



॥ सा विद्या या विमुक्तये ॥

ಭಾರತೀಯ ತಂತ್ರಜ್ಞಾನ ಸಂಸ್ಥೆ ಧಾರವಾಡ

भारतीय प्रौद्योगिकी संस्थान धारवाड

**Indian Institute of Technology Dharwad**

Near High Court, PB Road, Dharwad-580011

TEL NO: +91 836 2212 839

**TENDER FOR SUPPLY, INSTALLATION, TESTING,**  
**COMMISSIONING & PROVIDING COMPLETE SET-UP FOR**  
**HVAC SYSTEM IN AUDITORIUM AT WALMI CAMPUS IN**  
**INDIAN INSTITUTE OF TECHNOLOGY DHARWAD**

**Tender no: IITDH/MMD/IPS/2019-20/44**

**INDIAN INSTITUTE OF TECHNOLOGY DHARWAD**  
**Near High Court, PB Road, Dharwad-580011**  
**TEL NO: +91 836 2212 839**

**Tender no: IITDH/MMD/IPS/2019-20/44**

**NOTICE INVITING TENDER**

Name of the work:	Tender for supply, installation, testing, commissioning & providing complete set-up for HVAC System in Auditorium at WALMI campus in Indian Institute of Technology Dharwad.
Type of Tender:	Open Tender Enquiry
Estimate Value:	Rs. 16.00 lakhs
Cost of tender documents	Free of cost
EMD:	Rs.32,000/- (DD/PO in favour of “The Registrar, IIT Dharwad”) to be attached with the tender.
Issue of tender	23 <sup>rd</sup> August 2019
Timeline for clarifications in respect of the tender document	From 23 <sup>rd</sup> August 2019 till 06 <sup>th</sup> September 2019 (05:00 PM)
Last date and time for submission of tender:	Date: 23 <sup>rd</sup> September 2019
	Time: 10:00 AM
Opening of tender:	Date: 23 <sup>rd</sup> September 2019
	Time: 10:30 AM
Contacting Authority:	The Assistant Registrar (MMD) Indian Institute of Technology Dharwad Near High Court, P B Road, Dharwad-580011 E-mail: <a href="mailto:armm@iitdh.ac.in">armm@iitdh.ac.in</a> Telephone: 91-836-2212-839

**Tender no: IITDH/MMD/IPS/2019-20/44**

GENERAL CONDITIONS OF CONTRACT

-----  
Sealed tenders are hereby invited on behalf of the Indian Institute of Technology, (IIT) Dharwad, for supply, installation, testing, commissioning & providing complete set-up for HVAC System in Auditorium at WALMI campus.

**2. QUALIFICATION CRITERIA:**

Only those bidders fulfilling the following Eligibility Criteria should participate in the tender: -

- 2.1 The Bidder must have carried out at least one similar/ project work of minimum Rs.6.00 lakhs or more in reputed organizations/IITs/IIMs/Govt. offices/PSUs/Central Universities etc. during a period of last 3 years (i.e. must have successfully completed the work during August 2016 till date). Completion certificates etc. to this effect are required to be enclosed.
- 2.2 A Certificate/Undertaking on the letter head of the Company to the effect that the bidder has not been blacklisted anywhere in India or abroad by any organization. A self-certification to this effect is required to be enclosed.
- 2.3 The Bidder should be registered with concerned statutory authorities for GST/Income Tax etc. The bidder should furnish relevant GST registration documents and PAN/TAN copies along with the bank details of the firm.

Any prospective bidder, not satisfying any of the above mentioned qualification criteria shall be disqualified on technical grounds and the price bid of such disqualified bidder will not be considered for this tender.

3. Tender documents can be obtained from IIT Dharwad website:

[https://www.iitdh.ac.in/announcements\\_worktenders.php](https://www.iitdh.ac.in/announcements_worktenders.php)

4. Tenders are to be submitted in a serially numbered & bounded manner. Tender should be placed in sealed cover super-scribed with the name of the work and the same will be put in the tender box by the tenderer kept in Office of Assistant Registrar up to 10:00 AM on or before last date and time of bid submission as mentioned in Notice Inviting Tender (NIT) and will be opened by Assistant Registrar or his authorized representatives in his office / any other place in the Institute on date and time of tender opening as mentioned in NIT, in the presence of such tenderers who desire to attend.

5. Tenders must be submitted in sealed covers and should be addressed to The Assistant Registrar (MMD), Indian Institute of Technology Dharwad, Near High Court, PB Road Dharwad- 580011. The name of the tenderer and the name of the work must be noted on the above.

6. Income Tax PAN number & GST registration number is to be submitted along-with the bid.

7. The tenderers should write in figures as well as in words for the rates quoted by them on the proper form of the tender. All corrections / over writings must be attested by the dated initials of

the contractor. The tenderer is advised to avoid offering discount /rebate in the covering page or at the end of the schedule. Instead the same can be incorporated in the unit rate by reducing the unit rates. If at all offered, the discount / rebate percentage offered is to be written in words such as Five percent / point Five percent etc.

8. The rates quoted shall be inclusive of all taxes, royalties etc. The contractor shall quote for all the items whose rates are asked and not leave any blanks all taxes including GST shall be borne by the contractor.

9. The offer should be valid for 60 days from the date of opening for the purpose of issue of acceptance letter. The amount quoted herein after referred to as Base rate must be firm and inclusive of all charges of any kind and inclusive of any kind of liability from / to any authority. GST shall be mentioned separately and must not form part of base price. There will be no extra payment or payment of escalation in the amount under any circumstances whatsoever. Statutory taxes will be deducted at source from the payment against the bill amount.

10. No extra item or substitute item shall be allowed out without prior approval in writing.

11. Work has to be carried out in consultation with the representative as authorized by IIT Dharwad.

12. The tenderer should submit the requisite interest free Earnest Money Deposit (EMD) by pay order or Demand Draft in favor of the Registrar, IIT Dharwad. Tenders not accompanied by the Earnest Money Deposit shall not be considered. The EMD of unsuccessful tenderers will be returned within one month of award of work. In case EMD exemption is sought under SME/MSME/NSIC, Valid certificate from MSME explicitly mentioning the tender work herein, is required to be submitted.

13. The contractor whose tender is accepted will be required to furnish security deposit for the due fulfillment of his contract. Security deposit shall be 5% (Five percent) of the amount of work order for DLP (Defect Liability Period) of 12 months (Twelve months) from the date of commissioning / handing over of the work. The Earnest money deposit paid at the time of tender, will be released after payment of final bill.

