



INDIAN INSTITUTE OF TECHNOLOGY, MADRAS  
CHENNAI – 600 036  
ENGINEERING UNIT

Technical Bid (Volume 1)

T. No. 26/2013–2014/Eldb

Name of work	: Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras
Approximate value put to Tender	: Rs. 13,97,000/-
Earnest money Deposit	: Rs. 27,940/-
Cost of Tender Schedule	: Rs. 525/- (including VAT – 5%)
Date and Time of Submission	: Date: 02.09.2013 Time: 03.00 pm
Date and Time of Opening	: Date: 02.09.2013 Time: 03.10 pm
Venue	: Engineering Unit Conference Room 3 <sup>rd</sup> Floor Admin Block I.I.T, Madras Chennai – 600 036

Consultant (Elect)

Executive Engineer (E)

Issued to

**INDIAN INSTITUTE OF TECHNOLOGY, MADRAS, CHENNAI-36**  
**ENGINEERING UNIT**  
**TENDER DOCUMENTS**  
TENDER No. 26/2013-14/Eldb

Name of Work:- Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras

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This tender document contains 57 (Fifty Seven) pages and 9 pages in Volume 2 only. The contractor should take print out as published in the website and enclose the entire documents. If the contractor has not submitted all the pages, the tender will be liable for rejection.

**INDIAN INSTITUTE OF TECHNOLOGY MADRAS**  
**ENGINEERING UNIT**  
**TENDER No. 26/2013-14/Eldb**  
**1.0 BRIEF NOTICE TO TENDERERS**

The Executive Engineer (E), Engineering Unit, Indian Institute of Technology, Madras, Chennai on behalf of the Chairman, Board of Governors, IITM, invites item rate tenders from the contractors who have executed at least 2 similar works costing not less than Rs. 7 lakhs each within last 5 years. Proof of completion certificates shall be submitted in the tender. The work order will not be considered as proof of completion.

<b>Name of Work and Location</b>	<b>Estimated Cost Rs. in lakhs</b>	<b>Earnest Money in Rs</b>	<b>Time allowed for completion</b>	<b>Last date and time of receipt of tender</b>	<b>Last date and time of opening of tender</b>
Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras	13.97	27,940	3 Months	02.09.13 3.00 P.M.	02.09.13 3.10 P.M.

The tender documents can be downloaded from the Institute website ([tenders.iitm.ac.in](http://tenders.iitm.ac.in)). The cost of tender document so downloaded has to be paid in the form of DD while submitting the tender. Tender documents may also be purchased up to 30.08.2013 3.00 P.M. from the office of the Executive Engineer (E), Engineering Unit, Near Administration Building on payment of Rs. 525/- in the form of crossed demand draft drawn in the name of Indian Institute of Technology Madras from any Scheduled bank and payable at Chennai. The tender, without cost of tender document, will be summarily rejected.

Tenders should be accompanied by an EMD for an amount of Rs. 27,940/- in the form of demand draft drawn in the name of Indian Institute of Technology Madras, Chennai on any scheduled bank and payable at Chennai.

The EMD in the above form and the technical bid shall be put in a cover super scribed with the name of the work and wording 'EMD + Technical bid' (cover 1). The price bid consisting of the BOQ shall be put in another cover super scribed with the name of the work and the wording 'Price Bid' (Cover 2). Both the cover 1 and 2 may be put in a third cover super scribed with the name of work (cover 3).

The tender shall be deposited in the tender box kept at the office of the Engineering Unit, 3<sup>rd</sup> floor of Administrative Block on or before the stipulated date and time of opening of the tender.

At the time fixed for opening of the tender, the cover 3 shall be opened and then cover containing the EMD and Technical bid will be opened. If the EMD submitted is in the acceptable form then the Technical bid will be evaluated, if not the tender will be returned to the tenderer. If the eligibility criteria mentioned in the Technical bid is met, then the tender containing the price bid will be opened. Otherwise the tender will be returned to the tenderer.

**Executive Engineer (E)**

INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
ENGINEERING UNIT

**2.0 NOTICE INVITING TENDERS**

- 2.1 Item rate tenders are invited on behalf of the Chairman Board of Governors, Indian Institute of Technology Madras (IITM) for the work of "Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras " from the contractors as stipulated in NIT.
- 2.2 The work is estimated to cost Rs. 13.97 lakhs.
- 2.3 Agreement shall be drawn with the successful tenderer in prescribed the Form 8 of CPWD duly modified to suit IITM requirements. The tenderer shall quote the rates as per various terms and conditions of the said form which will form part of the agreement.
- 2.4 Time allowed for carrying out the work is 3 months which shall be reckoned from the 10<sup>th</sup> day after the date of written orders to commence the work or from the first day of handing over of the site whichever is later.
- 2.5 The tender documents can be downloaded from the Institute website ([tenders.iitm.ac.in](http://tenders.iitm.ac.in)). The cost of tender document so downloaded has to be paid in the form of DD while submitting the tender. Tender documents may also be purchased up to 30.08.13, 3.00 P.M. from the office of the Executive Engineer (E), Engineering Unit, Near Administration Building on payment of Rs. 525/- in the form of crossed demand draft drawn in the name of Indian Institute of Technology Madras from any Scheduled bank and payable at Chennai. The tender, without cost of tender document, will be summarily rejected.
- 2.6 Tender documents consisting of plans, specifications, the schedule of quantities of the various classes of work to be carried out and the terms and conditions of contract to be complied with by the tenderer and other documents can be seen in the office of the Executive Engineer (E), IITM between 11:00 AM and 4:00 PM from 19.08.13 to 02.09.2013 except on IITM holidays.
- 2.7 Tenders should be accompanied by Earnest Money Deposit for an amount of Rs. 27,940/-.
- 2.8 The description of the work is given below. Replacement of Walk in coolers in Himalayas and Vindhya Mess at IIT Madras. The details of works to be carried out are indicated in the bill of quantities.
- 2.9 The competent authority does not bind itself to accept the lowest or any other tender and reserve itself the authority to reject any or all the tenders received without the assignment of any reason. Tenders in which any of the prescribed conditions is not full filled or with any conditions including that of conditional rebate put forth by the tender shall be summarily rejected.
- 2.10 Canvassing whether directly or indirectly, in connection with the tender is strictly prohibited and the tenders of the tenderers who resort to canvassing will be liable for rejection.
- 2.11 The competent authority reserves to itself the right of accepting part or whole of the tender and the tenderer shall be bound to perform the same at the rate quoted.
- 2.12 The tenderer shall not be permitted to tender for works in IITM if his near relative is posted as Divisional Accountant, Asst. Registrar (EU) or as an officer in any capacity in the grades of all Engineers (All inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him who are near relatives to any officer in IITM. Any violation of this by the tenderer would render him liable to be removed from the approved list of tenderers and the tender is liable to be rejected.
- 2.13 No Engineer or other officers employed in Engineering unit of IITM or other Gazetted officers employed in Engineering or Administrative duties in any Engineering establishment of Government of India shall be allowed to work as a tenderer or employee of the tenderer in IITM for a period of two years after his/her retirement from service, without previous permission of IITM / Government of India. Any violation by the tenderer would render the tenderer liable to be removed from the approved list of tenderer and the tender is liable to be rejected.

