractor through a specialist group, in accordance with the specifications and ASHRAE Guidelines and Standards. Performance Test shall consist of seven days of 24 hr. operation of System, for each season.
All test results in prescribed format by ASHRAE, in quadruplicate shall be submitted for scrutiny. Four copies of the certified manufacturer's performance curves for each piece of equipment, high lighting operational parameters for the project, shall be submitted along with the test certificates.

The installation shall be tested again after removal of defects and shall be considered "Commissioned" only after approval by the Project Manager or Consultant. All Tests shall be carried out in the presence of the representatives of the Owner. Architect / Consultant and Project Manager.

The accepted final Readings, Settings, etc. in TAB Format shall form part of the Manual, and is mandatory before the Plant is considered as "Taken Over" by Owner or his representative.

3.35 CRITERIA FOR SLECTION

The Selection Criteria for the Acceptance of any Bid by Vendor / Contractor shall take into account the following, over a Period of THREE Years, after Guarantee Period of TWO Years.

3.35.1 Owning Costs, including Cost of Owning.
3.35.2 Operating Costs, including Power Consumption Costs, Water Costs and Costs of any other required Materials
3.35.3 Labour Charges for Operation of Plant.
3.35.4 Maintainance Costs.
3.35.5 Any other Costs to be defined by Vender / Contractor.

3.36 In order to assess the above the Submittals should include a Matrix for Power Consumption, of % Load Vs Outdoor Temperature for Air Cooled Systems for 6°C for Chillers and 20°C / 50% RH for PACs, and 23°C for Splits and Ductable Units. Operating Power for all Ancillary Equipment shall be indicated.

3.37 Charges for Operation of Plant for 5 Years and Comprehensive AMC, including Gases, Spares, and above etc. are to be indicated.

3.38 Incomplete information required for Selection Criteria, shall lead to rejection of the Bids.

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

4. BASIS OF DESIGN :

The Building is to be located at Pune. The following table indicates the prevalent Weather Conditions in Pune area.

OUTDOOR DESIGN CONDITIONS FOR PUNE

Season	Design Month	Dry Bulb Temp.	Wet Bulb Temp.	Daily Range	Dust Levels
Summer	May	40 deg.C	24.2 deg.C	20 deg.C.	> 800,000
Monsoon	July	28.3 deg.C.	23.7 deg.C	8.3 deg.C.	Particles / CFT.
Winter	December	9.4 deg.C..	6.1 deg.C	20 deg.C.	Of 0.5μ and greater

Building Envelope :

For the purposes of HVAC design the following information synopsis's the assumptions.

BUILDING ENVELOPE :

External Walls : 30 mm Cement Plaster + 150 mm Common Brick + 150 mm Air Gap + 150 mm Common Brick + 13 mm Cement Plaster.

Exposed Roof` : 13 mm Cement Plaster + 50 mm EPS Insulation + 200 mm HW Concrete + 150 mm Black Batt Coba + 13 mm Cement Plaster.

Glass : Single Pane clear Glass with Thermal Break + Light Blinds. No Glass for Data Archival.

Height : Data Archival : 4.8 M.
Other Areas : 3.9 M.

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AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

SCHEDULE OF OPERATIONS FOR AC AREAS :-

No.	Room Name	Area	Occu pancy	Lighting Load	Eqpt. Load	Usage Factor	Schedule operations
		(SqFt.)	Nos.	W/SqFt	Watt	%	
1	Data Archival Phase II	775	-	2	Airside 223000 Waterside 538000	100%	24 Hrs.
2	Data Archival Phase III	930	-	2	Airside 195000	100%	24 Hrs.
3	UPS Room	662	-	2	64480	100%	24 Hrs.
4	Battery Room	662	-	2	48360	100%	24 Hrs.

	Supply Temperature	Supply Pressure	Return Pressure	Flow Rate per Server of 8 TFL
Data Archival Server Cooling	8 $\pm$ 2 deg.C	2.5 kg/cm^{2}g	0.9 kg/cm^{2}g	10.2 CMH

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

DESIGN INDOOR CONDITIONS :

Room Name	Dry Bulb Temp.	Relative Humidity	Filtration
UPS	23^0 C $\pm$ 1.5^0 C	less than 55 %	EU 3
Data Archival	20^0 C $\pm$ 1.5^0 C	50 % $\pm$ 55 %	EU 4

LOADS :-

The peak coincident Load for Areas assumed to be Air Conditioned, and operating simultaneously works out for the following Areas :

1. The Cooling Load on Water Side works out to 153 TR.

SYSTEMS DESCRIPTION

The Data Archival Room shall be served by 'Precision Environment Control', Air Cooled Unit with provision of Humidification, Dehumidification, high level of Filtration, Microprocessor control, etc. These Units shall be stand alone, and using Under Floor discharge.

A separate Air Cooled Chiller, with Pumps etc. shall be used for providing Chilled water for Cooling of Racks.

A "Buffer" Tank is proposed to store the Chilled Water at Temperature 8 $\pm$ 2°C. A Pump connected to the Tank shall circulate the Chilled Water through the Heat Exchanger of Servers.

The Heat Exchanger is supposed to be mounted in the Server by Server Manufacturer to separate out the Water passing through the Server and Chilled Water circuit

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

In the Heat Exchanger the Chilled Water absorbs the Heat rejected by Servers and get heated.

This Water further passes through the Chiller where it rejects the Heat and get chilled and is stored in the Buffer Tank.

The Storage Capacity of Tank of Total Holdup of 4000 Lts. is designed to Supply Chilled Water for 15 minutes at a Temperature Rise of 7°C, in case of Power failure. The Pumps are supposed to work on UPS for uninterrupted Operation.

The Piping for these will be in Plastics and run Under Floor. The Tank and Pumps are proposed to be in SS 304 to avoid corrosion.

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AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

5. TECHNICAL DATA OF EQUIPMENT (TO BE FILLED UP BY CONTRACTOR)

DESCRIPTION	DATA TO BE FILLED BY CONTRACTOR
CHILLER	
EQUIPMENT	
TAG Number	
Numbers Working	
Numbers Standby	
Refrigerant	
Type of Evaporator	
Expansion Device	
Capacity at Rating Conditions RT	
Model No	
Contry of Origin	
Type Of Compressor	
No of Compressors/Chiller	
Compressor Speed	
Type of MOTOR	
Motor Speed	
No Of Circuits/Chiller	
Capacity Control	
Rating Conditions	
Chilled Water Inlet Temperature	
Chilled Water Outlet Temperature	
Chilled Water Flow Rate	
Chiller Fouling Factor British Units	
Chilled Water Pressure Drop	
Condensor Air Inlet Temperature	
Condensor Air Outlet Temperature	
Condensor Air r Flow Rate	
Condensor Fouling Factor British Units	
Condensor Water Pressure Drop	
Power Supply	
Power Input	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

IkW/RT @ 100 % Load 6/40 Deg C	
75%	
50%	
25%	
Overall Dimensions	
Length	
Width	
Height	
Clearances for Maintainance	
Sides	
Front	
Back	
Above Equipment	
Tube Cleaning	
Weight of Equipment	
Bare Unit	
Operating Weight	
ELECTRICAL	
Type Of Starter	
Starting Current	
Operating Current at Full Load	
Type of Panel	
Display Type	
Connectivity to BMS	
Miscellaneous Data	
Type of Anti Vibration Mounts	
Sound Level at 1 M	
Type and Size of Connections, Chiller	
Type and Size of Connections,Condensor	
Victaulic Connections	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