14. The full value of Earnest Money Deposit is to be absolutely forfeited to the Director, IIT Dharwad or his authorized representative, with prejudice to any other rights or remedies to the Director, IIT Dharwad or his authorized representative, if the contractor fails to commence the work within 15 days continuously from the schedule date of commencement specified.

15. No part of the contract shall be sublet without written permission of IIT Dharwad nor shall transfer be made to power of Attorney authorizing others to receive payment on contractor's behalf.

16. **Process for execution of work:** The successful contractor shall execute the work only upon receipt of the written approval. No work should be commenced without obtaining written sanction from the office of Dean (IPS). The written approval shall form the basis of execution of work at site and must be enclosed with the R. A. bills for the purpose of measurement of work carried out and settlement of bills.

17. IIT Dharwad reserves the right to reject any tender or all the tenders without assigning any reason therefore.

18. The Contractor shall comply with the provisions of all Acts, Statutes, Rules, Regulations etc. of the Central and State Government as the case may be that may apply to his case and if necessary, get himself duly registered as required by the said Acts, Statutes, Rules, Regulations etc.

19. The contractor for the work shall be liable to pay applicable tax (including Taxes on works contract to state Government) if any that may be levied by the State or Union Government. Any request contrary to this will not be accepted.

20. Completion period: **Two months (60 days) from issuing work order.**

21. It shall be open to the Institute to abandon or give up at any stage of the construction of any of the said works or any part thereof. In the event of such abandonment or giving up or in the event of termination of the agreement, the Contractor shall be paid up to the work performed by then.

22. **Termination of contract** If the Contractor fails to perform any of its obligations under this agreement or if Institute is dissatisfied with the services of the Contractor, Institute may issue seven days' written notice intimating the Contractor of their failures or deficiencies and calling upon Contractor to rectify within such time as may be specified in the notice and if the Contractor fails to perform such obligation or make good such deficiencies as pointed out to the Contractor in the notice, Institute may terminate the services of Contractor under this agreement. Institute may also terminate the Contract hereunder:

- i) If the firm is adjudged bankrupt or
- ii) If they make a general assignment for the benefit of their creditors or
- iii) If a receiver is appointed on account of their insolvency or
- iv) They disregard law, ordinances, rules, regulations or orders of any public authority having jurisdiction on the works.

The termination shall be without prejudice to all rights, liabilities and remedies that have arisen or accrued till date of such termination or that may arise on account of such termination and Institute may get the project completed by whatever method they may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment, if due, until the loss, damage or expense incurred by Institute due to breach of this agreement by Contractor have been settled.

In case the Contractor abandons the work during the course of the project, the Institute has the right to appoint an alternate Contractor or make an arrangement for carrying out the work of Contractor, at the risk and cost of the Contractor. Traveling / daily allowances shall not be payable to the Contractor, its representatives, officials and consultants engaged by it for their visit to construction site, offices of local authorities, Employer's office or any other place in Dharwad.

The scope of work broadly described herein and assigned to Contractor, as their area of responsibility is inclusive of all constancy and other services required in connection with the completion of work whether specifically mentioned herein or not and rendering such constancy services will not entitle the Contractor to charge any additional fees in as much as the same are included in the overall professional fees payable to them.

**23. Liquidated Damages Clause:**

If any delay in execution of the works is attributable to the acts or omissions and commissions of Contractor, Institute shall be entitled to recover liquidated damages at the rate of 0.5% of the total fees for per week of delay limited to maximum of 10% of the total actual fees payable.

24. **Professional indemnity:** Contractor warrants that it shall exercise high degree of care and diligence in rendering the services pursuant to this agreement and that; such services shall be of a quality and standard satisfactory to Institute. The Contractor shall indemnify Institute from any damage or loss arising from such lack of care and diligence or arising out of any unsatisfactory performance of service by Contractor. The contractor is required to obtain a Contractor All Risk (CAR) policy for successful and safe completion of project. Contractor shall provide a copy of this

policy to Institute showing that such insurance has been taken and being maintained and that all the premia there on have been paid. A certified copy of such insurance policy shall be deposited with Institute.

**25. Dispute Settlement:** In case of any dispute or difference arise between the parties during the progress of or after construction of this contract or touching or relating either to the said buildings or works, or to any other matter or thing arising directly or indirectly under this contract, then and in such an event the same shall be referred to Director, IIT Dharwad as the SOLE ARBITRATOR who shall alone consider and determine the same, whose decision / award shall be binding and conclusive upon both the said parties and this clause shall be deemed a submission within the meaning of Arbitration and Conciliation Act 1996 or Statutory modification or re-enactment thereof. It is specifically agreed that the Contractor shall continue to render its services provided herein with all the due diligence, professional skill and tact notwithstanding that any matter, question or dispute has been referred to arbitration. The venue of Arbitration proceedings shall be Dharwad. It is further agreed between the parties as hereto that the Dharwad Courts alone shall have the exclusive jurisdiction.

**26. Site:** The contractor shall remove all surplus materials, debris etc. out of the IIT Campus from the site of work on completion work and will hand over the site clean before the bill is processed for final payment. Dismantled materials if any (declared by In-charge of the work) shall be returned to the Estate/ Electrical stores by the contractor at his own cost. The disposal of material shall be done in environmental friendly way and complying with the local rules and regulations.

## **27. Security**

### **a. Movement of contractor's materials:**

Any materials which are removed from the site of work and are required to be taken out from the IIT campus, the contractor should follow the following procedure:

The contractor shall apply in writing to the In-charge of the work the details of the materials to be removed including which are rejected etc. This application shall be endorsed by the In-charge of work or his authorized representatives. The materials shall only be allowed to go out of IIT campus after counter signature of the security officer and checked at the gate. No materials/tools will be allowed to be brought on holidays/Saturdays/Sundays inside the campus. Contractors can bring the materials/tools/between 0900 hours and 1700 hours on any working day (Monday to Friday). This may please be noted.

### **b. Search:**

Thorough search of all persons and transport shall be carried out at each gate and for as many times as gate is used for entry or exit and may also be carried out at any time or any number of times at the works site within the restricted area.

### **c. Labour Law:**

The work will be executed strictly following the Labour Laws of Central Govt & State Govt as may be applicable.

## **28. Evaluation Criteria**

The L-1 will be decided on the Grand total rate quoted for the work. All levies/taxes (i.e. GST etc.) must be clearly mentioned in the row provided for the purpose (as per format of commercial bid). However, the decision of the competent authority will be final and binding in awarding the order. In case of any clarification required, the same can be clarified from IIT Dharwad before submission of the bids.