- 2.14 The tender for the works shall remain open for acceptance for a period of thirty days from the date of opening of tender. Any tenderer who withdraws his tender before the said period or issue of acceptance, whichever is earlier or makes any modification in the terms and conditions of the tender which are not acceptable to the Institute, then the tenderer will forfeit 50 % of the said Earnest Money aforesaid to IIT Madras without prejudice to any other right or remedy. Further the tenderer who withdraws or makes modifications which are not acceptable shall not be allowed to participate in the future tenders of IITM.
- 2.15 This notice inviting tender including additional conditions, specifications and drawings, if any, shall form a part of the contract document. The successful tenderer on acceptance of his tender, shall within 15 days from the stipulated date of start of the work, sign the contract consisting of Notice inviting tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation and acceptance thereof together with any correspondence there to and General Conditions of contract for CPWD works (Standard CPWD form 8) duly modified to suit IITM.

INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
ENGINEERING UNIT  
ITEM RATE TENDER & CONTRACT FOR WORKS

Tender for the work of “Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras

(i) To be submitted by 3.00 P.M. hours on 02.09.2013 at the office of the Engineering Unit, IITM at Third floor of Administrative block.

(ii) To be opened on the same day in the presence of tenderers who may be present at 3.10 P.M. Hours in the office of the Engineering Unit, 3<sup>rd</sup> floor, Administration Building, IITM, Chennai.

Issued to .....

Signature of the Officer issuing the documents:

Designation:-

Date of Issue:-

### 3.0 TENDER

I / We have read and examined the notice inviting tender, schedules A, B, C, D, E & F, specifications applicable, drawings, Conditions of contract and other documents and rules referred to in the conditions of contract and all other contents in the tender documents for the work.

I / We hereby tender for the execution of the work specified for the Indian Institute of Technology Madras, within the time specified in Schedule – 'F' and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in General Rules and Directions and in Clause 11 of form 8 (General conditions of contract) and with such materials as are provided for, by, and in all respects in accordance with such conditions so far as applicable.

We agree to keep the tender open for **Thirty (30) days** from the due date of opening thereof and not to make any modifications in its terms and conditions

A sum of **Rs. 27,940/-** is enclosed in the form of demand draft towards EMD.

I/we hereby declare that I/we shall treat the tender documents, drawings and other records connected with the work as secret / confidential documents and shall not communicate the information derived there from to any person other than a person to whom I/we am / are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Dated

Signature of the Tenderer  
Postal Address

Witness

Signature

Name

Postal Address

Occupation

#### 4.0 ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for an on behalf of the Indian Institute of Technology Madras, for a sum of

Rs. \_\_\_\_\_

(Rupees \_\_\_\_\_

\_\_\_\_\_)

The letters referred to below shall form part of this contract Agreement:

- a)
- b)
- c)

For & on behalf of Indian Institute of Technology

Signature \_\_\_\_\_

Designation: Executive Engineer (E)  
Engineering Unit

Dated \_\_\_\_\_



## **5.0 NOTE ON GENERAL CONDITION OF CONTRACT**

- 5.1 The general condition of contract for CPWD works 2005 comprising of general rules and directions, conditions of contract, and the contract clauses in Form 8 should be read in conjunction with all Correction Slip (C.S.) issued by the DG (Works), CPWD, New Delhi up to 30 – 04 – 2007
- 5.2 Wherever the expression “The President of India” or “The Government” or “The CPWD” appears in the clauses it should be substituted by the expression “IITM” representing “Indian Institute of Technology Madras”.
- 5.3 Wherever the expression “divisional Officer” appears in the Clauses, it should be substituted by the expression “Executive Engineer (E)”.
- 5.4 “Engineer in Charge” means Executive Engineer (E), IITM, and the Engineer means the officer representing the Engineer-in-Charge of the Project.

## 6.0 GENERAL RULES AND DIRECTIONS

- 6.1 The tender must be signed by the person / persons competent to sign as indicated in para 8.13 of the document. Same stipulations will also apply in the case of Receipt for payments made on account of work when executed by a firm.
- 6.2 Any person who submits a tender shall fill up the form, stating at what rate he is willing to undertake each item of the work. Only one rate shall be given in words & figures for each item. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other condition of any sort including conditional rebates, will be summarily rejected. Tender shall have the name and number of the work to which they refer, written on the envelopes. Amount must be quoted in full rupees by ignoring fifty paise and below and considering more than fifty paise as rupee one.
- 6.3 The officer inviting tender or his duly authorized assistant will open the tenders in the presence of any intending tenderers or their authorized agents who may be present at the time and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of a tender being accepted, a receipt for the Earnest Money forwarded therewith shall thereupon be given to the tenderers. In the event of a tender being rejected, the Earnest Money forwarded with such unaccepted tender shall thereupon be returned to the tenderers remitting the same, without any interest.
- 6.4 The officer inviting tenders shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest or any other tender.
- 6.5 The memorandum of work tendered for and the schedule of materials to be supplied by the Institute and their issue-rates, shall be filled and completed in the office of the officer inviting tender before the tender form is sold. If a form issued to an intending tenderer is without these details the tenderer shall request the officer to have this done before he completes and delivers his tender.
- 6.6 The tenderers shall sign a declaration under the Official Secret Act, 1923, for maintaining secrecy of the tender documents, drawings or other records connected with the work given to them.
- 6.7 In the case of Item Rate Tenders, only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected. Rates quoted by the tenderer in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However, if a discrepancy is found, the rates which correspond with the amount worked out by the tenderers shall, unless otherwise proved, be taken as correct. If the amount of an item is not worked out by the tenderer or it does not correspond with the rates written either in figures or in words, then the rates quoted by the tenderer in words shall be taken as correct. Where the rates quoted by the tenderer in figures and in words tally but the amount is not worked out correctly, the rates quoted by the tenderer, will, unless otherwise proved, be taken as correct and not the amount.
- 6.8 In the case of any tender where unit rate of any item/items appear unrealistic, such tender will be considered as unbalanced and in case the tenderer is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.
- 6.9 All rates shall be quoted on the tender form. The amount for each item should be worked out and the requisite totals given. Special care should be taken to write the rates in figures as well as in words and the amount in figures only in such a way that interpolation is not possible. The total amount should be written both in figures and in words. In case of figures, the word 'Rs' should be written before the figure of 'Rupees' and the word 'P' after the decimal figures, eg.' Rs.2.15P' and in case of words, the word, "Rupees" should precede and the word 'Paise' should be written at the end. Unless the rate is in whole rupees and followed by the word 'only', it should invariably be up to two decimal places. While quoting each rate in schedule of tender, the word 'only' should be written closely following the rate and it should not be written in the next line.