BALL VALVE		
Size	Upto 40 NB	
Application	Water	
Temp / Pressure of Operation	5 deg.C, 5 kg / cm^2	
Body	Cast Bronze to IS 318	
Material	Gun Metal / Brass	
Bonnet	Screwed	
Material	Same as Body	
Spindle Material	SS 304	
Spindle Seal	O' Ring	
Seal Material	PTFE	
Ball		
Material	AISI S S 304-316	
Seat Material	PTFE	
End Connection	Screwed	
Specification	B.S.P., Inlet Male, Outlet Female	
Valve Operation	Hand Level actuated / T Key Cap Actuator / motorized	
Hydraulic Test Pressure		
Body	16 kg / cm^2	
Leakage	16 kg / cm^2	
BUTTERFLY VALVE		
Size	50 NB and above	
Application	Water	
Temp. / Pressure of Operation	5 to 50 deg.C at < 5 kg / cm^2g	
Body	One Piece	
Material	IS 210 Gr.FG200	
Disc Material	IS 210 Gr.FG201	
Seat Material	Replaceable	
	PTFE / Nitrile	
Spindle Material	AISI 410 / 316	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Spindle Seal	O' Ring	
Sealing Material	Teflon / Polyacetal	
End Connection	Wafer Type	
Valve Operation	Hand Level Operated (Serrated Plate / T-Key Cap Actuated)	
Inspection & Testing	Not Applicable	
Manufacturing Standard	ISI 13095 - 1991	
Test Pressure		
Body	10 kg at 30 deg.C	
Sealing Material	10 kg at 30 deg.C	
Accessories	C/F, nuts, bolts, Washers	
SUCTION GUIDE CUM STRAINER		
Fitting	At Pump Inlet	
Connections	Flanged	
Type of Flange	BS 10 Table D or P 10 kg	
Fluid	Water / MEG Brine	
Material of Construction		
Body	CI 210	
Cover	CI 210	
Strainer	80 Mesh	
Startup Strainer	80 mesh SS	
Guide	MS or GI	
Brine Fluid Temperature and Pressure	110°C and 10 kg / cm^2 Max.	
Accessories	Inlet Guide Vanes for Straitening of Flow Pressure and Blow down Taps	
Inlet Direction	Vertically Downwards	
Outlet	Horizontal	
NON RETURN VALVE		
Size	As per Schedule	
Application	Water	
Temp. / Pressure of Operation	5 to 50 deg.C at 5 kg / cm^2	
Body Material	IS 210 Gr. 20	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Cover	Same as Body	
Connection	Bolted	
Disc	Swing Check Rotating Ball Type	
Material	IS 210 Gr. 20 Plastic	
Seat	Renewable	
End Connection	Flanged	
Specification of End Connection	BS 10 Table D	
Position	Horizontal or Upward Flow	
Manufacturing Standard	BS 1868	
Hydraulic Test Pressure		
Body	10 kg / cm^2	
Seal	10 kg / cm^2	
PIPING (PLASTIC)		
Material	Poly Butylene	
Rating	16 kG for 0 to 70 Deg C	
Jointing Method	Electrofusion	
Fittings Jointing	Electrofusion	
Thickness	As per Rating	
Sizes	16 mm to 125 mm	
Supports	At 1.2 M spacing	
3 WAY CONTROL VALVE		
Operation	Motorised / Linear Solenoid	
Valve Body	Cast Iron for 65 NB & above and Cast Bronze for 50 NB and below	
Seat Material	Crome Nickel Steel / Special alloy	
Disc Material	Crome Nickel Steel	
Spindle Material	Stainless Steel	
Spindle Packing	'O' Ring / Gland Box	
Control Signal	0 – 10 V DC / 4 – 20 mA	
Type / Control Signal	Variable, Modulating	
Protection Standard	IP 31	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Connection	Flanged for 65 NB & above and Screwed NPT (F) for 50 NB & below	
Mounting position	Vertical / Horizontal	
Response Time	< 1 Second	
Operating Pressure	10 kg / cm^2	
Operating Temp.	5 to 50°C	
PRESSURE GAUGES		
Fluid	Water	
Operation Pressure	0 - 9 kg	
Operation Temperature	5 to 50 deg.C	
Measuring Element	Bourdon	
Case Material	Aluminum, Die Cast	
Size	100 mm / 150 mm	
Bourdon Tube	SS 316	
Tube Shape	C'	
Socket	Brass / SS 316	
Size	1/2"	
Threads	NPT Male	
Mounting & Connection	Bottom connection direct mounting	
Accuracy	`+/- 1% of FSD	
Window	Glass	
Pointer	Steel / Aluminum	
Pressure Range	As Specified in BOQ	
Y TYPE STRAINER		
Size	As per Schedule	
Application	Water	
Temperature of Operation	5 to 50 deg.C	
Pressure of Operation	5 kg	
Body		
Type	Y Type	
Material	CI 210 Gr. 20	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Screen	120 Mesh St.Steel on SS Case	
Support Screen	Yes	
Cap / Cover	CI / M S Bolted or Screwed	
Plug	Yes	
Material	Forged Steel	
Connections	Flanged	
Pressure Rating	10 kg / cm^2	
End connection	BS 10 Table 'D'	
Material of Construction	IS 210 gr 20	
Cage removal	Bolted / Screwed	
DUCTING (Rolamate Joints)		
Shape	Rectangular	
Material	Plain GI	
Thickness	As per BOQ	
Joints	Rolamate Type	
Type	As per Rating	
Hangars	Threaded GI Rod	
Supports(Trapeze)	Perforated GI C Section Channel	
Support Spacing	< 2.4 M	
Transverse Joint Seals	Soft Synthetic Rubber Gasket	
Size	3mm thich x 20 mm wide	
Other Joints	Non Toxic Water Based	
Joint Covering	3 M Duct Tape 100 mm wide	
Construction Standard	SMACNA	
Leakage Class	As specified	
AUTOMATIC DUCT FLOW CONTROLLERS		
Shape	Circular	
Material of Construction	G I Outer Sleeve	
Material of Bulb	Silicon pre pressurised Builb	
Sealing	Gaskets	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Sizes	80 mm to 250 mm dia.	
Adjustment	Pre adjusted	
Control Range	± 5 % Set Flow	
Temp. of Operation	0 to 50°C	
Usage	In Supply or Exhaust	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

WATER PUMPS (CENTRIFUGAL)		
Type	Monoblock	
Casing		
Type	Vertical	
Position of Split	NA	
Material	SS	
Position of outlet/inlet	Horizontal / Horizontal	
Type of End		
Connections	Flanged, Screwed for Air Washer	
Standard specification	BS 10 Table 'D' or NPT (F) as per size End Connection	
Impeller		
Type	Enclosed	
Material	SS	
Coupling Method	Rigid / Flexible	
Mounting Position	Vertical	
Motor		
Type	S.P.D.P or T.E.F.C. below 20 KW suitable for Variable Frequency Drives	
Output	As specified	
No. of Poles	2P / 4P as per Design	
Protection	IP 23 / 44	
Mounting	Foot Mounted / Flange Mounted	
Shaft Material		
Type of Seal	Mechanical Shaft Seal	
Method of Flushing	Internal Fluid	
Operational Data		
Max. Working Pressure	5 kg / cm^2	
Hydrostatic Test Pressure	10 kg / cm^2	
Accessories	Coupling Guard / Base Plate / Foundation / Bolts / Counter Flanges , Rain Guard	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

Operating Parameters		
Fluid	Water	
Temperature of Fluid	5 to 50 deg.C	
Flow Rate	As specified	
Head	As specified	
Performance Test	Witnessed	
if witnessed (by)	Client	
Performance Test Certificate	Required	
Performance Curve	Yes	
(Marked after Test)		
Manufacturer		
Type / Model		
Caopacity (USGPN) / CMH		
Head (ft.) M		
Efficiency (%)		
Pump (RPM)		
B.H.P		
Motor (HP)		
Motor Make		
Electrical Characteristics (+/-10% Voltage Variation)		
PF / Motor Efficiency and Class of Insulation		
Bearing Material		
Impeller Material		
Shaft Material		
Type of Water Seals		
Vibration Isolation		
Operating Weight (kg)		
Overall Dimensions(M) (LXWXH)		
Note : Performance Curves for each Pump shall be submitted along with the Tender		

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

MICROBUBBLE DEAERATORS / DIRT SEPARATORS		
Fluid	Water	
Temperature Range	0 to 110 deg.C	
Installation	Vertical / Horizontal	
Material of Casing	Carbon Steel	
Maximum Pressure	10 Bar	
End Connection	Flanged to Table 'D'	
Designed Properties	The System totally without Air & Dirt free	
Fluid Flow Rate	As per BOQ	
AUTOMATIC VACUUM DEGASSER		
Type	Fully Automatic, Vacuum type	
Medium	Water	
Max. Operating Pressure	6 Bar	
Control	Electronic, Adjustable	
Function	For filling of degassed Water and for degassing System Water	
Make Up Pump	1 Working + 1 Standby	
System Volume	Approx. 30 CuM	
BUFFER TANK		
Material	SS 304	
Shape	Round / Square	
Air Vent	Natural	
Connections	Overflow, Drain, Inlet / Outlet for Process, Level Indicator, Temperature Indicator	
Specifications	As per Drawing	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

6. AUTOMATION SYSTEM :

PRESSURE TRANSMITTER		
Type	Differencial Pressure	
Range	0 - 25 mm WC ± 0.1 mm WC	
Accuracy	0.4 % of F.S.	
Media	Air	
Output	4 - 20 mA	
TEMPERATURE TRANSMITTER		
Type	Immersion Type for measuring Fluid	
Stem Material	SS 316	
Stem Diameter	6.35 mm	
Stem Length	As per Table	
Adapter	Threaded ½ NPT	
Response Time	Approx. 10 second	
Medium	Water	
Power Supply	24 V AC / DC.	
Output	4 – 20 mA.	
Range	0 – 50 0 C	
LEVELTRANSMITTER		
Type	Differential Pressure	
Range	0 - 3000 mm WC	
Accuracy	0.4 % of F.S.	
Media	Water	
Output	4 - 20 mA	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