## **29.1 SPECIAL TERMS AND CONDITIONS**

### **a. INTRODUCTION**

These General Specifications cover the equipments and materials for the system, their testing and/or inspection as may be necessary before their dispatch from their respective works, their delivery at site, all preparatory works, assembling, installation and adjustments, commissioning, final testing, putting into operation, equipment capacity computation and handing over of the complete system.

### **b. Related Documents**

These General Specifications shall be read in conjunction with the General conditions of contract. These General Specifications shall also be read in conjunction with the tender specifications, schedule of work, drawings and other documents connected with the work.

### **c. Site Information**

The tenderer should, in his own interest, visit the site and familiarise himself with the site conditions before tendering. For any clarification, tenderer may discuss with the Engineer-in-Charge.

### **d. Heat Load Calculations and Equipment Selection**

- i) The successful bidder/ contractor should give detailed heat load calculations, immediately after award of work separately for all the seasons in which, the specified conditions are to be maintained.
- ii) The successful Bidder/Contractor should also give the above heat load calculations wherever required separately for the areas served by each AHU in a central air conditioning/ heating system.
- iii) The equipment selection and duct design shall be made on the basis of the above heat load calculations wherever required.
- iv) The Contractor can refer and utilize the design done by the department/ consultants for the department, however, there shall be no commitment to provide the same to the contractor, nor shall the contractor be absolved of the responsibility of correct design and performance of the air-conditioning system provided by him.

## **29.2 CONFORMITY WITH STATUTORY ACTS, RULES, STANDARDS AND CODES**

- i) All components shall conform to relevant Indian Standard Specifications, wherever existing, amended to date.
- ii) All works shall conform to National Building code as well as relevant BIS codes.
- iii) All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 2003 and Indian Electricity Rules, 1956 amended to date. They shall also conform to CPWD General Specifications for Electrical works, Part-I: Internal, 2013 and Part-II: External, 1994 and Part IV (Sub-station), 2013, as amended to date.
- iv) All components shall conform to Energy Conservation Building Code 2007 of India as amended or revised up to date.

## **29.3 SAFETY CODES AND LABOUR REGULATIONS**

- i) All the safety procedures outlined in the safety codes shall be complied with.
- ii) In respect of all labour employed directly or indirectly on the work for the performance of the air conditioning contractor's part of work, the contractor at his own expense, will arrange for the safety provisions as per the statutory provisions, B.I.S recommendations, factory act, workman's compensation act, CPWD code and instructions issued from time to time. Failure to provide such

safety requirements would make the tenderer liable for penalty as provided in the labour laws/ GCC for each violation. In addition, the Engineer-in-charge, shall be at liberty to make arrangements and provide facilities as aforesaid and recover the cost from the contractor.

iii) The contractor shall provide necessary barriers, warning signals and other safety measures while laying pipelines, ducts cables etc. or wherever necessary so as to avoid accident. He shall also indemnify CPWD against claims for compensation arising out of negligence in this respect. Contractor shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause. The department shall not be responsible for any accident occurred or damage incurred or claims arising there from during the execution of work. The contractor shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the contractor due to the above provisions thereof.

#### **29.4 WORKS TO BE DONE BY THE CONTRACTOR**

Unless otherwise mentioned in the tender documents, the following works shall be done by the contractor and therefore, their cost shall be deemed to be included in their tendered cost whether specifically indicated in the schedule of work or not: -

- i) Foundations for equipments including foundation bolts and vibration isolation spring/ pads,
- ii) Support columns and beams for cooling towers,
- iii) Suspenders, brackets and floor/ wall supports for suspending/ supporting ducts and pipes,
- iv) Suspenders and/ or cable trays for laying the cables,
- v) Excavation and refilling of trenches in soil wherever the pipes are to be laid directly in ground, including necessary base treatment and supports,
- vi) Sealing of all floor slab/ wall openings provided by the Department or contractor for pipes and cables, from fire safety point of view, after laying of the same,
- vii) Painting of all exposed metal surfaces of equipments and components with appropriate colour as per standard scheme.
- viii) Making openings in the walls/ floors/ slabs or modification in the existing openings wherever provided for carrying pipe line, ducts, cables etc.
- ix) Providing wooden/ metallic frames for fixing grills/ diffusers.
- x) Making good all damages caused to the structure during installation and restoring the same to their original finish.
- xi) Balancing of all HVAC systems in accordance with generally accepted engineering standards. A written balance report shall be provided (wherever asked for) to the Engineer-in-Charge or his representative for HVAC systems serving zones with a total conditioned area exceeding 500m<sup>2</sup>.
- xii) A set of three copies of operations manual shall be provided to the Engineer-in-Charge or his representative containing following information at a minimum
  - a) HVAC equipment capacity,
  - b) Equipment operation and maintenance manuals,



- c) HVAC system control maintenance and calibration information, including wiring diagrams, schedules, and control sequence descriptions,
- d) A complete written narrative of how each system is intended to operate.

### **29.5 COMPLETENESS OF THE TENDER, SUBMISSION OF PROGRAMME, APPROVAL OF DRAWINGS AND COMMENCEMENT OF WORK**

#### i) Completeness of the tender

All sundry equipments, fittings, assemblies, accessories, hardware items, gaskets, masonry platforms/ foundation for Chilling Units, pumps, Cooling Towers etc., supports for pipes foundation bolts, supports, termination lugs for electrical connections, cable glands, junction boxes and all other items which are useful and necessary for proper assembly and efficient working of the various equipments and components of the work shall be deemed to have been included in the tender, irrespective of the fact whether such items are specifically mentioned in the tender or not.

#### ii) Submission of programme

Within fifteen days from the date of receipt of the letter of acceptance, the successful tenderer shall submit his programme for submission of drawings, supply of equipment, installation, testing, commissioning and handing over of the installation to the Engineer-in-Charge. This programme shall be framed keeping in view the milestones stipulated in the contract, building progress. Items like ducting, piping etc. that directly affect the building progress shall be given priority.

#### iii) Submission of Drawings

The contractor shall submit the drawings to the Engineer-in-Charge as per para 1.11.2 for approval before start of work.

iv) Commencement of Work the contractor shall commence work as soon as the drawings submitted by him are approved.

### **29.6 DISPATCH OF MATERIALS TO SITE AND THEIR SAFE CUSTODY**

The contractor shall dispatch materials to site in consultation with the Engineer-in-Charge. Suitable lockable storage accommodation shall be made available free of charge temporarily. Watch & ward however, shall be the responsibility of contractor. Programme of dispatch of material shall be framed keeping in view the building progress. Safe custody of all machinery and equipment supplied by the contractor shall be the responsibility of the contractor till final taking over by the department.