- 6.10 a) The tenderer shall be required to deposit 5% of the tendered value of work (as mentioned in the letter of acceptance) as performance guarantee in the form of irrevocable bank guarantee bond of any scheduled bank or State Bank of India in accordance with the form prescribed or in cash or in the form of Govt. Security or fixed deposit receipt, within 15 days of the issue of letter of acceptance.
- b) The tenderer whose tender is accepted, will be required to furnish by way of Security Deposit for the fulfillment of his contract, an amount equal to 5 % of the tendered value of the work. The Security deposit will be collected by deductions from the running bill of the contractor at the rates mentioned above and the earnest money deposited at the time of tender, will be treated as a part of this Security Deposit. The SD amount will also be accepted in cash or in the shape of Government securities. Fixed deposit receipt of a scheduled bank or State bank of India will also be accepted for this purpose provided confirmatory advice is enclosed.
- 6.11 On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Engineer-in-Charge shall be communicated in writing to the Engineer-in-Charge.
- 6.12 Sales tax (VAT), service tax, purchase tax, turnover tax, works contract tax or any other tax on material, labour and works in respect of this contract shall be payable by the contractor and IITM will not entertain any claim whatsoever in respect of the same. However, the service tax component included in the amount quoted shall be indicated separately. The Security Deposit will not be released unless and until the contractor pays the Service Tax to the Department of Revenue, Government of India and produce the receipt.
- 6.13 The contractor shall give a list of officers and staff of IITM who are related to him.
- 6.14 The tender for the work shall not be witnessed by a contractor or contractor who himself / themselves has/have tendered for the same work. Failure to observe this condition would render tenders of the contractor tendering, as well as witnessing the tender, liable to summary rejection.
- 6.15 The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules and orders issued there under from time of time. If he fails to do so, his failure will be a breach of the contract and the Executive Engineer (E) may in his discretion, without prejudice to any other right or remedy available in law, cancel the contract. The contractor shall also be liable for any pecuniary liability on account of any violation by him of the provisions of the said Act.

## 7.0 CONDITIONS OF CONTRACT

- 7.1 The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of the IITM and the contractor, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in-charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.
- 7.2 In the contract, the following expressions shall, unless context otherwise requires, have the meanings, hereby respectively assigned to them:-
- 7.2.1 The expression 'works' or 'work' shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.
  - 7.2.2 The Site shall mean the land/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.
  - 7.2.3 The tenderer shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.
  - 7.2.4 The Engineer-in-charge means the Engineer officer who shall supervise and be in-charge of the work and who shall sign the contract on behalf of IITM as mentioned in Schedule 'F' hereunder.
  - 7.2.5 Accepting Authority shall mean the authority mentioned in Schedule 'F'.
  - 7.2.6 Excepted Risk are risks due to riots (other than those on account of tenderer's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, any acts of IITM, damages from aircraft, acts of God, such as earthquake, lightening and unprecedented floods, and other causes over which the tenderer has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by IITM of the part of the works in respect of which a certificate of completion has been issued or a caused solely due to IITM faulty design of works.
  - 7.2.7 Market Rate shall be the rate as decided by the Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Schedule 'F' to cover, all overheads and profits.
  - 7.2.8 Schedules(s) referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard schedule of Rates of the CPWD mentioned is schedule 'F' hereunder, with the amendments thereto issued upto the date of receipt of the tender.
  - 7.2.9 Department means IITM which invites tenders.
  - 7.2.10 District specification means the specifications followed by the state of Tamil Nadu in the area where the work is to be executed.
  - 7.2.11 Tendered value means the value of the entire work as stipulated in the letter of award.

- 7.3 Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.
- 7.4 Headings and marginal notes to the General Conditions of contract shall not be deemed to form part thereof be taken into consideration in the interpretation or construction thereof of the contract.
- 7.5 The contractor shall be furnished, free of cost one certified copy of the contract documents, except standard specifications, Schedule of Rates and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of his contract.
- 7.6 The work to be carried out under the contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipments and transport which maybe required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of quantities (Schedule-A) shall, unless otherwise states, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.
- 7.7 The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of Quantities, which rates and prices shall except as otherwise provided cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.
- 7.8 The several documents forming the contact are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General conditions.
- 7.8.1 In the case of discrepancy between the schedule of Quantities, the specifications and/or the Drawings, the following order of preference shall be observed.
- 7.8.1.1 Description of Schedule of Quantities.
- 7.8.1.2 Particular Specifications and special conditions, if any
- 7.8.1.3 Drawings.
- 7.8.1.4 C.P.W.D Specifications
- 7.8.1.5 Indian Standard specifications of B.I.S.
- 7.8.2 If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority with regard to the Intention of the documents and his decision shall be final and binding on the contractor.
- 7.8.3 Any error in description, quantity or rate in schedule of Quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.
- 7.9 The successful contractor, on acceptance of his tender by the Accepting Authority, shall within 15 days from the stipulated date of start of the work sign the contract consisting of:-
- 7.9.1 The notice inviting tender, all the tender documents including drawings in 3 volumes, forming the tender as issued at the time invitation of tender and acceptance thereof together with any correspondence leading thereto.

**7.10 ORDER OF PRECEDENCE IN INTERPRETATION OF DOCUMENTS**

- 7.10.1 The several documents forming the contract are to be taken as mutually explanatory of one another. In cases of ambiguities or discrepancies the same shall be brought to the attention of the Engineer who shall thereupon issue instructions to the contractor.
- 7.10.2 In case of any conflict in interpretation of contract documents, the following order of precedence shall prevail.
  - 7.10.2.1 For Contract Conditions, Special Conditions shall prevail over General Conditions and Clauses of contract. Addenda / Corrigenda / clarifications issued shall prevail over conditions of contract including special conditions and clauses of contract.
  - 7.10.2.2 For Technical clarifications and general guidelines on technical specification and workmanship, provisions in conditions of contract will be applicable.
  - 7.10.2.3 Drawings shall prevail overall for scope of work, read in conjunction with bill of quantities, technical specifications and conditions of contract.
  - 7.10.2.4 For drawings, written dimensions shall prevail over scaled dimensions. Enlarged details shall prevail over general plan, section, elevation etc.

## 8.0 ADDITIONAL CONDITIONS

- 8.1 The Electrical power shall be made available at a near by location of the proposed site. Contractor shall make arrangement for laying cables etc to the site of work and make necessary payments for the electrical consumptions at the rate of **Rs.10.50/-** per unit.
- 8.2 Some restrictions may be imposed by the security staff etc., on the working and on movement of labour, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account. Necessary entry passes have to be obtained for entry of labour and materials. Contractor should take advance action for obtaining such passes and no claim on this account shall be entreated.
- 8.3 The contractor shall give a performance test of the installation(s) as per standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.
- 8.4 Samples of various materials, finishes, etc are available in the office of the Executive Engineer (E). The same may be seen by the tenderers before submission of the tender.
- 8.5 Sample of all materials all materials to be used in this work shall be got approved in advance from the Engineer-in-Charge before taking up the work.  
The contractor shall produce all the materials in advance so that there is sufficient time for testing and approving the material and clearance of the same before use in work.
- 8.6 A prospective Tenderer requiring any clarification on the Tender Document may notify the Executive Engineer (E), IITM at Chennai. The Executive Engineer (E) will respond to any request for clarification which he receives earlier than 5 days prior to the deadline for submission of Tenders.
- 8.7 Before the deadline for submission of Tenders, the Tender Document may be modified by IITM by issue of Addenda. Any Addendum issued shall be part of the Tender Documents and shall be communicated in writing to all who have purchased the tender documents. The prospective Tenderers shall acknowledge receipt of each Addendum in writing to the Executive Engineer (E) / IITM. To give prospective Tenderers reasonable time in which to take the Addenda into account in preparing their tenders, extension of the deadline for submission of Tenders may be given as necessary.
- 8.8 The Tender should be accompanied by Earnest Money for an amount of **Rs. 27,940/- (Rupees Twenty Seven thousand Nine Hundred and forty only)**. The EMD documents should be enclosed in cover – 1. Any tender not accompanied by Earnest Money in an acceptable form shall be rejected by the Employer as non-responsive.
- 8.9 The Earnest Money of the Tenderers whose tender is found not acceptable will be returned as soon as scrutiny of tender has been completed by the Employer.
- 8.10 The Earnest Money of the successful Tenderer will be taken as part of the Security Deposit as stipulated in Clause 1A of “General conditions of Contract”.  
The Earnest Money will be forfeited to an extent of 50%, if during the period of Tender Validity, the tenderer
- 8.10.1 Withdraws his Tender  
or
- 8.10.2 Makes any modifications in the terms and conditions of the Tender which are not acceptable to the Employer.
- The Earnest Money will be forfeited in full if the successful Tenderer.
- 8.10.3 Fails to commence the work on 16th day after the date on which the Employer issues written order to commence the work/ handing over the site which ever is later. .
- 8.11 The Tenderers shall submit offers, which comply strictly with the requirements of the Tender Document. Alternatives or any modification shall render the Tender invalid.