7. ELECTRICAL INSTALLATION:

7.1	ELECTRIC PANEL(LT)		DATA TO BE FILLED BY CONTRACTOR
	Standard	IS	
	Cabinet Construction		
	Material	CRCA Steel	
	Thickness	2 mm Thick	
	Enclosure	Totally Enclosed	
	Dust withstand Capacity	Dust Proof	
	Vermin withstand Capacity	Vermin Proof	
	Mounting	Floor/Wall as per BOQ	
	Doors	Hinged	
	Lock	Padlock/Door lock	
	Gasket	Neoprene	
	Joints	Seam Welded	
	Size	for 25 % additional Components	
	Finish	7 Tank process with Oven Baked Enamel Paint	
	Colour of Paint	As agreed	
	Cable/Conduit Entry	Knockout Holes & Removable Plate	
	Name Plates	Trifoliate Type Black on White for all Items	
	Meters	Front Mounting	
	Cable Entry	Provision for both Top & Bottom Entry	
	Internal Power Wiring	Colour Coded 1100 V PVC Insulated Copper	
	Min Power Wiring Size	4 Sq MM	
	Internal Control Wiring	1.5 Sq MM Colour Coded 1100 V PVC Insulated Copper	
	Circuit Compartment	Steel on all sides for MCB/MCCB/Contactor/Circuit Breaker	
	Interlock for ON Position	For Circuit Breakers/Isolators	
	BUS Bars	Aluminum,Rectangular,Heat Shink PVC Sleeve Col Coded	
	Bus Bar Size	Suitable for 150 % of Operating Currents	
	Bus Bar Supports	GRP	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

	Bus Bar Chamber	Separate and Shrouded	
	Bus Bar Connections	Bolted	
	Connections to Breakers	Solid Copper Strip for Full Rating	
	Cable Compartments	Sized for Max No of Cables with Intermediate Supports	
7.2	**COMPONENTS**		
7.2.1	**Air Circuit Breakers**		
	Enclosure	Sheet Metal, Flush Front, Drawout Type	
	Operating Mechanism	Trip Free Manual with External Handle, ON/Off Positions	
	Rating	Continuous	
	Trip	Mechanical front Operated	
	Cradle	fro Smooth operations wit Bearings	
	Protective Devices	Short Circuit & Earth Fault	
7.2.2	**Selector Switches**	Section of Operating Eqpt with Proper Rating	
7.2.3	**MCCB**		
	Duty	Motor Duty	
	Rating	Continuous	
	Standards	IS	
7.2.4	**Starters**		
	Standard	IS	
	Change Over	Automatic for Star Delta & ATS	
	Contacts	Main Plus 2 NO & NC	
	Type	Air Break even at 35 % PF	
	Insulation	Class E	
	Coil Voltages	220 V 0r 415 V as reqd	
	Drop out Voltage	90%	
	Housing	Heat resistant	
	Safeties	Thermal overload on each Phase	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

7.2.5	**Over Load Relays**		
	Type	Three Element	
	Action	Positive Action	
	Compensation	for Ambient Temperature	
	Setting	Site Settable	
	Connections for Motors < 35 HP	Direct	
	Connections for Motors > 35 HP	Through CT	
7.2.6	**Current Transformers**		
	Accuracy	Class 1	
	Features	Resin Bound, Epoxy Coated	
7.2.7	**Single Phase Preventors**		
	Conformity	As per IS	
	Voltage Drop out Level	90%	
	Trip	On Phase Failure	
7.2.8	**Time Delay Relays**		
	Type	Adjustable	
	Time Scale	0 to 180 Seconds	
	Auxilliary Contacts	1 No,1 NC	
7.2.9	**Indicating Lamps**		
	Phase Indication	Reqd	
	On indication	Reqd	
	Off Indication	Reqd	
7.2.10	**Metering**		
	Type	Flush Mounted	
	Display	Digital	
	Size	96 mm X 96 mm	
	Selector Switch	3 Way and OFF	
	Voltage Range	0 to 500 V	
	Current Range	Direct or with suitable CTs	
	Harmonics	Full Range	
	Power	As reqd	
	Power Factor	Both Leading and Lagging 0 to 1.00	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

7.2.11	**Toggle Switches**		
	Rating	5 Amps	
	Type	Two Position/Three Position	
7.2.12	**Push Buttons**		
	Rating	6 Amps	
	Mounting	Front Mounting	
	Colour	As per Code	
7.2.13	**Conduits**		
	Material	Hard Drawn MS	
	Thickness for Conduits < 32 mm	1.6 mm	
	Thickness for Conduits > 32 mm	2.0 mm	
	Surface Finish	Stove Enameled Inside & Outside	
7.2.14	**CABLING**		
	Power Wiring	Colour Coded 1100 V PVC Insulated Copper	
	Min Power Wiring Size	4 Sq MM	
	Copper Cables for	4 Sq mm and 6 Sq mm	
	Aluminum Cables for	10 Sq mm and Higher	
	Control Wiring	1.5 Sq mm Copper Colour Coded 1100 V PVC Insulated	
7.2.15	**CABLE LAYING**		
	Cable Laying for Multiple Cables	14 Gauge GI Perforated Tray	
	Cable Tray Cover	14 G GI Plain	
	Bend Radius	> 12 Times the Dia of Cable	
	Cable Laying for Small Cables	In Conduits	
7.2.16	**EARTHING**		
	Standard	IS	

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

	Earthing of Main Panels	From Main Earthing Source	
	Earthing of Single Phase Panels/Switches	3 mm Dia Copper	
	Earthing for 3 Phase Switches etc.upto 60 Amps	2 Nos 3 mm Dia Copper	
	Earthing for 3 Phase Switches etc.from 63 to 100 Amps	2 Nos 4 mm Dia Copper	
	Earthing for 3 Phase Switches etc.from 125 to 200 Amps	2 Nos 6 mm Dia Copper	
	Earthing for 3 Phase Switches etc.above 200 Amps	2 Nos 3mm X 25 mm Copper Strips	
	Earthing of Motors upto 10 HP	2 x 3 mm Dia Copper	
	Earthing of Motors from 12.5 to 40 HP	2 x 4 mm Dia Copper	
	Earthing of Motors from 50 to 75 HP	2 x 6 mm Dia Copper	
	Earthing of Motors above 75 HP	2 X 25 mm x 3mm Strip	
	Jiont Overlaps for Strips	75 mm, Rivetted and Brazed	
	Power Capacitors		

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

	INCLUSIONS		
	Wall or Floor Mounted Painted Panel Enclosure		
	Wall or Floor Mounting Arrangement for Panel		
	Incoming SFU		
	Main Incoming Contactor		
	Distribution Bus Bar		
	Internal Power and Control Cabling		
	Cable Connectors		
	Outgoing MCBs for ODUS		
	Outgoing MCB for Exhaust Fans		
	Outgoing MCB for Fresh Air Fans/AHU		
	Outgoing MCB for Ozone Generator or Air Cleaner		
	Outgoing MCBs for Single Phase Supply to IDUs		
	Indicating Lamps for Phases		
	Voltage Scanner with Under and Over Voltage Trips		
	Current Scanner with Over Current Trips, with CTS		
	Harmonic Meter with Settable High Harmonic Trip		
	Power Meter		
	Power Totaliser		
	Single Phasing Preventer		
	Power Factor Meter with Random Selection Relays		
	Capacitors in 1/2/4/8/8 Configuration		

7.3 OPERATING PARAMETERS (IKW / TR) :

7.3.1 CHILLERS :

Load	Outdoor DBT							
	5^0C	10^0C	15^0C	20^0C	25^0C	30^0C	35^0C	40^0C
100%								
90%								
80%								
70%								
60%								
50%								
40%								
30%								
20%								
10%								

7.4 Power Factor Improvement :-

It is a mandatory to install Power Factor improvement System for all individual Electrical Panels. Panels which feed a number of Motors or Units shall have Automatic Power Factor correction System with bank of adequately sized Capacitors with switching Equipment and Digital indication of Power Factor. Panels which are standalone, and feeding only one Motor shall have its own Power Factor improvement System with only Capacitor and delayed Contractor to switch the Capacitor On / Off.

The controlled Power Factor should be around 0.97 and adequate care should be taken to avoid Leading Power Factor in the design.

The Size of capacitors shall be in the Ratio of 1 / 2 / 4 / 8 / 8 / 8 / 8, and Controller shall be Random selector.

8. TESTING AND BALANCING OF EQUIPMENTS REQUIRED FOR TESTING

Balancing of all Air and Water Systems and all Tests as called for in the Specifications shall be carried out by the AC Contractor through a specialist group, in accordance with the specifications and ASHRAE Guidelines and Standards. Performance Test shall consist of seven days of 24 hr. operation of System, for each season.
All test results in prescribed format by ASHRAE, in quadruplicate shall be submitted for scrutiny. Four copies of the certified manufacturer's performance curves for each piece of equipment, high lighting operational parameters for the project, shall be submitted along with the test certificates.

The installation shall be tested again after removal of defects and shall be considered "Commissioned" only after approval by the Project Manager or Consultant. All Tests shall be carried out in the presence of the representatives of the Owner. Architect / Consultant and Project Manager.