### **29.7 CO-ORDINATION WITH OTHER AGENCIES**

The contractor shall co-ordinate with all other agencies involved in the work so that the work of other agencies is not hampered due to delay in his work. Ducting, piping, cabling or any other work, which directly affect the progress of building work, shall be given priority.

### **29.8 QUALITY OF MATERIALS AND WORKMANSHIP**

i) The components of the installation shall be of such design so as to satisfactorily function under all conditions of operation.

ii) The entire work of manufacture/ fabrication, assembly and installation shall conform to sound engineering practice. The entire installation shall be such as to cause minimum transmission of noise and vibration to the building structure.

iii) All equipments and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.

iv) None of the equipment/ machines supplied shall be more than Six months old from date of supply at site, Copy of Excise Gate Pass/ Invoice/ Shipment /Custom Clearance certificate/ details (in case of Imported equipments) shall be submitted to prove the date of manufacture & genuineness of the equipments/ machines supplied.

### **29.9 RUNNING IN PERIOD & DATE OF ACCEPTANCE**

i) After the installation work has been completed by the contractor, he will conduct tests and make adjustments as may be necessary to satisfy himself that the plant including low side equipments is capable of continuous running. There after he will offer to the department a running in period of 7 days' subject to a minimum aggregate of 120 hrs at his cost. The duty cycle of the plant during this running in period shall be same as that specified in the tender documents. In case of multiple compressor installations, all the compressors should be run by rotation. The plant will be operated and a log of all parameters will be maintained during this period. The contractor will be free to carry out necessary adjustments etc. during this period without stopping the plant. Record of inside conditions will be made during this period to check that the same are as per NIT requirements. The plant will be said to have successfully completed the running-in-period, if no break down or abnormal/ unsatisfactory operation of any machinery occurs during this period. After this the plant will be made available for beneficial use. After the plant has operated without any major break down/ trouble and inside conditions are maintained as per NIT requirements for the above specified running in period, it shall be taken over by the department subject to guarantee clause mentioned below. This date of taking over of plant after trouble free operation during the running in period shall be the date of acceptance.

ii) Any loss of refrigerant or oil during the running in period shall be made good by the contractor free of charge.

iii) Capacity test of the chilling unit & other major equipments shall be carried out as and when conditions become stabilized.

iv) Seasonal testing may be carried out as & when outside conditions become suitable for the Major Season Test.

### **29.10 GUARANTEE**

i) The contractor shall guarantee the complete system to maintain the specified conditions under all conditions of ambience and internal loads subject to the condition that designed outside conditions & designed internal loads are not exceeded. Also the inlet/ outlet temperatures at the specified flow of water in the chiller unit shall be guaranteed.

ii) All equipments shall be guaranteed for a period of 12 months from the date of acceptance and taking over of the installation by the Department against unsatisfactory performance and/or breakdown due to defective design, material, manufacture, workmanship or installation. The equipment or component or any part thereof so found defective during the guarantee period shall be repaired or replaced free of cost to the satisfaction of the Engineer-in-Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk & cost of the contractor. The decision of Engineer-in-Charge in this regard shall be final.

iii) Any leakage of refrigerant and/or oil due to defective design, manufacture, workmanship or installation during the guarantee period shall be made good by the contractor free of charge.

### **29.11 PAYMENT TERMS**

The following percentage of contract rates shall be payable against the stages of work shown herein:

<b>S. No.</b>	<b>Stage of work</b>	<b>Machinery &amp; Equipment</b>	<b>All other items</b>
<b>I</b>	After initial inspection (wherever specified) & delivery at site in good condition on pro-rata basis	<b>80%</b>	<b>70%</b>
<b>II</b>	On completion of pro-rata installation	<b>10%</b>	<b>20%</b>
<b>III</b>	On commissioning and completion of successful running in period	<b>5%</b>	<b>5%</b>
<b>IV</b>	On completion of major seasonal test	<b>5%</b>	<b>5%</b>

When the major seasonal test cannot be carried out on commissioning of the installation due to any reason not attributable to the contractor, the installation will be handed over to the Department for beneficial use after completion of successful running in test of 7 days' subject to a minimum aggregate of 120 hours as per para 1.9 above. The balance payment shall be released to the contractor on his furnishing a bank guarantee in the specified format from a scheduled bank for an equivalent amount. The bank guarantee shall be valid for a period of 6 months. However, it will be extended till the successful completion of the major seasonal test. This bank guarantee shall be independent of the one furnished for performance guarantee.

The following shall be considered major seasonal test for the purpose of the above payment terms: -

- a) Air-conditioning system: Summer or monsoon
- b) Central heating system: Winter
- c) ETAC: Summer
- d) Cold room/ Walk in cooler: Summer

### **29.12 TENDER DRAWINGS, DRAWINGS FOR APPROVAL & COMPLETION DRAWINGS**

#### a. Tender Drawings

The drawings appended/ uploaded with the tender documents are intended to show the areas to be conditioned, space allotted for various equipments, tentative duct, cable and pipe routes. The equipments offered shall be suitable for installation in the spaces shown in these drawings.

#### b. Drawings for approval on award of the work (Not applicable in case of Window and Split AC)

The contractor shall prepare & submit three sets of hard copy & one Digital/ soft copy in AutoCAD format of following drawings and get them approved from the Engineer-in-Charge before the start of the work. The approval of drawings however does not absolve the contractor not to supply the equipments/ materials as per agreement, if there is any contradiction between the approved drawings and agreement.

- i) Lay out drawings of the equipments to be installed in various rooms such as plant room, AHU rooms, hot water generator room, cooling tower and other equipments.
- ii) Drawings including section, showing the details of erection of entire equipments including their foundations, water basin for the cooling towers / air washers, etc.

- iii) Plumbing drawings showing the layout of entire piping, dia & length of pipes, valves and isometric drawings showing connections to various equipment.
- iv) Ducting drawings showing sizes, locations of dampers, grilles & diffusers.
- v) Electrical wiring diagrams for all electrical equipments and controls including the sizes and capacities of the various cables and equipments,
- vi) Dimensioned drawings of all electrical and control panels,
- vii) Drawings showing the details of all insulations and vapour barrier works,
- viii) Drawings showing details of supports for pipes, cable trays, ducts etc.
- ix) Any other drawings relevant to the work. The department shall, at its discretion, use the soft copy of such drawings to prepare and examine the integrated services layout, resolve conflicts, and advise the contractor to modify the execution drawings suiting & adjusting to all the services requirements. The contractor shall be bound to modify & execute accordingly.

c. Completion Drawings (Not applicable in case of Window and Split AC) One set of Digital/ soft Copy and one set of the following laminated drawings shall be submitted by the contractor while handing over the installation to the Department. Out of this one of the sets shall be laminated on a hard base for display in the A.C. plant room. In addition, one set will be given on compact disc.