- 8.12 The tender shall be submitted in the covers containing
- Cover 1** shall contain the EMD and Technical Bid. This shall be marked as “EMD + Technical Bid”. Each page of the document shall be signed and affixed with the seal of the contractor.
- Cover 2** shall contain BOQ and shall be marked as “Price Bid”. Each page of the document shall be signed and affixed with the seal of the contractor.
- Cover 3** shall contain cover 1 & Cover 2

### 8.13 AUTHORITY TO SIGN

- 8.13.1 If the tenderer is an individual, he should sign above his full type written name and current address.
- 8.13.2 If the tenderer is a proprietary firm, the Proprietor should sign above his full type written name and the full name of his firm with its current address.
- 8.13.3 If the tenderer is a firm in partnership, the Documents should be signed by all the Partners of the firm above their full type written names and current addresses. Alternatively the Documents should be signed by a Partner holding Power of Attorney for the firm and in this case a certified copy of the Power of Attorney should accompany the Documents. In both cases a certified copy of the Partnership Deed and current address of all the partners of the firms should be furnished.
- 8.13.4 If the tenderer is a limited Company, or a Corporation, the Documents shall be signed by a duly authorized person holding Power of Attorney for signing the Documents, accompanied by a copy of the Power of Attorney. The tenderer should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary.
- 8.14 Tenders must be received by the Employer at the following address not later than 3.00 PM of the receipt date mentioned. In the event of the specified date for the submission of the Tender being declared as a holiday by the Employer, the Tenders will be received up to the appointed time on the next working day.

#### Address for Submission of Tender

The Executive Engineer (E),  
Engineering Unit, Administrative Building, 3<sup>rd</sup> floor,  
Indian Institute of Technology Madras, Chennai – 600036.

The Employer may extend the deadline for submission of Tenders by issuing an amendment

Any Tender received after the deadline prescribed will be returned unopened to the Tenderer.

### 8.15 Evaluation of tenders wherein tenderers has not quoted rate(s) for one or more items

In the case of item Rate Tenders, only rates quoted shall, be considered. Any tender containing percentage below / above the rates quoted is liable to be rejected. Rates quoted by the contractor in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However if a discrepancy is found, the rates, which correspond with the amount worked out by the contractor, shall, unless otherwise proved, be taken as correct. If the amount of an item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words, then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally but the amount is not worked out correctly, the rates quoted by the contractor will, unless otherwise proved, be taken as correct and not the amount. In event no rate has been quoted for any item(s), leaving space both in figure(s), words(s) and amount blank, it will be presumed that the contractor has included the cost of this / these item(s) in other items and rate for such items(s) will be considered as zero and work will be required to be executed accordingly.

### 8.16 Contractor Superintendence, Supervision, Technical Staff & Employees

- 8.16.1 The contractor shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than that specified in Schedule 'F'. The



Engineer-in-Charge shall within 3 days of receipt of such communication, intimate in writing his approval or otherwise of such representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such a withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-Charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself /themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative and other technical representative(s) shall deem to have the same force as if these have been given of the contractor. The principal technical representative(s) and other representatives shall be actually available full time during all stages of execution of work, recording/checking/ test checking of measurement of work and wherever so required by Engineer-in-Charge and shall also note instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in of acceptance of measurements/ checked measurements/test checked measurements. The representative(s) shall not look after other works in addition to the work covered under this contract. Substitutes, duly approved by Engineer-in-Charge of the work in manner as aforesaid shall be provided of absence of any of the representative for more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representation is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the Engineer-in-Charge as recorded in the site order book and measurements checked/test checked in Measurement books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable Principal technical representative and other technical representative(s) or if such appointed persons are not effectively present or absent by more than two days without duly approved substitute or do not discharge their responsibility satisfactorily, the Engineer-in-Charge shall have powers to suspend the execution of the work until such date as suitable other representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor should submit a certificate of employment of the technical representatives(s) along with every on account of bill / final bill and shall produce evidence at any time if required by the Engineer in charge.

## **8.17 INSURANCE TO BE TAKEN BY THE TENDERER AND EMPLOYER TO BE INDEMNIFIED**

### **8.17.1 Insurance of Works**

The contractor shall effect contractor's all risk insurance policy (CAR policy) in the joint names of the Employer and the contractor, the name of the former being placed first in the policy, covering the following:

- 8.17.1.1 The Works at the contract price together with the materials for incorporation in the works at their replacement value.
- 8.17.1.2 All plants, machinery and equipment and other things brought to the site by the contractor at their replacement value.

The insurance shall be against all losses or damages from whatever causes, other than excepted risks, as defined in Clause 2 of Conditions of Contract, for which the contractor is responsible under the Contract. The insurance cover shall be for the period of contract and also for the period of maintenance, for loss or damage arising from a cause prior to commencement of the period of maintenance, and for any loss or damage, occasioned by the contractor in the course of any operations carried out for the purpose of complying with his obligations during maintenance period under Clause 17 of Clauses of Contract.

Such insurance shall be effected with an insurer and with terms approved by the Employer. The contractor shall produce the policy or policies and the receipts for payment of the current premiums.

### **8.17.2 Third Party Insurance**

Before commencing the execution of the Works, the contractor shall insure against the liability for any material or physical damage, loss or injury which may occur to any property or life including that of the Employer or to any person, including any employee of the Employer, by or arising out of the execution of the works or in the carrying out of the Contract. The sum insured will be for Rs.5.00 lakhs, Such insurance shall be effected with an insurer and in terms approved by the Employer. The contractor shall produce before the Engineer-in-charge the policy or policies of insurance and the receipts of payment of the current premiums. This third party insurance can either be included in the CAR policy or taken separately.

#### **8.17.3 Workmen's Insurance**

IITM shall not be liable for any payment in respect of any damages or compensation payable according to law in respect or in consequence of any accident or injury or loss of life to any workman or other person in the employment of the contractor or any sub-contractor.

#### **8.17.4 Recovery from the contractor**

Without prejudice to the other rights of the Employer against the contractor in respect of such default, the Employer shall be entitled to deduct from any sums payable to the contractor the amount of any damages, compensation costs, charges and other expenses paid by the Employer and which are payable by the contractor under this clause.

#### **8.17.5 Extension of time**

The contractor, in case of rebuilding or reinstatement, shall be entitled to such extension of time for completion as the Engineer-in-charge may deem fit, but shall, however not be entitled to reimbursement by the Employer of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

#### **8.17.6 Period of Policies**

All the insurance covers mentioned above shall be kept alive during the complete period of the contract including maintenance period.