The accepted final Readings, Settings, etc. in TAB Format shall form part of the Manual, and is mandatory before the Plant is considered as "Taken Over" by Owner or his representative

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

9. LIST OF APPROVED MAKES FOR EQUIPMENT & MATERIALS :-

The following are the approved makes of equipment and other supplies:

S. NO.	Details of Material / Equipment	Manufacturer's Name
1.	Air Cooled Water Chilling Unit	Blue Star / Emerson / Clima Veneta / Uniflair.
2.	Pump	Kirloskar / Salmson / Grundfos / ITT Bell & Gossett.
3.	Pipes and Fittings (Plastic)	George Fischer
	Auto Balancing Valves	Sevcon / Danfoss/Tour & Anderson
	Check Valve	Normax
	Pot / Y Strainer	Emerald equal
	Thermometer	Star Scientific / Taylor / H. Guru Tour & Anderson
	Pressure Gauge	Dwyer / H. Guru / Fiebig.
	Ball Valve	Rapid Control / Audco
4.	Insulation	
	Expanded Polystyrene	Beardsell / Modifoam
	Premoulded PUF section for pipe supports	Lloyd / equal
	Hessian Fire treated	Navair / Pyroguard / equal
	Fiberglass	UP Twiga / Kimmco /Owens Corning
	Foamed PU	Armaflex / equal
5.	Controls	
	Pressure Independent Control Valves	Flocon / Danfoss / Belimo

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

S. NO.	Details of Material / Equipment	Manufacturer's Name
	Temperature Transmitter	Landis-Steafa / Johnson Controls / Honeywell / Sauter
	Dial Thermometer Capillary Type	Penn / Teddington / H. Guru / Jn. Marshall
	Flow Switch	Rapid Control / equal
6.	Miscellaneous	
	Vibration Isolator	Resistoflex / Emerald
	Flexible Pipe connection	Resistoflex
7.	Electrical Accessories	
	Air Circuit Breaker (3/4 Pole)	Larsen & Toubro / GC (M-Pact) / Siemens
8.	Motors	Siemens / Bharat Bijlee / ABB / Kirloskar / NGEF / KEC / Crompton
9.	Soft Starter	Allen Bradley / Crompton / equal
10.	Variable Frequency Drives	CG / Hitachi / Siemens / Danfoss / Allan Bradley
11.	Starter, Contractor, Push Button	Larsen & Toubro / Siemens / Groupe Schneinder / Bhartia Cutler Hammer
12.	Moulded Case Circuit Breaker (MCCB)	Larsen & Toubro / GE / Groupe Schneinder
13.	Miniature Circuit Breaker (MCB)	Hager (Larsen & Toubro) / GE / Groupe Schneinder / Ind Kopp
14.	Over Load relays with built in single Phasing Preventor	Larsen & Toubro / Siemens / Groupe Schneinder / BCH
15.	Current Transformer (Epoxy Cast Resin)	Automatic Electric / Kappa / Voltamp

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

S. NO.	Details of Material / Equipment	Manufacturer's Name
16.	Power Capacitor	ABB
17.	Automatic Power factor correction relay	GEC Alsthom / Kryguard / Enercon
18.	Protection Relay	GEC Alsthom / Easun Reyolle
19.	BMS	Honeywell / Johnson / Sauter / Steafa
20.	Micro Bubble Separator	Spirotec.
21.	Vacuum Degasser Systems	Spirotec.

Other Makes may be approved at Engineers discretion, if Application / Offer accompanied by Literature and full Technical Specifications.

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

10. LIST OF DRAWINGS :

1. Proposed AC Equipment Layout: 08 – 25 – AC – IITM_HPC – PUNE-TER – FL – 05.
   for Terrace Floor
2. Proposed AC Equipment Layout: 08 – 25 – AC – IITM_HPC – PUNE - F – FL – 06.
   for First Floor
3. Proposed P & ID for Water : 08 – 25 – HVAC – IITM – HPC – PID – 07

AIR CONDITIONING WORKS FOR IITM AT PASHAN, PUNE.

11. TERMS AND CONDITIONS :

A. The rates for each item of work shall cover supply, erection, commissioning and testing of the entire installation meeting in all respects the intents of the Tender Specifications and Drawings. Where specifications and drawings conflict, the more stringent shall apply.

B. All quoted prices shall include all materials, labour appurtenant services, taxes, duties, commissioning, and testing.

C. Prices shall be firm and free from variation due to rises or fall in the cost of materials, labour, taxes and duties, during the pendancy of the contract.

D. PRICES

The quoted prices and unit rates shall include the following :

1. All equipment and accessories and materials which are new and of best quality conforming to Indian Standards.

2. Transport from the place or places of manufacture to the place of installation, loading, storage and safe custody.

3. All taxes and duties currently applicable.

4. Comprehensive insurance against loss of materials during transit, erection and testing till the equipment/installation is handed over.

5. Workman's compensation for any personnel deployed by the tenderer during erection and commissioning.

6. 3rd party liability arising out of action or lack of action of the tenderer or his representative.

7. Preparation of Working / Shop drawings after checking the actual site conditions and obtaining the approval of the same from/by the Engineer before the execution of work.

8. Special tools required for operation and maintenance of the equipment.

9. Erection, Testing, Balancing and Commissioning of all Equipment including Free Supply Equipment.

10. Providing Testing Equipment, Instruments, Locations, access and preparing filled up TAB Document.

11. Obtaining approvals from local authorities wherever applicable before and/or after execution of the work.

12. Making as - built drawings. and clearance of site.

13. And all other items and services pertinent to and meeting the intents of the tender document and this document including drawings.

14. Comprehensive Maintenance period for 24 months after handling over inclusive of all materials, consumable and other equipment if needed.

15. The prices shall be firm till the entire installation is handed over and shall be free from any fluctuation in the cost of raw materials and labour.

16. The rates are self sustaining and shall remain valid for any increase or decrease in quantity.

17. Imported Equipments :

    The tenderer shall submit with their bid the following to facilitate Owners in their application for concessional duty for Equipment / Material proposed to be imported by tenderer, if available.

    A. Four copies of Proforma Invoice from manufacturer / Supplier identifying FOB price and Freight cum Insurance upto Site.

    B. Four sets of Technical Literature, high lighting Model No. of actual Equipment / Material offered.

18. Project Execution and management :

    The project management shall be through modern technique. The Contractor's Office at Site shall be fully equipped with Fax, Modem, Computers, Plotters, Photocopier and Modern Telecommunication Systems including Mobile communication System.

    For quality control and monitoring of workmanship, contractor shall assign at least one full time engineer who would be exclusively responsible for ensuring strict quality control and ensuring top class workmanship for the Air Conditioning installation.

The Contractor shall arrange to have mechanised and modern facilities of transporting material to place of installation for speedy execution of work.

E. TAXES AND DUTIES

The unit rates and the total price shall includes all relevant taxes and duties prevailing.
The variation in the taxes and duties shall be applicable only to the extent of statutory variation imposed by the government. All such variation shall be paid by the Contractor before the supply of materials/installations, Any increase or decrease will be to the Owner's Account. Increase in duties will be paid by the Owners and decrease in duties shall be passed on to the Owners.
Any statutory variation and new levies beyond the contracted delivery and completion periods shall be borne by the contractor in all cases of delay from their part in delivery of equipments and completion of the installation.

F. ITEMS NOT INCLUDED IN PRICE BREAKUP

Should a need arise for any additional items of Work not covered by the Schedule of Work and the intents of the specifications herein **THE RATES SHALL BE DERIVED FROM THE INCLUDED ITEMS OR SUBSTANTIATED BY A DETAILED RATE ANALYSIS**

G. SCHEDULE OF QUANTITIES

The Schedule of quantities hereto is an estimated quantum of each item. The contract value and payment shall be based on the actual quantities and item rates applicable. Variations in the Quantities shall not vitiate the Tender rates in the Breakup in the Schedule.

H. SITE FACILITIES

Prices are based on the following :

1. A lockable storage space shall be provided by the CLIENTS BUT SAFE custody shall be the responsibility of the contractor till the installation is taken over.

2. Power shall be made available at one point through a submeter near the construction power panel on the site and further extensions shall be carried out by the AC contractor as required.

All such extensions shall meet the relevant codes and local authorities consumption charges shall be recoverable from the contractor at the same tariff rates of the supply authority.

3. Power supply and Earthing connection for the Plant shall be made Available at one point The cabling shall have to be terminated on your Panel. Power and Earthing connection shall also be available at each

I. COMPLETION PERIOD :

The works are supposed to be carried out on schedule, or as intimated from time to time by the Owners. The proposed completion period is 3 months from the date of Letter of Intent.

J. TERMS OF PAYMENT

Please refer separate Clause, given elsewhere.

K. ITEMS AND WORKS TO BE PROVIDED TO THE AC CONTRACTOR :

1. Plant Room, trenching, foundations, Equipment Pedestals and other Civil Works.

2. Power Supply and Earthing connection to plant room or Designated Panel.

3. Drain connections at Package Units.

4. False ceilings, Plenums around Ducts, enclosures including Frame work in False Ceiling for installing Grills / Diffusers / Trap Doors, etc.

5. Water and power Connections for Erection and Commissioning.

6. Associated Civil Works :

Following Civil works associated with HVAC installation are excluded from the scope of this contract. These shall be executed by other agencies in accordance with approved Shop Drawings of and under direct supervision of the Air Conditioning contractor.

I. Round holes for Exhaust Fans.

II. Required cutouts in Walls and Floor openings for pipe, Duct and Services crossings and making these good.
III. Cutouts in False Ceiling for various Diffusers, Grills, etc. fixtures.
IV. Provision of Drain points.

7. Associated Electrical Works :

All Associated HVAC works listed below are excluded from the scope of this contract. These shall be installed by other agencies in accordance with approved shop drawings of and under direct supervision of the Air Conditioning contractor.