- (i) Plant installation drawings giving complete details of all the equipments, including their foundations,
- (ii) AHU room installation drawings,
- (iii) Plumbing layout drawings including insulation giving sizes and lengths of all the pipes and the sizes and locations of all types of valves, and including isometric drawings for the entire piping including the pipe connections to the various equipments and insulation details wherever required,
- (iv) Duct layout drawings with their sizes and locations, and sizes and locations of all dampers, grilles & diffusers,
- (v) Line diagram and layout of all electrical control panels giving switchgear ratings and their disposition, cable feeder sizes and their layout,
- (vi) Control wiring drawings with all control components and sequence of operations to explain the operation of control circuits,
- (vii) BMS drawings (wherever applicable)

### **29.13 AFTER SALES SERVICES**

The contractor shall ensure adequate and prompt after sales service in the form of maintenance, spares and personnel as and when required and shall minimise the breakdown period. In case of equipment supplied by other manufacturers the firm shall furnish a guarantee from the manufacturer for the same before the plant is taken over.

### **29.14 DOCUMENTS TO BE FURNISHED ON COMPLETION OF INSTALLATION**

Three sets of the following documents shall be furnished to the department by the contractor on completion of work: -

- a) Completion drawings as per 1.12.3,
- b) One set in Digital form and 1 set in printed form of manufacturer's technical catalogues of all equipments and accessories,
- c) Operation and maintenance manual of all major equipments, detailing all adjustments, operation and maintenance procedure

### **30. TECHNICAL SPECIFICATION**

#### **I. AIR COOLED INVERTER SPLIT UNITS**

##### **A) CONDENSING UNIT: (Ductable / Hi – Wall Split Units)**

The compressor(s) shall be Inverter scroll type and designed for continues operation even at high ambient temperature of 53 deg c. The condenser shall be air cooled, made of Copper tubes with extended aluminium fins. Cabinets shall be fabricated out of heavy gauge steel, properly formed for close fit and structural rigidity. All access panels shall be so constructed as to be quickly and easily removable. All outside surface shall be finished with powder coating for protection against humid weather. The condenser fan shall be directly driven and designed to achieve low condensing temperature and operate continuously and silently.

Refrigerant control in the outdoor unit shall be through Electronic Expansion Valve. Complete refrigerant circuit, oil balancing/ equalizing circuit shall be factory assembled & tested. The outdoor units must be suitable for more than 50 Meter Refrigerant piping between outdoor unit & the farthest indoor units. Allowable level difference between outdoor unit & indoor units shall be 30 Meter.

**Outdoor units shall be complete with following safety devices:**

- High pressure switch
- Fan driver overload protector
- Over current relay
- Inverter Overload Protector
- Fusible Plug

**Unit shall be supplied with**

- Installation manual
- Operation Manual
- Connection Pipes
- Clamps

##### **B) EVAPORATING UNIT: DUCTABLE TYPE**

The cooling coils shall me made of Copper Tubing having extended aluminium fins. The tubes shall be mechanically expanded for positive bonding between tubes and fins. The cooling coil circuit shall be fed with liquid refrigerant through the expansion device and distributor. Motor shall be high efficiency brushless DC Motor. The blower shall be statically and dynamically balanced and designed for silent operation at required airflow rates against required static pressure. The filters shall be washable synthetic media type arranged for convenient cleaning and replacement. The drain pan shall be fabricated out of heavy steel sheet. Insulated with expanded polythelene sheet. The casing shall be of heavy gauge GI, duly powder coated for weather protection. Noise Level of each Indoor unit in running conditions should not exceed 40 db. Corded Type remote controller shall be supplied with Ductable split units. Controller shall have self – Diagnostic Function to pre warn of failure or problems with function codes. Controller shall have digital indication of temperature along with setting and other functions. ON / OFF switch, timer, RTC, operation of the fans, swing of louvers and other operation modes as desired including diagnostics.

##### **C) HI – WALL MOUNTED UNIT (with cordless remote):**

With decorative look to match with the interior Layout of Cordless Remote type complete in PVC construction. Evaporating unit comprising of DX Cooling coils, blower, electric motor, insulated sandwiched drain Tray, and junction box for electrical connections, 20 micron HDPE washable filter etc.

#### **D) FOUR WAY CASSETTE UNIT (with cordless remote):**

These units shall be installed between the bottom of finished slab & top of false ceiling. The maximum allowable height for the cassette type units shall be 300 mm. The unit must have in built drain pump, suitable for vertical lift of 750 mm. The unit casing shall be Galvanized Steel Plate. Unit must be insulated with sound absorbing thermal insulation material, Polyurethane foam. The noise level of unit at the highest operating level shall not exceed 42 dB (A), at a vertical distance of 1.5 m from the grille of the unit. Unit shall have provision of connecting fresh air without any special chamber & without increasing the total height of the unit (345 mm maximum). The unit shall be supplied with suitable decorative panel.

**All above types of indoor units shall be supplied with following from the factory**

- Operation Manual
- Installation Manual
- Paper pattern for installation
- Drain hose/ Clamp metal/ Washer fixing plate/ Sealing pads/ Clamps/ Screws Washer for hanging bracket/ Insulation for fitting

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

#### **II. REFRIGERANT PIPING & INSULATION:**

All refrigerant piping shall be in high grade copper (18 Gauge) including all connections. All refrigerant piping shall be insulated with suitable thickness of Closed Cell Elastomeric Thermal Insulation material. All joints on the insulation should be sealed with good quality sticking compound. All joints should be covered with 2” wide Aluminium tape.

**Entire Refrigerant piping inside the building should be installed on the ceiling with proper clamping arrangement and refrigerant piping outside (i.e. terrace & vertical wall) the building should be properly clamped on GI ladder type cable tray on parapet / vertical wall of building dully covered with 16-gauge GI sheets.**

#### **III. ELECTRICAL WORK**

The electrical work will be carried out as per IE rules. The Employer will provide incoming cable with earthing for each outdoor / Indoor unit. The further distribution of control cabling and earthing of GI shall be carried out by the contractor.

#### **IV. DRAIN PIPING**

Condensate from the Indoor unit shall be drained through properly installed drain piping designed to prevent any accumulation of condensate in the drain pan. Drain piping shall be made of rigid PVC pipe of 6 Kg. /cm sq. pressure rating with water tight threaded connections leading from the Indoor unit to a suitable drain point. Complete drain piping shall be made leak proof and water tight by means of precise installation and the use of leak proof sealant / adhesives. All drain piping shall be insulated with suitable thickness of Closed Cell Elastomeric thermal Insulation material. All joints on the insulation should be sealed with good quality sticking compound. All joints should be covered with 2” wide Aluminium tape.