#### **8.17.7 Remedy on Contractor's Failure to Insure**

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

#### **8.17.8 Damage to Persons and Property – Employer to be Indemnify**

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

8.17.8.1 The permanent use or occupation of land by the works or any part thereof.

8.17.8.2 The right of the Employer to execute the works or any part thereof on, over, under, in or through any land.

8.17.8.3 Injuries or damage to persons or property resulting from any act or neglect of the Employer, his agents, servants or other contractors, not being employed by the contractor or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents, such part of the compensations as may be just and equitable having regard to the extent of the responsibility of the Employer, his servant or agent or other contractor, for the damage or injury.

8.18 The contractor shall make arrangement for construction of a temporary site office as required by the Engineer-in-charge for which no extra payment will be paid.

**Signature of Contractor**

**Executive Engineer (E)**

## 9.0 SPECIAL CONDITIONS

- 9.1 No labour camps shall be permitted inside the IITM Campus. Workers should be made to confine themselves to the work areas and should not wander in to the near by areas / buildings/ forests.
- 9.2 If night work is required to be carried out to fulfill the agreed rate of progress, all arrangement shall be made by the Contractor, inclusive of lighting the area without any claim for extra rate. To the extent possible engaging women labour in the night shift should be avoided.
- 9.3 The works shall be carried as per C.P.W.D specifications with Addenda and Corrigenda issued up to 30-04-2007 and as per best Engineering practice.
- 9.4 No variations from, additions to and omissions from in the items of work shall vitiate the contract. All such variations, additions, substitutions etc shall be decided as per the terms of the contract agreement.
- 9.5 Child Labour is strictly prohibited.
- 9.6 Water required for construction shall be arranged by the contractor. No water shall be supplied by the Institute and bore well / open wells etc shall not be permitted in side the campus.

### 9.7 Protection for Environment

- 9.7.1 The debris / construction waste and other waste generated from the work spot should not be thrown in the campus outside the designated construction area. All waste and debris material should be taken out of the campus and disposed off in a legal and environmental friendly way.
- 9.7.2 All construction material should be stored only at places earmarked by the engineer-in-charge. Material like cement, aggregate, steel etc should not be stored in buildings that are in use. If any material is stored in an unauthorized location the same will be removed at cost to the contractor.
- 9.7.3 Necessary display boards indicating the following shall be displayed in a conspicuous place near the work spot.
  - Name of the work
  - Name of the contractor and Contact Number
  - Tendered cost
  - Date of start and stipulated date of completion
  - AEE and JE in charge for the work and Contact number
- 9.7.4 A Suggestion box should be kept near the above said board.
- 9.7.5 For intercarting of various materials animal drawn vehicles are strictly prohibited.
- 9.7.6 Preparation of concrete and mortars on the roads, pavements, under the building bare floors is strictly prohibited.
- 9.7.7 No vegetation inside the campus should be damaged.
- 9.7.8 Drinking water requirement of the labour should be arranged by the contractor and they should be instructed not to misuse the facilities available in the various buildings.
- 9.7.9 All labour should be dressed properly attending to work. Wearing loose cloths like dhotis, lungies should be avoided to the extent possible.
- 9.7.10 No labour camps shall be permitted inside the IITM campus. Workers should be made to confine themselves to the work areas and should not wander in to the near by areas / buildings/ forests.
- 9.7.11 While transporting the materials along the road, spillage of material should be avoided. If any spillage occurs the same should be got cleaned immediately.
- 9.7.12 Toilets facilities for the workers should be provided within the designated construction area.

Any violation of above will attract levy of compensation by the engineer-in-charge on the contractor.

### 9.8. Safety at the Site

The contractor must appoint a full time qualified person as safety-in-charge for taking care of implementation of the safety system.

The contractor shall submit the Project Safety Plan stating the methodology of implementation of systems to ensure the safe and environment friendly work place.

The Safety Plan must include the following:

### **9.8.1 Organisation Chart**

Reporting relationship of the safety function in a flow chart

### **9.8.2 Safety Committee**

Structure – Chairman, secretary and committee members – Roles & Responsibilities

Applicable Statutory requirements, standards and codes related to safety and its adherence

### **9.8.3 General safety rules and regulations concerning**

Use of personal protective equipment and safety devices relevant to site activities

Awareness and Training Programs

Motivational schemes and programs

Access, Egress and workstation safety

Safe use of construction power supply and upkeep / maintenance of installations

Work permit systems

Use, maintenance and inspection of Plant & machinery

Scaffold & formwork norms

Use, maintenance and inspection of Lifting Tools

Fire Protection and prevention

Emergency preparedness

Status of Safety implementation at site shall be discussed in the Weekly Review meeting.

Tenderer must submit the safety statistics every month in the enclosed format.

Merit Certificate will be issued for the achievement of safety mile stones like 0.5 million safe man hours, one million safe man hours, 1.5 million safe man hours and so on.

The General Guidelines governing the safety implementation shall include the following Rules, while preparing the safety plan.

- 9.8.3.1 No child labour shall be employed in the work
- 9.8.3.2 All the workmen shall undergo Safety Induction, screening before engaging them on the job. Physical fitness of the person to certain critical jobs like working at height or other dangerous locations should be ensured before engaging the person on work.
- 9.8.3.3 Smoking is strictly prohibited at workplace.
- 9.8.3.4 Sub-contractors shall ensure adequate supervision at workplace. They shall ensure that all persons working under them shall not create any hazard to self or to co-workers.
- 9.8.3.5 Nobody is allowed to work without wearing safety helmet. Chinstrap of safety helmet shall be always on. Drivers, helpers and operators are no exception.
- 9.8.3.6 No one is allowed to work at or more than three meters height without wearing safety belt and anchoring the lanyard of safety belt to firm support preferably at shoulder level.
- 9.8.3.7 No one is allowed to enter into workplace and work at site without adequate foot protection.