I. Earthings to Individual Units.
II. Incoming Power connections for each Unit.

8. Associated Plumbing Works :

All Associated PLUMBING works listed below are excluded from the scope of this contract. These shall be installed by other agencies in accordance with approved shop drawings of and under direct supervision of the HVAC contractor.

I. Drain connections / point for Equipment.

9. Free Supply of Equipment directly processed by Client.

TENDER DOCUMENTS

(PARTICULAR SPECIFICATIONS AND PRICE BID - PART 2)

FOR

AIR CONDITIONING (CHILLER)

AT

INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PASHAN, PUNE – 411 008

I N D E X

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

1. TERMS AND CONDITIONS :

ENQUIRY NO: **WS/HVAC-II/4**

1)) Tenders addressed to the Director, Indian Institute of Tropical Meteorology, Pune 411008 are to be submitted for each item separately, under two bids system Superscribed with Tender No. **WS/HVAC-II/ "1) Precision Air conditioner – 4 Nos, 2) Chiller Plant 6 – Nos,** due on **10 May 2010. Manufacturers/Suppliers can bid for either one or both the items and each items have to be separately quoted.**

2) The firms are requested to give detailed sealed tender in their own forms in two Bids i.e.
Part – I Technical Bid.
Part - II Commercial Bid.

3) A sum of **Rs.3000.00 (Rs. Three thousand only) is to be paid** by Demand Draft drawn in favour of **The Director, Indian Institute of Tropical Meteorology, Pune as Tender fees and EMD of Rs.1,50,000.00 (Rs. One Lakh fifty thousand only)** for Precision Air conditioner quantity 4 Nos. and **Rs.1,50,000.00 (Rs. One Lakh fifty thousand only)** for Chiller Plants quantity 6 Nos., must be sent along with your technical bid in the form of a Demand Draft/Banker's cheque (preferably from a Nationalized Bank only) drawn in favour of **The Director, Indian Institute of Tropical Meteorology, Pune payable at Pune**, otherwise your technical & financial bids will not be considered. The Earnest Money of successful bidder will be returned only after installation, commissioning and satisfactory demonstration on acceptance of the equipment by the Institute as per the terms of our purchase order. If the successful bidder fails to fulfill the contractual obligations before the due date, the EMD amount will be forfeited.

4) You have to submit two separate bids in two separate sealed envelopes and both the bid envelopes in an envelope for sending to us.
The first envelope will contain the **TECHNICAL SPECIFICATIONS** of the indented equipment along with Tender fees and EMD amount.
The second envelope will contain only the **FINANCIAL BID** in which price, maintenance, AMC and any other information, which has financial implications.
The main envelope, with both the bids, should be superscribed with our tender enquiry No. **WS/HVAC-II/** due on **24 May 2010.**

4) The technical bids will be opened on the specified due date in the presence of tenderers who wish to be present & the financial bids of only those bidders will be opened whose technical bid is found suitable by us.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

5) The Date and Time of opening for Part-II (Commercial Bid) will be intimated only to pre-qualified and technically acceptable Tenderers for the item at a later date.

Last Date and Time for receipt of Tenders: **Upto 13.00 hrs. on 24 May 2010.**

Date and Time of opening of Tenders: **At 15:00 hrs. on 24 May 2010.**
(Part - I Technical Bid only)

6) This tender is not transferable and the entire quotation of Technical bids only to be given preferable on a CD in word format along with the hard copy the quotation bid.

7) The Equipments are required to be installed at site **IITM**, **Pune.** Training is to be imparted before commissioning. Packing, Forwarding, Freight, Insurance and Commissioning Charges, if extra may be quoted separately in Commercial Bid. Octroi Payment may be shown separately.

8) Cost of the items should be mentioned clearly in the Commercial Offer (Part-II) only. The optional and any other essential items / accessories required should also be specified in the offer separately.

9) In case of foreign quote, the Principal supplier should clearly indicate the address of the Indian Agent and percentage (%) of Agency Commission payable if any, to be paid to the Indian Agent in Indian Currency.

10) Percentage & amount of Indian Agency commission payable in Indian currency after the receipt of consignment in good condition at our Stores & satisfactory installation and commissioning of the ordered equipment on submission of copy of DGS&D registration wherever it is applicable.

11) Indicate the names of the reputed Indian Organizations where you have supplied the similar equipment and may attach the satisfactory performance report of the equipment from user Organization.

12) a) If you have supplied identical or similar equipment to other Institutes under Ministry of Earth Sciences and Ministry of Science & Technology, the details of such supplies should be indicated.

b) Based on the above information IITM will have its option to obtain details of the equipment, their performance, after sales services etc. for evaluation of the tender, directly from the concerned Labs. /Scientists etc.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

13) Tenders received through Fax / E-mail / Telegraphic / Telex will not be considered.

14) All the Bank Charges inside and outside India, including opening of LC, communication, confirmation, amendments etc., if any to Beneficiary's Account only which may please be noted.

15) The tenders must be clearly written or typed without any cancellations / corrections or overwriting.

a) Tenders, which are submitted without following the Two-Bid Offer System, will summarily be rejected.
b) Unsigned Tenders will also be rejected.
c) Part and incomplete tenders are liable to be rejected.

16) The tenders will be received in the Institute till **24 May 2010,** up to **13:00 hrs.** and shall be opened on **24 May 2010** at **15:00 hrs.** in presence of the tenderers or their authorized agents who wish to be present.

17) IITM will not be responsible:
a) For delayed / late quotations submitted / sent by Post / Courier etc.
b) For submission / delivery of quotations at wrong places other than the Office of Director, IITM, Pune,

18) In case of Foreign Quote, the mode of dispatch should be by Air Post Parcel/Ocean Freight/Air Freight (By Air India Freight) and on Freight to-pay basis only. The approximate dimensions of the packages and weight of consignment are to be indicated.

19) The makes / brand and name and address of the manufacturer, Country of Origin, Country of Shipment and currency in which rates are quoted are to be mentioned.

20) The Technical Bid should accompany with complete specification, Manufacturer's name, address and relevant Technical Literature/Brochures with Warranty Terms.

21) The payment of local currency portion shall be payable in equivalent Indian Rupees, within 30 days after the receipt of the equipment in good condition and after satisfactory installation and commissioning and demonstration.

22) The tender / quotation / offer submitted by the firm should be valid for a minimum period of **One Hundred Eighty (180) days** from the date of opening the tender.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

23) The quotation should be only in Indian Rupees for indigenous items. In case of foreign quote, the vendors may quote their rates in, Indian Rupees.

24) The bidder who submits the tender on behalf of their principals should produce documentary evidence in support of their authority to quote or submit proforma invoice of their principals.

25) Details of services rendered by you as well as after-sales services offered by you are to be clearly mentioned in the tender.

26) The Tenderer's conditions printed on the tender or otherwise sent along with the tender shall not be binding on IITM.

27) The vendor should have appropriate facilities and trained personnel for supply, installation, commissioning and warranty-maintenance of the equipment to be supplied. Detailed information in this regard may be furnished.

28) **Delivery Period**: As time is the essence of the contract, Delivery period (**one month** or earlier) mentioned in the Purchase Order should be strictly adhered to.

29) Details regarding terms of payment including period of warranty should be clearly mentioned. However, we prefer to release the payment on BILL Basis after receipt of consignment in good condition, satisfactory installation, and commissioning thereof.

30) Supply means "Supply, Installation, Commissioning and satisfactory demonstration of the whole system and training". If any charges extra for Installation, Commissioning and training, the same should be specified in the commercial offer.

31) Kindly attach a of copy of your latest DGS&D, New Delhi registration certificate under the compulsory Scheme of Ministry of Finance regarding the registration of Indian Agent of foreign supplier wherever it is applicable.

a) The Tenderer is required to furnish the Permanent Account Number (PAN) Allotted by the Income Tax Department. If registered with the National Small Industries Corporation, the registration number, purpose of registration and the validity period of registration. should also be provided in Technical Bid for Indian Agents.

b) A copy of latest Income Tax Clearance Certificate from Income Tax Department (INDIA)
for Indian Agents.

32) In case of Foreign quote, the address of Principal's / Manufacturer's and their Banker’s details should be furnished,

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

33) The system should be supplied with hardware and software manuals including technical / Electronic drawings / circuit diagrams / user manuals etc. The documentation should be complete in all respects to operate the system without any problem.

a) In case of Indigenous Items the offer should contain the Basic Price and percentage of Excise Duty should be shown separately, since IITM, Pune is exempted from payment of Excise duty vide Govt. Notification No.10/97-Central Excise dated 15th March, 1997.

b) IITM is exempted from payment of Custom Duty vide Govt. Notification No.51/96-Customs dated 23rd July, 1996. However as per the Govt. of India further notification No.24/2002-Customs dated 15th March, 2002 and notification No.19/2006-Customs' dt. 01.03.2006 Custom Duty is levied on all imports meant for IITM. Since the suppliers are requested to quote only on FOB basis freight, insurance and custom duty as applicable to R&D Institutions will be paid by IITM.

34) Tender must clearly indicate the features offered unit price, VAT tax, transport, transit insurance, installation charges. Institute cannot furnish any concessional certificate for exemption or reduction in VAT tax or any other duty / tax. The vendor should mention the price of the equipment and the duties / taxes to be paid such as customs duty / excise duty / VAT taxes etc. separately.

a) No advance can be paid.

b) **PAYMENT:** 70% payment shall be made against delivery of materials. 20% against successful installation and commissioning of equipment. 10% against Bank guarantee.