#### **V. SHEET METAL DUCTING: (FOR SQUARE / ROUND DUCTING)**

- a) The galvanized steel sheet shall confirm to IS: 277.
- b) Ducts shall be made of G.I. Sheet confirming to IS: 655 as under:

Max. Side (mm)	Thk. of Sheet (mm)	Type Of Joint	Bracing
UP TO 30"	0.63	1" GI Flange	None
31" TO 60"	0.80	1" X 3 MS Angle frame	1" X 1" X 3 Angles, 48" From Joint
61" TO 90"	1.00	1 1/4" X 3 MS Angle Frame	1 1/4 " X 1 1/4 " X 3 Angles. 48" From Joint
90" & ABOVE	1.25	1 1/4" X 3 MS Angle Frame	1 1/4 " X 1 1/4 " X 3 Angles. 48" From Joint

All ducts shall be rigid and shall be adequately supported at every 6'- 0" distance and braced where required with standing seams, tees or angles or ample size to keep the ducts true to shape and to prevent buckling, vibration or breathing. Duct supporting shall be as per the following:

Max. side (mm)	Spacing	MS angle size (mm)	MS rod Ø (mm)
Up to 30"	8'-0"	1 1/4 " X 1 1/4 " X 3	8
31" to 60"	8'-0"	1 1/2 " X 1 1/2 " X 3	10
61" to 90"	8'-0"	2" X 2" X 3	10

G. I. Nut – bolts to be used for duct connection at 150 mm pitch on periphery and shall be of hot deep galvanized. A good quality Neoprene rubber gasket of uniform thickness and width shall be used as gasket between flanged joints. The gasket shall be fixed by a suitable adhesive.

All the joints shall be made tight and all interior surfaces shall be smooth. Bends shall be made with radius not less than one half the width of the duct or with properly designed interior curved van.

AC Indoor Units / Fans will be connected to ducting by means of weather proof flexible connection of canvas / suitable material type with zip. Supply and installation of flexible connection shall be part of ducting work and no separate item will be acceptable / entertained.

## VI. PRE INSULATED DUCTING: (FOR SQUARE / RECTANGLE DUCT)

Pre-Insulated Ducting having 20 mm Thickness made of Polyisocyanurate Foam Panel having 45 Kg / M3 density, The material shall be CFC/ HCFC free. The Ducting Sheet shall have 80 Micron Aluminium facing on both sides. All required accessories shall be part of ducting work for fabrication of the ducting in Square, Rectangle, Radius, Offset construction.

Required size of Polymer/ Aluminium flanges with self-adhesive good quality gasket shall be provided for joining / connection of duct pieces. Good quality Silicon Sealant of Approved make along with 50 mm thick Aluminium tape shall be used for sealing of all joints.

**Pre insulated ducting shall be installed by using M/s. Gripple wire supports with adequate size anchor fastener, clamps, etc.**

After completion of the work AC vender / Contractor shall balance entire air distribution system to supply the air quantities as required in the various zones and rooms to maintain required temperature / Air change per hour ratio. The final balancing of the air quantity through each grille or diffuser shall be recorded by contractor and shall submit the same to consultants / clients for approval.

## VII. VOLUME CONTROL DAMPER:

- a) Dampers: All duct dampers shall be opposed blade louver dampers of robust 16 G GSS

construction and tight fitting. The design, method of handling and control shall be suitable for the location and service required.

- b) Dampers shall be provided with suitable links levers and quadrants as required for their proper operation. Control or setting device shall be made robust, easily operable and accessible through suitable access door in the duct. Every damper shall have an indicating device clearly showing the damper position at all times.
- c) Dampers shall be placed on ducts for the proper volume control and balancing of the air distribution system.

## **VIII. GRILLES**

Supply & Return air grilles / registers shall be of either steel or aluminium sections as specified in schedule of quantities. Steel construction registers shall have primer coat finish whereas extruded aluminium registers shall be either Anodized or Power coated as specified in Schedule of Quantities. These grilles / registers shall have individually adjustable louvers both horizontal and vertical. Supply air grilles / registers shall be provided with key operated opposed blade extruded aluminium volume control damper anodized in matt black shade. The grilles / registers shall be suitable for fixing arrangement having concealed screws as approved by Architect. Liner continuous supply cum return air grilles / register shall be extruded aluminium construction with fixed horizontal bars at 15 Deg. Inclination and flange on both sides only (non on top and bottom). The thickness of the fixed bar louvers shall be minimum 5.5 mm in front and 3.8 mm in rear with rounded edges. Flanges on the two sides shall be 20 mm / 30 mm wide as approved by Architect. The grilles shall be suitable for concealed fixing. Volume control dampers of extruded aluminium anodized in black colour shall be provide in supply air duct collars. For fan coil unit's horizontal fixed bar grilles as described above shall be provided with flanges on for sides, and the core shall be and suitable for clip fixing, permitting its removal without disturbing the flanges.

- a) All grilles / registers shall be selected in consultation with the Architect. Different spaces shall require horizontal or vertical face bars, and different width of margin frames. These shall be procured only after obtaining written approval from Architect for each type of grille / register.
- b) All grilles / registers shall have a soft continuous rubber / foam gasket between the periphery of the grilles / register and the surface on which it has to be mounted. The effective area of the grille / registers for air flow shall not be less than 66 percent of gross face area.
- c) Grille / Registers specified with individually adjustable bars shall have adjustable pattern as each grille bar shall be pivot able to provided pattern with 0 to +45-degree horizontal are and up to 30-degree deflection downwards. Bars shall hold deflection settings under all conditions of velocity and pressure.
- d) Bar longer than 45 cm shall be reinforced by set-back vertical members of approved thickness.
- e) All collar dampers shall be anodized aluminium in mat black shade.
- f) In case of continuous grilles / diffusers, dummy grilles shall be blanked of using GI sheet duly painted black. (If Required)
- g) All square / rectangular diffusers, slot diffusers to have insulated plenum installed above dampers from OEM factory and not to be constructed at site.