- 9.8.3.8 Usage of eye protection equipment shall be ensured when workmen are engaged for grinding, chipping, welding and gas-cutting. For other jobs as and when site safety co-ordinator insists eye protection has to be provided.
- 9.8.3.9 All PPE like Safety shoes, Safety helmet, Safety belt, Safety goggles etc. shall be arranged before starting the job.
- 9.8.3.10 All excavated pits shall be barricaded & barricading to be maintained till the backfilling is done. Safe approach to be ensured into every excavation.
- 9.8.3.11 Adequate illumination at workplace shall be ensured before starting the job at night.
- 9.8.3.12 All the dangerous moving parts of the portable / fixed machinery being used shall be adequately guarded.
- 9.8.3.13 Ladders being used at site shall be adequately secured at bottom and top. Ladders shall not be used as work platforms.
- 9.8.3.14 Erection zone and dismantling zone shall be barricaded and nobody will be allowed to stand under suspended loads.
- 9.8.3.15 Contractors should spray water using Water browser periodically in the site to reduce the dust rising due to wind.
- 9.8.3.16 Horseplay is completely prohibited at workplace. Running at the site is completely prohibited, except in the case of emergency.
- 9.8.3.17 Material shall not be thrown from the height. If required, the area shall be barricaded and one person shall be posted outside the barricading for preventing the trespassers from entering the area.
- 9.8.3.18 Other than electricians, with red helmet, no one is allowed to carry out electrical connections, repairs on electrical equipment or other jobs related thereto.
- 9.8.3.19 All electrical connections shall be made using 3 or 4 core cables, having a earth wire.
- 9.8.3.20 Proper Earthing pits at site to be constructed and the sensitivity must be maintained at less than 1 ohm
- 9.8.3.21 Main panel boards should have MCBs and RCCB / ELCBs ( 30 mA sensitivity).
- 9.8.3.22 Inserting of bare wires for tapping the power from electrical sockets is completely prohibited.
- 9.8.3.23 All major, minor accidents and near misses to be recorded and reported to the IITM and the contractor must take necessary steps to avoid the recurrence.
- 9.8.3.24 Scaffoldings used should be of proper construction. No Casuarina pole / bamboo scaffolding is permitted. It should be inspected by competent person(s) before use.
- 9.8.3.25 All tools and tackles shall be inspected before use. Defects to be rectified immediately. No lifting tackle to be used unless it is certified by the competent authority.
- 9.8.3.26 All tools and tackles shall be tested and have a Identification no., SWL and date of next test marked on them.
- 9.8.3.27 A tools and tackles inspection register must be maintained and updated regularly.
- 9.8.3.28 Good housekeeping to be maintained. Passages shall not be blocked with materials. Materials like bricks shall not be stacked to the dangerous height at workplace.
- 9.8.3.29 All the Earth moving vehicles and Equipments used at site should have reverse horn.
- 9.8.3.30 Debris, scrap and other materials to be cleared from time to time from the workplace and at the time of closing of work everyday.

- 9.8.3.31 Adequate fire fighting equipment shall be made available at workplace and persons are to be trained in fire fighting techniques with the co-ordination of site safety coordinator.
- 9.8.3.32 All unsafe conditions, unsafe acts identified by contractors, reported by site supervisors and / or safety personnel to be corrected on priority basis.
- 9.8.3.33 No children shall be allowed to enter the workplace.
- 9.8.3.34 Other than the Driver / operator, no one shall travel in a tractor / tough rider etc.
- 9.8.3.35 All the lifting tools and tackles shall be stored properly when not in use.
- 9.8.3.36 Clamps shall be used on Return cables to ensure proper earthing for welding works.
- 9.8.3.37 Return cables shall be used for earthing.
- 9.8.3.38 All the pressure gauges used in gas cutting apparatus shall be in good working condition.
- 9.8.3.39 Proper eye washing facilities shall be made in areas where chemicals are handled.
- 9.8.3.40 Connectors and hose clamps shall be used for making welding hose connections.
- 9.8.3.41 Proper warning boards and caution notices to be displayed at required areas inside the site.
- 9.8.3.42 All cranes must have a trained signal man for signaling.
- 9.8.3.43 All underground cables for supplying construction power shall be routed using conduit pipes.
- 9.8.3.44 Spill trays shall be used to contain the oil spills while transferring / storing them.
- 9.8.3.45 Tapping of power by cutting electric cables in between must be avoided. Proper junction boxes must be used.
- 9.8.3.46 A monthly site safety statistics shall be submitted by the tenderer on the first week of succeeding month to the Engineer in charge, in the perfoma given below.

### 9.8.3.47 MONTHLY SITE SAFETY STATISTICS

#### A) TOTAL MANHOURS WORKED DURING THE MONTH

Sl. No.	Description	Number	Man-hours worked	OT Performed	Total
1	Company Staff				
2	Subtenderer's Workmen (including security personnel				
	GRAND TOTAL OF MANHOURS WORKED DURING THE MONTH				

B) Total Man-hours worked since start of work \_\_\_\_\_

C) Safe man hours from last reportable Lost time/ injury : \_\_\_\_\_

#### D) Details of Reportable Lost Time / Injury

S. No	Name of Injured	Date of Accident	Resumed duty on	Man days lost			Claim Status
				Up to last month (1)	This month (2)	Total (1+2)	
Man days Lost during the month (Cumulative of 2)							

E) Number of Dangerous Occurrences : \_\_\_\_\_

F) No of Near Miss Cases : \_\_\_\_\_  
Routed through

Site In charge

Site Safety Co-ordinator / Time Keeper

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

9.9 Typical reinforcement detailing of columns and beams to confirm to IS 13920 (seismic detailing) shall be got approved before bending and tying.

9.10 One sample quarter including finishing like flooring, water supply, electrical, sanitary fittings etc., shall be completed within 6 months from the date of commencement of the work.

9.11 The construction site shall be completely enclosed with GI sheet barricade. The height of barricade shall be 10.0m on the side facing the existing C2 type quarters and 6.0m on other sides.

## **10.0 SCHEDULES**

### **SCHEDULE – ‘A’**

The Bill of Quantities:-vide page Nos. 1 to 9 (vol.II) as Price Bid

### **SCHEDULE – ‘B’**

Schedule of materials proposed to be issued to the tenderer

**NO MATERIAL SHALL BE ISSUED TO THE TENDERER BY IITM**

### **SCHEDULE – ‘C’**

Schedule of tools and plants proposed to be hired to the tenderer

**NO TOOLS AND PLANTS SHALL BE HIRED TO THE CONTRATOR BY IITM**

### **SCHEDULE – ‘D’**

Extra schedules for specific requirements / documents for the work, if any.

1. No labour shall be permitted to stay in the campus
2. The construction activities should be restricted within the area earmarked around the proposed blocks.

### **SCHEDULE – ‘E’**

### **SCHEDULE – ‘F’**

Reference to General conditions of contract



**Name of work** : "Replacement of walk in coolers in Himalaya & Vindhya Mess at IIT Madras ."

**Estimated cost or work :**

	<b>Rs. 13,97,000/-</b>
i). Earnest money	<b>Rs. 27,940/-</b>
ii). Security Deposit	5% of tendered value
iii). Performance Bank Guarantee	5% of tendered value

**General Rules and Directions:**

Officer inviting tender	Executive Engineer (E), IITM
Maximum percentage for quantity of items work to be executed beyond which rates are to be determined in accordance with clause 12.2 and 12.3.	See below

**Definition**

2 (v)	Engineer in charge	Executive Engineer (E)
2(viii)	Accepting authority	Director, IIT Madras
2 (x)	Percentage on cost of material and labour to cover all overheads and profits.	15 %
2 (xi)	Standard schedule of rates	CPWD DSR 2012
2 (xii)	Department	IIT Madras
9(ii)	Standard CPWD contract form	CPWD form 8 with modification and correction

**Clause 2**

Authority for fixing compensation under clause 2.	Superintending Engineer.
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**Clause 2a**

Whether clause 2a shall be applicable	Yes applicable
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**Clause 5**

Number of days from the date of issue of letter of acceptance for reckoning date of start	10 Days
Time allowed for execution of work	3 Months
Authority to give fair and reasonable Extension of work for completion of work	Superintending Engineer. IITM

**Clause 7**

Gross work to be done together with net Payment / adjustment of advances for material collected, if any, since the last such payments for being eligible to interim payment.

**Clause 10 CA and 10C**

Not applicable

**Clause 11**

Specification to be followed for execution of work

Particular specifications CPWD Specifications for Heating ventilation and air conditioning works 2004, general specifications for electrical works part – I 2004, , general specifications for electrical works part-IV Sub Station 20, American Society of Heating, refrigeration and air conditioning Engineer guides, Data book and standards, Air conditioning and Refrigeration Institute National Electrical code.