35) The prices quoted should be firm and irrevocable and not subject to any change whatsoever, even due to increase in cost of raw material components and fluctuation in the foreign exchange rates and excise duty.

36) The Tenderer has to state in detail the Electrical Power/UPS requirements, floor Space, head room, foundation needed and i.e. pre-installation facilities required for installation may please be intimated in the technical bid.

37) INSTALLATION & COMMISSIONING: Bidder shall be responsible for installation / demonstration wherever applicable and for after sales service during the warranty and thereafter.

38) PRODUCT ACCEPTANCE: Acceptance tests at the site to be prescribed later will be carried out after installation and the items will be treated as commissioned only after successful completion of the following acceptance tests.

(a) Sub-system performance compliance at the site
(b) Site installation and commissioning

39) Installation demonstration to be arranged by the supplier free of cost.

40) IITM will not provide any accommodation/transportation for the Engineers/ Representatives for attending Installation, Commissioning and Demonstration Work. It is the absolute responsibility of the Principal Supplier/Indian Agent to make their own arrangements.

41) WARRANTY/GUARANTEE: The equipment is to be guaranteed for trouble free performance for a minimum period of **ONE YEAR** after installation. Supplier shall finally warrant that all the stores, equipment and components supplied under the ORDER shall be new and of the first quality according to the specifications and shall be free from the defects (even concealed fault, deficiency in the design material and workmanship). The defects, if any, during the guarantee period are to be rectified arranging for free transport and replacement of material wherever necessary. Further, the technical specifications and requirements may also be verified and quoted accordingly.

42) Details of onsite warranty, agency who shall maintain during warranty and undertake Annual Maintenance Contract/Comprehensive Service Maintenance Contract beyond warranty along with cost details shall be given in the offer. In case of foreign quote, the Indian Agent who shall maintain during warranty and AMC beyond warranty shall be given in the Technical Offer.

43) The supply of spare parts is to be guaranteed at least for a period of 10 years after the supply of the equipment.

44) Please mention that during warranty period who will maintain system/ equipment / Instrument. Indicate the name of firm, address, contact person, phone no. and fax no. etc in your technical bid.

45) After successful installation what will be the minimum down time of equipment/instrument in case of breakdown. If the identified firm or person fails to put the system into working condition what is the further alternative course of action suggested by you to adhere to minimum down time.

46) Warranty period will stand extended for a period of total downtime of the equipment.

47) After warranty period (post warranty) who will maintain equipment / instrument. Indicate the name of Firm, address, contact person, phone no. And fax no. etc in your technical bid.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

48) Kindly mention the charges for comprehensive maintenance contract separately in **commercial bid** (for Post Warranty / Extended Warranty period).

49) No sub-contracting will be allowed for installation or maintaining system/ equipment / instrument during or after warranty period.

50) You have to quote rates for AMC / CMC, if any, only in commercial bid.

51) Any upgrade in Operating System (OS) and associated other software during the warranty period should be supplied free of charge.

52) Discount offered should be mentioned clearly in the commercial bid only.

53) The Tenderers are requested to quote for Educational Institutional Price for Equipment and Software, since we are eligible for the same.

54) This Institute is an autonomous scientific research organization under the Ministry of Earth Sciences and is a recognized centre for studies leading to M.Sc. and Ph.D. of the University of Pune and various other Universities. As such, all possible concessions / discounts / rebates applicable for educational Institutions may be given.

b) The Earnest Money of the unsuccessful bidder whose technical bid has not been found suitable will be returned within 15 days after receipt of Technical Committee recommendations.

c) Those who are registered with Central Purchase Organization (e.g. DGS&D), National Small Industries Corporation or the concerned Ministry / Department need not furnish EMD along with their bids.

d) Though EMD has to be submitted by Demand Draft, Banker's Cheque or Bank Guarantee, we prefer to have Bank Guarantee for easy return to the bidders once a decision is taken by IITM. (Specimen of Bank Guarantee is enclosed at Annexure 'A').

e) Tenders not accompanied with Demand Draft / Bank Guarantee towards "Earnest Money Deposit" will summarily be rejected.

55) If the supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date, the Supplier is liable to pay liquidated damages of one percent value of the Purchase Order awarded, per every week delay subject to a maximum of 10% for every week beyond the due date and such money will be deducted from any money due or which may become due to the supplier.

59) Goods should not be dispatched until the Vendor receives a firm order.

60) The purpose of certain specific conditions is to get or procure the best Equipment / service etc. for IITM. The recommendations of the Technical Committee shall be a guiding factor for Technical short listing.

61) In the event the Manufacturer / Supplier proposes for amalgamation, acquisition or sale of its business to any firm during the contract period, the Buyer/Successor of the Principal Company are liable for execution of the contract and also fulfillment of contractual obligations i.e. supply, installation, commissioning, warranty, maintenance/replacement of spares accessories etc. with the same cost / ordered value while submitting your bid, you may confirm this condition.

62) Corrupt or Fraudulent Practices.

A) IITM requires that the bidders/suppliers/ contractors under this tender, observe the highest standards of ethics during the procurement and execution of such contracts. In pursuance of this policy, IITM:

i) Defines for the purposes of this provision, the terms set forth as follows:

a) "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of the public official in the procurement process or in contract execution; and

b) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or a execution of a contract to the detriment of IITM, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive IITM of the benefits of the free and open competition;

ii) Will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt of fraudulent practices in competing for the contract in question;

B) IITM will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has

engaged in corrupt and fraudulent practices in competing for, or in executing, a contract.

63) Conditional Offers will not be considered.

64) All disputes are subject to exclusive jurisdiction of Competent Court and Forum in Pune, India only.

The Director, Indian Institute of Tropical Meteorology, Pune 411 008, India reserves the right to accept any tender in full or in part or to reject the lowest or any or all tenders without assigning any reason.

In case of any dispute regarding part-shipment, non-compliance of any feature etc., The Director, Indian Institute of Tropical Meteorology, Pune will be the final authority to decide the appropriate action and it will be binding on the Vendor.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

BID SECURITY FORM

Whereas 1 (hereinafter called " the Bidder") has submitted its bid dated (date of submission of bid) for the supply of _____ (name and/or description of the goods)(hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that WE _____ (name of bank) of (name of the country), having our registered office at (address of bank)(hereinafter called "the Bank"), are bound unto (name of Purchaser) (hereinafter called "the Purchaser") in the sum of _____ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Seal~d with .the Common Seal of the said Bank this ___ day of 20___THE CONDITIONS of this obligation are:

1. If the Bidder withdraws it's bid during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of it's bid by the Purchaser during the period of bid validity:
   a) fails or refuses to execute the; Contract Form if required; or
   b) fails or refuses to furnish the performance security, in accordance with the Instruction to Bidders.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, Without· the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it , owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee shall remain in force up to one year after the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

(Signature of the Bank)
Name of Bidder

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

ANNEXURE – I

MODEL BANK GUARANTEE FORMAT FOR FURNISHING EMD

Whereas……..

(hereinafter called the “tenderer”)

has submitted their offer dated…….

for the supply of …….

(hereinafter called the “tender”)

against the purchaser’s tender enquiry No…….

KNOW ALL MEN by these presents that WE…….. of

……. Having our registered office at

…… are bound unto……

(hereinafter called the “Purchaser”)

In the sum of ……

For which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents, Sealed with the Common Seal of the said Bank this……. Day of …….. 20……

THE CONDITIONS OF THIS OBLIGATION ARE :

1) If the tenderer withdraws or amends, impairs or derogates from the tender in any respect within the period of validity of this tender.
2) If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity :-
   a) If the tenderer fails to furnish the Performance Security for the due performance of the Contract
   b) Fails or refuses to accept / execute the Contract

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

This guarantee will remain in force upto and including 45 days after the period of tender validity and any demand in respect thereof should reach the Bank not later than the above date.