## **IX. ACCOUSTIC INSULATION**

Acoustic insulation for Plenum, main duct pieces shall be provided as per following. Acoustic



insulating material shall be processed Elastomeric Nitrile Rubber foam. The thickness of the Nitrile rubber shall be 15 mm. The material should be fiber free. The density of the same shall be within 140-180 Kg/m<sup>3</sup>. The material should have a thermal conductivity not exceeding 0.050 W/mK. The maximum surface temperature the material should withstand is 105<sup>0</sup> C and minimum temperature should be -20<sup>0</sup>C. Thickness of the material shall be as specified for the individual application. The material should conform to Class 1 rating for surface spread of Flame as per BS 476 Part 7. The recommended thickness is 15 mm. Material shall have active anti-microbial ingredients and microbiological growth on insulation surface should confirm to following standards: Mould Growth – UL 181; Fungi Resistance – ASTM G21/C1 338 and Bacterial resistance – ASTM G 22. Ducts so identified and marked on Drawings and included in Schedule of Quantities shall be provided with acoustic lining of thermal insulation material. Entire inside surface of main ducts, plenum chambers to be covered with Acoustic Insulation.

The inside surface for the ducts / Plenum Chamber shall be covered with adhesive recommended by the manufacturer. Cut acoustic insulation material sheets into required sizes apply adhesive on acoustic insulation material and stick it to the duct / plenum surface. Refer to installation procedure and adhesive recommended by manufacturer for further details.

**X. UNDER DECK INSULATION (Roof Insulation)**

Insulation material shall be 32 mm thick Closed Cell Elastomeric nitrile rubber. Density of Material shall be between 40 to 60 Kg/m<sup>3</sup>. Thermal conductivity of Elastomeric Nitrile rubber shall not exceed 0.035 W/m<sup>0</sup>K at an average temperature of 0<sup>0</sup>C. The insulation shall have fire performance such that it passes Class 1 as per BS476 Part 7 for surface spread of flame as per BS 476 and also pass Fire Propagation requirement as per BS476 Part 6 to meet the Class ‘O’ Fire category as per 1991 Building Regulations (England & Wales) and the Building Standards (Scotland) Regulations 1990. Water vapour permeability shall not exceed 0.017 Perm inch (2.48 x 10<sup>-14</sup> Kg/m.s.Pa), i.e. Moisture Diffusion Resistance Factor or ‘μ’ value should be minimum 7000.

**XI. MS STAND FOR INSTALLATION OF CONDENSING UNIT:**

MS Stand fabricated using adequate size angle / channels / plates shall be provided for installation of ODU’s. MS stand fabricated shall be of minimum 150 mm height. After fabrication, complete stand shall be cleaned with wire brush, painted with 2 coats of red oxide and finally with two coats of **anti corrosive paint**. 2 Nos. of 10 mm thick serrated rubber pads shall be provided between MS stand and ODU.

**31. LIST OF APPROVED MAKE**

- |    |   |  |
|----|---|--|
| 1. | AIR - CONDITIONING UNITS                      | : DAIKEN / LG / CARRIER /<br>TOSHIBA / VOLTAS / BLUESTAR |
| 2  | DRAIN PIPING                                  | : SUPREME / PRINCE                                       |
| 3. | INSULATION                                    |  |
|    | FIBREGLASS                                    | : UP TWIGA   |
|    | EXPANDED POLYSTRENE                           | : BEARDSSELL   |
|    | PHENOTHERM                                    | : BAKELYTE HYLEM/EQ. APPROV.                             |
|    | CLOSED CELL ELASTOMERIC<br>THERMAL INSULATION | : ARMAFLEX / ARMACELL                                    |

- |     |                          |                              |
|-----|--------------------------|------------------------------|
| 4.  | CABLES                   | : CCI / LAPP / POLYCAB       |
| 5.  | CONTROL CABLE            | : FINOLEX                    |
| 6.  | SWITCHGEARS / ELE. COMP. | : L & T / SIEMENS / E.E.     |
| 7.  | REFERIGERANT PIPING      | : MANDAV TUBES               |
| 8.  | G. I. SHEETS             | : JINDAL / ISPAT / SAIL      |
| 9.  | GRILLES / DIFFUSERS      | : DYNACRAFT                  |
| 10. | VCD                      | : DYNACRAFT                  |
| 11. | PRE INSULATED DUCT       | : ZECO/ PAL/ PIRALU          |
| 12. | EXHAUST FAN              | : KRUGER / SYSTEM AIR / DYNA |
| 13. | AHU                      | : ADVANTECH/ ZECO/ ETHOS     |

**Annexure-1**

**Bidder Information**

1.	Name of the Bidder	
2.	Address of the Bidder	
3.	PAN No.	
4	GSTN No.	
4.	Bank Details and Address	
5.	State of GST Registration	
6	E-mail	
6.	Contact Person's Name & Designation	
7.	Mobile No.	

Details of Satisfactory performance certificate from PSU/Govt. companies where the bidder has worked during the last 3 years (along with proof) if any

Sl. No.	Name of the PSU/Govt., Company	Period of contract

Work experience (along with proof)

Sl. No.	Name & Address of the Organization	Value of Contract	Duration from	To

(Use Separate sheet if required, details should be as per the above serial No's)

Date:

Signature of Authorised Person

Place:

Name:

**Tender no: IITDH/MMD/IPS/2019-20/44**

**SCHEDULE OF WORK / BOQ / PRICE BID  
(To be quoted on the letter head of the bidder)**

<b>BOQ for providing HVAC System in Auditorium at IIT Dharwad</b>					
Sl. No.	Description	Qty.	Units	Unit Rate	TOTAL
<b>A ) SUPPLY OF UNITS</b>					
1	Supply of Condensing UNITS – i) Air cooled Condensing unit with DX coil & Scroll Compressors suitable for operation at ambient temp. of 45 deg. C. ii) Microprocessor control panel.				
	a) Capacity - 8.5 TR	2	Nos.		
	b) Capacity - 5.5 TR	1	Nos.		
2	Double skin Air Handling Unit with 75mm wall thickness panel, DX coil, with mixing box, FA / SA / RA dampers, pre filters, fine filters, plug type fan (backward curved), 35 mm WG net external static (excluding cabinet and filter pressure drop), S.S, insulated drain tray, UV lights, inspection glass, ports for magnehelic gauges, fire retardant flexible connection at outlet & RA, control panel for controlling AHU fan to maintain positive pressure of 10 Pa in room, with pressure sensor & with suitable connectivity with DX outdoor units				
	a) AHU - Capacity 3200/ 35mm Static pressure/ 8.5TR	2	Nos.		
	b) AHU - Capacity 2200/ 35mm Static pressure/ 5.5TR	1	Nos.		
3	SUPPLY OF SPLIT AC UNIT FOR GREEN ROOM				
	1.5TR Inverter split AC	2	Nos		
	<b>SUB-TOTAL (A)</b>				
	<b>GST</b>				
	<b>TOTAL (A) : WITH TAX</b>				
<b>B) LOW SIDE WORK FOR THE ABOVE JOB</b>					
Sl. No.	Description	Qty.	Units	Unit Rate	TOTAL
1	INSTALLATION OF AC Condensing UNITS i) Condensing units with vibration isolating pads. ii) Necessary charge of oil & refrigerant gas as required up to handing over the system.				