BIS codes, Manufacturer's specifications, General Engineering Practice.  
(The specification mentioned earlier will prevail over the one mentioned later unless decided other wise by the Engineer in Charge)

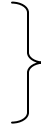
**Clause 12**

Deviation limit beyond which clauses  
12.2 & 12.3      12.2 & 12.3

30%

**Clause 16**

Competent Authority for  
Deciding reduced rates.



Executive Engineer  
IITM

**Clause 36(i)**

Designation	Minimum qualification and experience required	Discipline	Rate of recovery per month
Technical Representatives	Graduate with 2 years experience or Diploma holder with 3 years experience - 1 No	Electrical/R&AC/ Mechanical Engineering	Rs.10000

## **11.0 MEASUREMENT & PREPARATION OF BILL**

### **11.1 Computerized Bill to be submitted by the Contractor**

Conventional measurement book shall be replaced by a bound volume of computerized measurements to be furnished by the contractor, duly machine numbered for the pages, and with MB number given by the Institute. The pages of these measurements books shall be of A4 size. All these measurements books shall be serially numbered and a record of these computerized measurements book shall be maintained in a separate register. The same format as in existing measurement books shall be used for the computerized measurement books. The measurements shall be carried forward from the previous recorded measurement as per the existing procedure.

### **11.2 Mode of measurements**

The measurements shall be recorded and entered in the computerized format in the first instance by the contractor and a hard copy shall be submitted to the Institute. All entries shall be made as per the existing procedure.

This measurements shall then be 100% checked by the Junior Engineer/ Assistant Engineer, and test checked by the Asst. Engineer/Asst. Executive Engineer and Executive Engineer as per the existing procedure. If Junior Engineer is not available, then the Asst. Engineer/Asst Executive Engineer shall perform 100% check of the measurements.

The contractor shall incorporate all such changes or corrections, as may be done during the checks / test checks, to his draft computerized measurements and submit the final computerized measurements in the form of a book, duly hard bound in red colour on the lines of the conventional measurements books now in use with its pages machine numbered.

The Junior Engineer / Asst. Engineer, Assistant Executive Engineer, Executive Engineer shall check the computerized measurements to ensure that all the changes or corrections made by them earlier in the draft measurements are correctly incorporated in the final measurements. This book shall be treated as computerized measurement.

The Junior Engineer/ Asst. Engineer, Assistant Executive Engineer and Executive Engineer shall record the necessary certificate for their checks and test checks as per the existing procedure in this computerized measurement books.

The computerized measurements book shall be allotted a serial number as per the register of computerized measurement books maintained by IITM.

### **11.3 Cuttings / over writing/ insertions in the computerized measurements books are not allowed.**

The computerized measurements books given by the contractor, duly bound, with its pages numbered, shall have no cutting or over writing.

In case of any error, computerized misprints shall be canceled and the contractor shall re submit a fresh computerized measurements books.

This should be done before submission of corresponding computerized billing

The contractor shall submit as many copies of computerized measurement books as may be required and as specified in the NIT / contract for the purpose of reference and recording the various office of the department.

### **11.4 Computerized bill to be submitted by the contractor**

The contractor shall submit his running and final bill in a computerized form in the same format as the existing conventional bills with all the pages machine numbered and hard bound made and with all the entries as per the existing procedure. The contractor shall submit as many copies of the computerized bills as may required for the purpose of reference and record. The bill shall be carried forward from the previous running account bill as per the existing procedure. The computerized bill as may be processed as per the existing procedure.

## 12.0 ADDENDA & CORRIGENDA TO CLAUSES OF CONTRACT

**Clause 25 "Settlement of Disputes & Arbitration"** shall be substituted by the following.

### **Settlement of Disputes & Arbitration**

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

If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputed any drawings, record or decision given in writing by the Engineer-in-charge or any matter in connection with or arising out of the Contract or carrying out of the work, to be unacceptable, he shall promptly within 15 days request the Executive Engineer (E) in writing for written instruction or decision. Thereupon, the Executive Engineer (E) shall give his written instructions or decisions within a period of one month from the receipt of the contractor's letter.

If the Executive Engineer (E) fails to give his instructions or decisions in writing within the aforesaid period or if the contractor is dissatisfied with the instructions or decision of the Executive Engineer (E), the contractor may, within 15 days of the receipt of Executive Engineer's decision appeal to the Chairman (Engineering Unit), IITM who shall afford an opportunity to the contractor to be heard, if the matter so desires and to offer evidence in support of his appeal. The Chairman (Engineering Unit), IITM shall give his decision within 30 days of receipt of contractor's appeal.

If the contractor is dissatisfied with the decision of the Chairman (Engineering Unit), he may within a period of 15 days of the receipt of the Chairman's decision appeal to the Director, IITM who shall afford an opportunity to the contractor to be heard, if the matter so desires and to offer evidence in support of his appeal. The Director, IITM shall give his decision within 30 days of receipt of contractor's appeal.

If the contractor is dissatisfied with the decision of the Director IITM, he shall within 30 days of the receipt of the decision give notice to the Director, IITM for appointment of an arbitrator to adjudicate his claims, failing which the said decision of the Director, IITM shall be final and binding on the contractor.

Except where the decision has become final, binding and conclusive in terms of Sub para (iii) above, disputes or difference shall be referred for adjudication through a sole arbitrator appointed by the Director, IITM. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another sole arbitrator shall be appointed in the manner aforesaid. Such person shall proceed with the reference from the stage at which it was left by his predecessor.

It is a term of this contract that the party invoking arbitration shall give list of disputes with amounts claimed in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the rejection by the Director, IITM of the appeal.

It is also a term of this contract that no person other than a person appointed by such Director, IITM, as aforesaid should act as arbitrator.

It is also a term of this Contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims in writing as aforesaid within 120 days of receiving the intimation from the Engineer-in-charge that the final bill is ready for payment, the claim of the contractor shall be deemed to have been waived and absolutely barred and IITM shall be discharged and released of all liabilities under the Contract in respect of these claims.

The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act 1996 (26 of 1996) or any statutory modifications or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is also term of this Contract that the arbitrator shall adjudicate on only such disputed as are referred to him by the Director, IITM and give separate award against each dispute and claim referred to him and in all cases where the total amount of the claims by any party exceeds **Rs.1,00,000/-** the arbitrator shall give reasons for the award.

It is also a term of the Contract that if any fees are payable to the arbitrator, these shall be paid equally by both the parties.

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

**Clause 37 "Levy / Taxes Payable by Contractor"**

Para (i) shall be substituted as under

"Sales tax including VAT if any or any other tax on materials as well as on Labour and Works in respect of this Contract shall be payable by the Contractor and IITM shall not entertain any claim whatsoever in this respect."