……

(Signature of the Authorized Officer of the Bank)

……

……

Name & Designation of the Officer

……

Seal, Name & Address of the Bank and address of the Branch

AIRCONDITIONING WORKS FOR IITM AT PASHAN, PUNE

2. SCHEDULE OF UNIT RATES

8.1 Rate per year for maintenance of the Plant for 5 yrs. after guarantee period of years.

8.2 List with prices of recommended spares for 5 yrs. of trouble free operations, after Guarantee period.

8.3 Rate / Year for operation of Plant on 12 Hrs. / day shift.

AIR CONDITIONING WORKS FOR IITM, AT PUNE

3. BILL OF QUANTITIES

SR. NO.	DESCRIPTION	QTY.	UNIT	UNIT RATE IN RS.	TOTAL PRICE IN RS.
	PHASE - III				
A]	**PART I : CHILLERS & PLANT ROOM**				
	EQUIPMENT				
1	Twin Compressor, Twin Circuit Air Cooled				
	Scroll/Screw Chiller with Chilled Water Inlet				
	Temp. 11°C & Outlet Temp. 6°C and Condenser				
	Air Inlet Temp.40°C Max. with Fouling of 0.001 for				
	Condensor & 0.0005 for Chiller, (in British Units)				
	with Digital µ P Control Panels, Starters,				
	A/V Mounts, suitable for Outdoor Installation,				
	Condensors coated With Anticorosive "Heresite"				
	Coating.				
	36 TR (5 + 1)	6	Nos.		
2	Insulated Chilled Water Water Pumps				
	Assemblies for				
	22 CMH Vs 21 M Head (5 + 1)	6	Nos.		
	TOTAL :				

AIR CONDITIONING WORKS FOR IITM, AT PUNE

3. BILL OF QUANTITIES

SR. NO.	DESCRIPTION	QTY.	UNIT	UNIT RATE IN RS.	TOTAL PRICE IN RS.
B]	**PART II : LOW SIDE WORKS**				
1	S.S Tank, SS 304 Construction with				
	Makeup Drain, Over Flow, Air Vent				
	Water Indicater of Capacity 4 CuM	1	No.		
	(Insulated as per Specificetion)				
2	"Microbubble" Deareators and Dirt Seperator				
	65 NB, 66 CMH	1	Nos.		
3	Main Electrical Panel, with Digital Intelligent				
	Power meter, with Voltage Scanner, Amps				
	Scanner, etc. with random selection PF Controller				
	System, with Capacitors with Remote Start /				
	Stop facility for all Panels				
	(Feeders for 6 Nos.Chillers, 6 Nos.Pumps etc.)	1	No.		
	Suitable for out Door Installation				
4	Power & Control Cabling & GI Earthing				
	between Main Panel, and				
	all Equipment, on G. I. cable trays with				
	Remote Start / Stop facility for all Equipment	1	Lot		
5	Any other items if Contractor feels				
	necessary for completing the job.				
	TOTAL :				

AIR CONDITIONING WORKS FOR IITM, AT PUNE

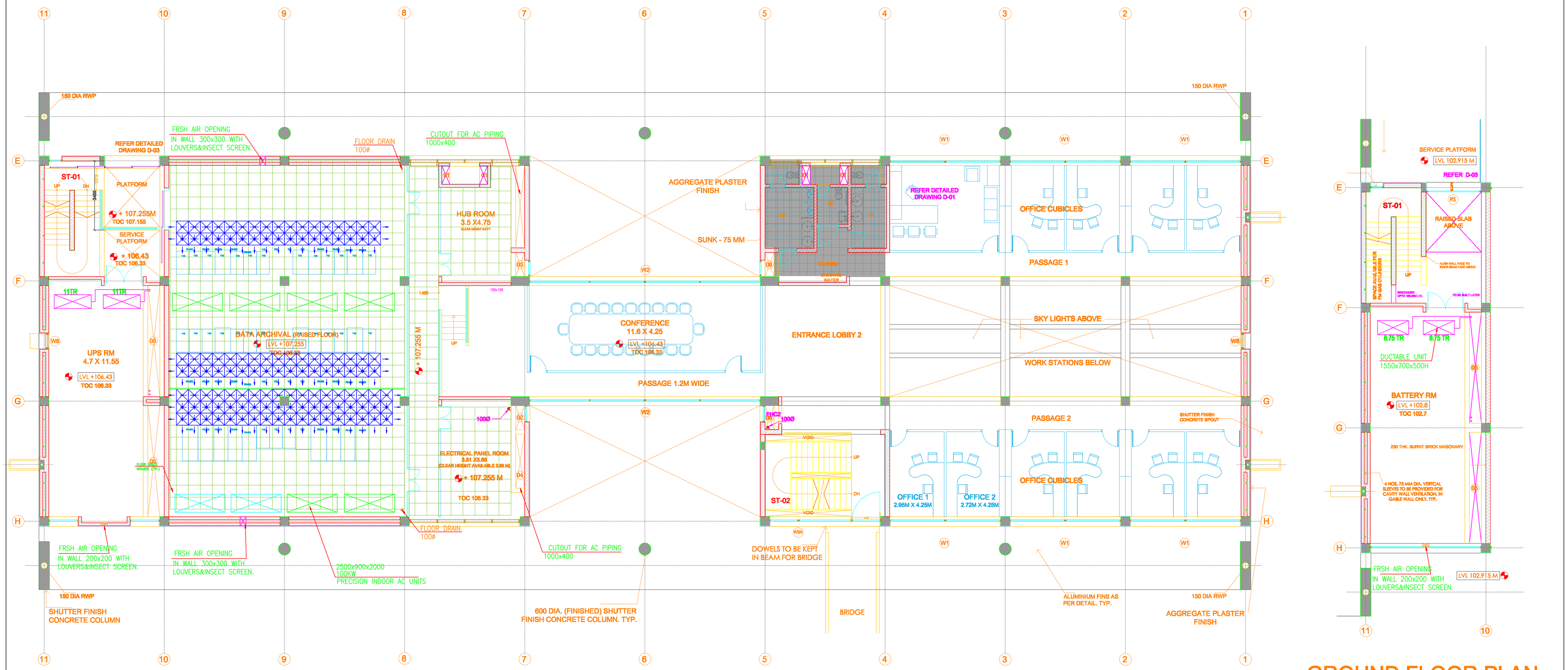
3. BILL OF QUANTITIES

SR. NO.	DESCRIPTION	QTY.	UNIT	UNIT RATE IN RS.	TOTAL PRICE IN RS.
C]	**AUTOMATION SYSTEM PHASE III**				
1	DDC / PLC Controllers, DDC / PLC Panels				
	for Process				
	Monitoring, & switching On / Off of Equipment				
	Configuration as below (including 10%				
	spare I / Os)				
	AI AO DI DO				
	4 4 20 20	1	Set		
2	Temperature Transmitter, 4 - 20 mA				
	450 long, Stem Type, with Thermowell				
	0 - 50^0 C	1	No.		
3	Differntial Pressure Transmitter				
	0 - 6 kg	1	No.		
3	Level Transmitter, 0 - 3000 mm	1	No.		
4	Solenoid Valve				
	25 NB	1	No.		
5	with 3 Way Valve, 100 NB,	1	No.		
6	BMS Cabling on Tray	1	Lot		
7	BMS Panel	1	No.		
	TOTAL :				

AIR CONDITIONING WORKS FOR IITM, AT PUNE

3. BILL OF QUANTITIES

SR. NO.	DESCRIPTION	QTY.	UNIT	UNIT RATE IN RS.	TOTAL PRICE IN RS.
	SUMMARY SHEET				
A]	PART I				
B]	PART II				
C]	AUTOMATION SYSTEM				
	TOTAL				
	OPERATION & MAINTANANCE CHARGES				
1	Cost of Operation				
	First Year				
	Second Year				
	Third Year				
	Fourth Year				
	Fifth Year				
2	Cost of Comprehensive AMC for 2 Years				
	after Guarantee Period				
	Fourth Year				
	Fifth Year				



FIRST FLOOR PLAN

GROUND FLOOR PLAN

DATE	REV. NO.	DESCRIPTION	AREA

R. S. KULKARNI.
CONSULTING ENGINEER FOR REFRIGERATION & AIR CONDITIONING.
OFFICE NO. 512+513, 5th FLOOR SIDDHARTH TOWERS SR. NO. 12/38
NEAR SANGAM PRESS, KOTHRUD PUNE- 411 029
TEL. :- 25436684, 25446014, 39522069
E-MAIL-ravindrask@sify.com

CLIENT -	IITM CAMPUS HPC BUILDING PUNE
ARCHITECT -	MADHAV JOSHI & ASSOCIATES PUNE
TITLE -	PROPOSED AC EQUIPMENT LAYOUT FOR FIRST FLOOR FOR PH-3