	a) Capacity - 8.5 TR	2	Nos		
	b) Capacity - 5.5.0 TR	1	Nos		
2	Double skin Air Handling Unit with 75mm wall thickness panel, DX coil, with mixing box, FA / SA / RA dampers, pre filters, fine filters, plug type fan (backward curved), 35 mm WG net external static (excluding cabinet and filter pressure drop), S.S, insulated drain tray, UV lights, heaters 1.5 KW x 2 nos., built-in air stat with interlock for heaters, inspection glass, ports for magnehelic gauges, fire retardant flexible connection at outlet & RA, control panel for controlling AHU fan to maintain positive pressure of 10 Pa in room, with pressure sensor & DX outdoor units				
	a) AHU - Capacity2500/ 35mm Static pressure/ 8.5TR	2	Nos.		
	b) AHU - Capacity1800/ 35mm Static pressure/ 5.5TR	1	Nos.		
3	INSTALLATION OF Split UNITS i) Condensing units with vibration isolating pads. ii) Necessary charge of oil & refrigerant gas as required up to handing over the system.	2	Nos		
	REFRIGERANT PIPING & ELECTRICAL CABLING				
	Ductable AC UNITS				
4	Supply, Installation, testing & commissioning of suitable Refrigerant piping for connecting AHU and CONDENSING units with nitrile foam insulation including copper pipes, fitting, support, saddles, pressure testing, tagging & evacuation. Minor civil works like brick wall, chasing or cutting is included in contractor scope and nitrile foam insulation sleeves to be properly taped on the joint, further quantity shall be measured one way considering single circuit per machine .(Separate rates /measurement shall not be considered for suction or discharge pipe for multiple circuits.)				
	Condensing Unit To AHU	36	Rmt		
	SPLIT AC UNITS				
5	Supply, Installation, testing & commissioning of suitable Refrigerant piping for SPLIT AC units with nitrile foam insulation including copper pipes, fitting, support, saddles, pressure testing, tagging & evacuation. Minor civil works like brick wall, chasing or cutting is included in contractor scope and nitrile foam insulation sleeves to be properly taped on the joint, further quantity shall be measured one way considering single circuit per machine .(Separate rates /measurement shall not be	6	Rmt		

	considered for suction or discharge pipe for multiple circuits.)-Proposed for new units - Extra needed in case of shortfall with the bundled unit-3mtrs.				
6	Electric CONTROL Cable From Indoor To outdoor				
	a) Ductable AC	36	Rmt		
	b) Split AC	8	Rmt		
	<b>GI SHEET METAL DUCTING:</b>				
7	Supply, installation, testing and commissioning of fabricated GI Rectangular Ducting , as per SMACNA STD. including suitable ,fitting, support, clamps.				
	a) 1555 to 2251 22Gauge	60	SQ M		
	b) 755 to 1555 24Gauge	196	SQ M		
	<b>THERMAL &amp; ACOUSTIC INSULATION:</b>				
8	a) Supply & Installation of Thermal Insulation of the ducts using 50mm thick Fibreglass having density 24 Kg/cu.m & covered with aluminium foil	222	SQ M		
8	b) Supply & Installation of Acoustic Insulation of the ducts using 50mm thk. Fibreglass board having density 24 Kg/cu.m & covered with RP tissue paper & finished with 24G aluminium perforated sheet.	34	SQ M		
9	Supply & Installation of cover to exposed duct for protection from atmosphere using 26G GI sheet. With proper interlocking of seam.	20	SQ M		
10	Dampers for Control of fresh Air ( GI)	3	Nos.		
11	GI Duct Volume control Dampers for Control of Supply Air	6	Sq.m		
12	GI FIRE Dampers for Supply Air	6	Sq.m		
13	Four way Grill type Diffusers Neck size 600mmX 600mm, Powered coated Aluminium Alloy Extrusion	16	Nos		
14	Aluminium Powder coated Return Air Grill with neck size 200mm width	12	Sq.m		
15	Fresh Air Duct with Bird Mesh in Plant Room Wall				
	Size 600mm x 450mm with all sides flanged.	2	Nos.		
16	<b>DRAIN PIPING</b>				
	Hard PVC Plumbing grade drain piping with 6mm Nitrile Insulation & pipe support.				
	a) 32mm dia	10	Rmt.		
	b) 19mm dia	5	Rmt.		
17	M.S. Stand with primer and painting for Ductable Condensing unit.	53	Nos.		
18	Powder coated Bracket for split AC	2	Nos.		
19	Flexible connection of double canvass cloth with necessary flange	6	Nos.		
	<b>SUB-TOTAL (B)</b>				
	<b>GST</b>				

TOTAL (B) : WITH TAX					
Sl. No.	(C) MISCELLANEOUS	Qty.	Units	Unit Rate	TOTAL
1	Supplying and fixing 2mm thick perforated cable tray with powder coated paint on existing MS angle support using necessary GI bolts/nuts and washer or welding as required. Size 150X50 MM	20	RMT		
2	"Supplying and erecting iron, sheet metal work consisting of CRCA sheets, various sections of iron, plates, chequered plates, rods, bars, MS pipes, etc. for panel board or any other purpose with bending, cutting, drilling and welding complete erected at the position with necessary materials duly painted with one coat of red oxide and two coats of enamel paint to match the switchgears or as per directions by the authority"	150	KG		
3	Concealed Conduit System Supplying heavy gauge PVC conduit pipe .....mm dia .....mm thick conforming to IS 2509 with suitable size bends, metal/PVC junction boxes, adhesive paste etc., and running before concreting the slab. The conduit should be tied to the reinforcement rods by using binding wires and unused ways of junction boxes and pipe ends should be covered using PVC end enclosures, run with 18SWG GI fish wire wherever necessary	10	RMT		
<b>SUB-TOTAL (C)</b>					
<b>GST</b>					
<b>TOTAL (C) : WITH TAX</b>					
<b>GRAND TOTAL (A) + (B) + (C)</b>					

Declaration: I/We do hereby accept all the terms and conditions laid down in the tender document for the above said work/supply. I/We also agree to the condition that the right to suspend the tender process or part of the process, to accept or reject any or all the tenders at any stage of the process and/or to modify the process or any part thereof at any time without assigning any reasons thereto is reserved by the Competent authority of the Institute without any obligation or liability whatsoever.

**Signature of the Bidder with date and seal**