DRAWN	CHECKED	REV	SIZE	SCALE	DATE
CHAITALI	RSK	00	A1	1:100	18.02.10

ARCHITECT - DRG NOS	RECEIVED DATE	
	REV NO	

DRG NO. 08-25-AC-IITM_HPC-PH3-1ST-06

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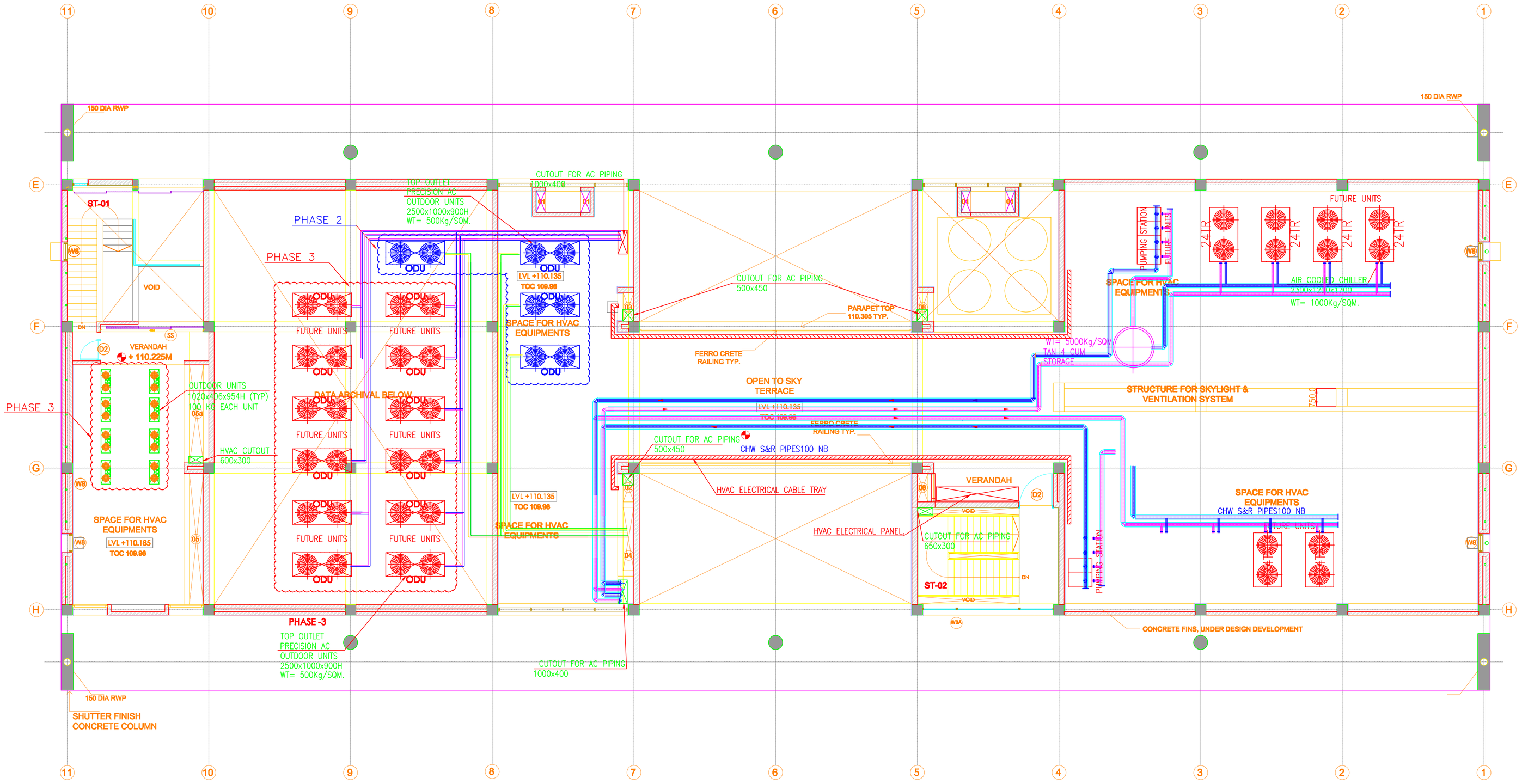

DATE	REV. NO.	DESCRIPTION	AREA

R. S. KULKARNI.
CONSULTING ENGINEER FOR REFRIGERATION & AIR CONDITIONING.
OFFICE NO. 512+513, 5th FLOOR SIDDHARTH TOWERS SR. NO. 12/38
NEAR SANGAM PRESS, KOTHRUD PUNE- 411 029
TEL. :- 25436684, 25446014, 39522069
E-MAIL-ravindrask@sify.com

CLIENT - IITM CAMPUS HPC BUILDING PUNE

ARCHITECT - MADHAV JOSHI & ASSOCIATES PUNE

TITLE - PROPOSED AC EQUIPMENT LAYOUT FOR TERRACE FLOOR FOR PH-3

DRAWN	CHECKED	REV	SIZE	SCALE	DATE
CHAITALI	RSK	00	A1	1:100	18.02.10

ARCHITECT - DRG NOS	RECEIVED DATE	
	REV NO	

DRG NO. 08-25-AC-IITM_HPC-PH3-TERR-05

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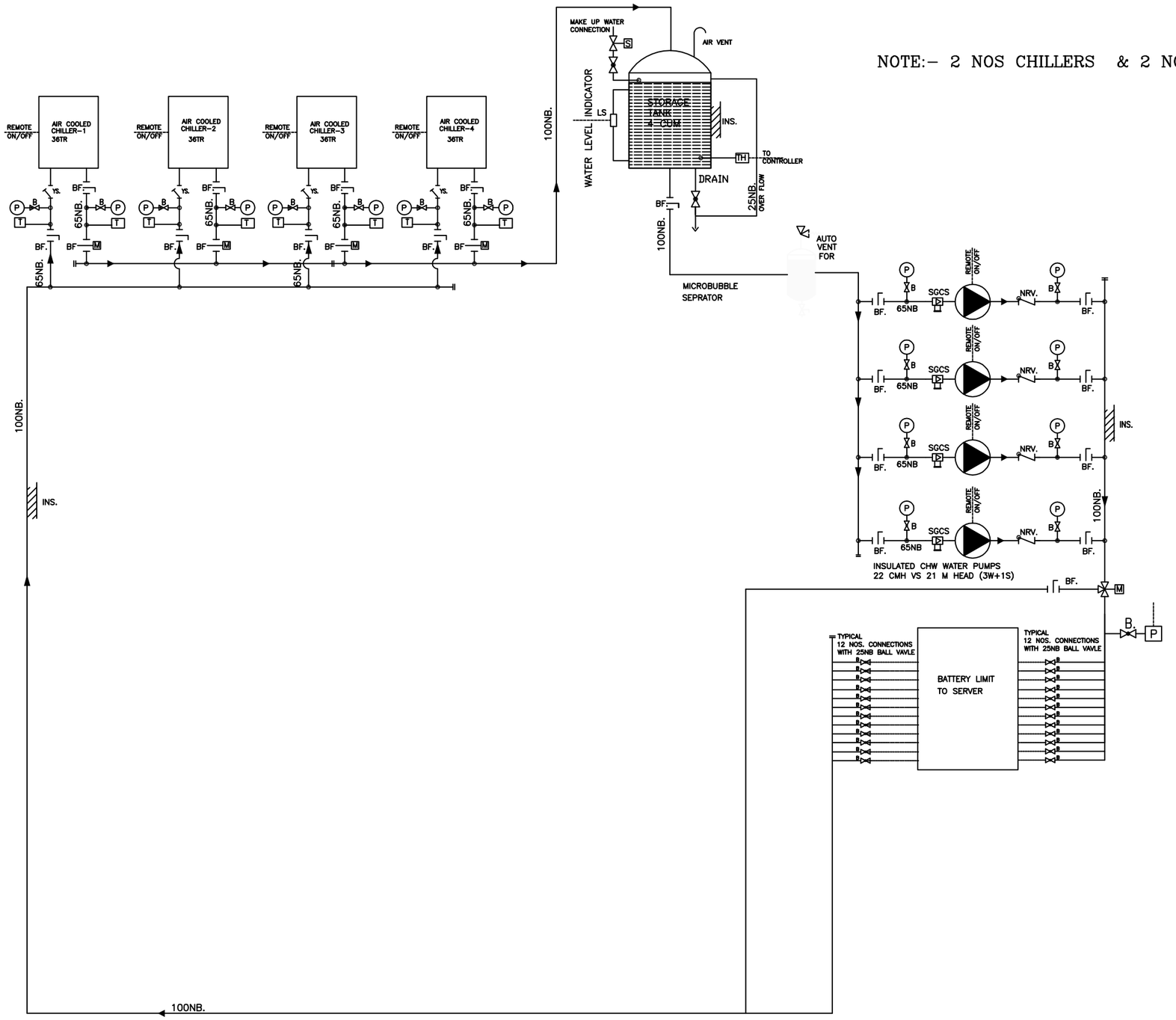

NOTE:- 2 NOS CHILLERS & 2 NOS PUMPS TO BE INSTALLED ALONG WITH PHASE -1

SYMBOL		DESCRIPTION
T		TEMPERATURE TRANSMITER
	BSV.	BALL VALVE WITH STRAINER.
	BF	BUTTERFLY VALVE.
	ABV.	AUTO BALANCING VALVE.
	SV.	SOLENOID VALVE.
	B	BALL VALVE.
	NRV.	NON RETURN VALVE.
	SGCS	SUCTION GUIDE CUM STRAINER
	PST.	POT STRAINER.
INS.	INS.	INSULATION.
	TH.	THERMOWELL
	D.	DRAIN VALVE.
	PV	PURGE VALVE.
	P	PUMP.
P	P.	PRESSURE TRANSMITTER.
	SFV.	SAFTY VALVE.
	CV	2 WAY VALVE
BAC.		BACCUMBER SYSTEM
DPT		DIFF.PRESSURE TRANSMITTER
FE		FLOW ELEMENT

R. S. KULKARNI. TEL. :- 25436684, 25446014.
E-mail-ravindrask@sify.com
CONSULTING ENGINEER FOR R & A/C.
OFFICE NO 512+513 5TH FLOOR SIDDHARTH
TOWERS KOTHRUD PUNE - 29

CLIENT - IITM CAMPUS_HPC BUILDIND PUNE

ARCHITECT - -
-

TITLE - PROPOSED P & I DIAGRAM FOR WATER SIDE (PERMANENT FACILITIES)

DRAWING NO:- 08/25/HVAC-IITM HPC-PID-07

DRAWN	V.G.SHINDE	REV	0
CHECKED	RSK	SIZE	A3
DATE	18-02-10	SCALE	NTS