### **C.P.W.D. SAFETY CODE**

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction. If ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than 14 to 1 (14 horizontal and 1 vertical.)
2. Scaffolding of staging more than 3.6 mt. (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
3. Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.
4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.(3ft.)
5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11 1/2") for ladder upto and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least 1/4" for each additional 30 cm/1 foot of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person.
6. Excavation and Trenching - All trenches of 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100 ft.) in length or fraction thereof Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.
7. Demolition - Before any demolition work is commenced and also during the progress of the work,
  - I. All roads and open areas adjacent to the work site shall either be closed or suitably protected
  - II. No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.
  - III. All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

8. All necessary personal safety equipment as considered adequate by the Engineer-in-Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned:- The following safety equipment shall invariably be provided.

i. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves and goggles.

ii. Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective gloves and goggles.

iii. Those engaged in welding works shall be provided with welder's protective eye-shields.

iv. Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

v. When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measures are adhered to :

a) Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.

b) At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.

c) Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.

d) Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.

e) Safety belt with rope should be provided to the workers. While working inside the manholes such rope should be handled by two men standing outside to enable him to be pulled out during emergency.

f) The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day. .

g) No smoking or open flames shall be allowed near the blocked manhole being cleaned.

h) The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.

i) Workers should not be allowed to work inside the manhole continuously. They should be given rest intermittently. The Engineer-in-Charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.

j) Gas masks with Oxygen Cylinder should be kept at site for use in emergency.

k) Air-blowers should be used for flow of fresh air through the manholes. Whenever called for portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.

l) The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole.

m) The workers shall be provided with Gumboots or non sparking shoes bump helmets and gloves non

sparkling tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing tile limbs before working inside the sewer lines.

n) Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.

o) If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.

p) The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.

vi) The following precaution should be taken while painting:

a) White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.

b) Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.

c) Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.

d) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.

e) Overall shall be worn by working painters during the whole of working period.

f) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.

g) Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man appointed by Institute.

h) Institute may require, when necessary medical examination of workers.

i) Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.

10) When the work is done near any place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.

11) Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions :

i) (a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.

(b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.

ii) Every crane driver or hoisting appliance operator, shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to operator.

iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.



iv) The contractor shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site of work who may get it verified.

12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.

15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by the Engineer-in-Charge or his representatives.

16. Notwithstanding the above clauses from (1) to (15) there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

### **1. APPLICATION**

These rules shall apply to all buildings and construction works in IITM in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

### **2. DEFINITION**

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work on any day during the period during which the contract work is in progress.

### **3. FIRST AID FACILITIES**

i) At every work place there shall be provided and maintained, so as to easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.

ii) The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment

a) For work places in which the number of contract labour employed does not exceed 50

Each first-aid box shall contain the following equipments :-

1. 6 small sterilised dressings
2. 3 medium size sterilized dressings.
3. 3 large size sterilized dressings.
4. 3 large sterilized burn dressings.
5. 1 (30ml) bottle containing a two per cent alcoholic solution of iodine
6. 1 (30 ml) bottle containing salvolatile having the dose and mode of administration indicated on the label.
7. 1 snakebite lancet.
8. 1 (30 gms.) bottle of potassium permanganate crystals
9. 1 pair scissors

10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
  11. 1 bottle containing 100 tablets (each of 5 gms) of aspirin.
  12. Ointment for burns
  13. A bottle of suitable surgical antiseptic solution.
- b) For work places in which the number of contract labour exceed 50. Each first-aid box shall contain the following equipments.
1. 12 small sterilised dressings.
  2. 6 medium size sterilised dressings.
  3. 6 large size sterilised dressings.
  4. 6 large size sterilised burn dressings.
  5. 6 (15 gms.) packets sterilised cotton wool.
  6. 1 (60 ml.) bottle containing a two per cent alcoholic solution iodine.
  7. 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
  8. 1 roll of adhesive plaster.
  9. 1 snake bite lancet.
  10. 1 (30 gms) bottle of potassium permanganate crystals.
  11. 1 pair scissors
  12. 1 copy of the first-aid leaflet issued by the director General Factory Advice Service and labour Institutes / government of India.
  13. A bottle containing 100 tablets (each of 5 gms) of aspirin.
  14. Ointment for burns.
  15. A bottle of suitable surgical antiseptic solution.
- iii) Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.
- iv) Nothing except the prescribed contents shall be kept in the First-aid box.
- v) The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.
- vi) A person in Charge of the First aid box shall be a person trained in First-aid treatment, in the work places where the number of contract labour employed is 150 or more.
- vii) In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance from the works. first-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
- viii) Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

#### **4. DRINKING WATER**

- (i) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- (ii) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- (iii) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn

form it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and waterproof.

(iv) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

## **5. WASHING FACILITIES**

- I. In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- II. Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

## **6. LATRINES AND URINALS**

i) Latrines shall be provided in every work place on the following scale namely:

- a) Where female are employed there shall be at least one latrine for every 25 females.
- b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.

ii. Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.

iii. Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting non-absorbent materials and shall be cement washed inside and outside at least once a year, Latrines shall not be of a standard lower than borehole system.

iv.

a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women Only" as the case may be.

b) The notice shall also bear the figure of a man or of a woman, as the case may be.

v) There shall be at least one urinal for male workers upto 50 and one for female workers upto fifty employed at a time, provided that where the number of male or female workmen, as the case may be exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.

vi) a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

b) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.

vii) Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

viii) Disposal of excreta :- Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).

ix) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

## **7. PROVISION OF SHELTER DURING REST**

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 meters (10ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sq.m. (6 sft) per head.

Provided that the Engineer-in-Charge may permit subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

## **8. CRECHES**

(i) At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and the other as their bedroom. The rooms shall be constructed with specifications as per clause 19H (ii) a, b & c.

(ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.

(iii) The contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the bed room.

(iv) The contractor shall provide one ayah to look after the children in the creche when the number of women workers does not exceed 50 and two when the number of women workers exceed 50.

(v) The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

## **9. CANTEENS**

(i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.

(ii) The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.

(iii) The canteen shall be sufficiently lighted at all times when any person has access to it.

(iv) The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour washed at least once in each year.

(v) Provided that the inside walls of the kitchen shall be lime-washed every four months.

(vi) The premises of the canteen shall be maintained in a clean and sanitary condition.

(vii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.

(viii) Suitable arrangements shall be made for the collection and disposal of garbage.

(ix) The dining hall shall accommodate at a time 30 per cent of the contract labour working at a time.

(x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square meter (10 sft) per diner to be accommodated as prescribed in sub-Rule 9.

(xi) a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.

b) Washing places for woman shall be separate and screened to secure privacy.

(xii) Sufficient tables, stools, chair or benches shall be available for the number of diners to be accommodated as prescribed in sub-Rule 9.

- (xiii) a) 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipments necessary for the efficient running of the canteen.
2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.
- b) 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.
2. A service counter, if provided, shall have top of smooth and impervious material.
3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipments.
- xiv. The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.
- xv. The charges for food stuffs, beverages and any other items served in the canteen shall be based on 'No profit, No loss' and shall be conspicuously displayed in the canteen.
- xvi. In arriving at the price of foodstuffs, and other article served in the canteen, the following items shall not be taken into consideration as expenditure namely:
- a) The rent of land and building.
- b) The depreciation and maintenance charges for the building and equipments provided for the canteen.
- c) The cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery and utensils.
- d) The water charges and other charges incurred for lighting and ventilation.
- e) The interest and amounts spent on the provision and maintenance of equipments provided for the canteen.
- xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

#### **10. ANTI-MALARIAL PRECAUTIONS**

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

**11.** The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.

#### **12. AMENDMENTS**

Institute may, from time to time, add to or amend these rules and issue directions - it may consider necessary for the purpose of removing any difficulty which may arise in the administration thereof.

## **C.P.W.D. Contractor's Labour Regulations**

### **1. SHORT TITLE**

These regulations may be called the C.P.W.D./PWD (DA) Contractors Labour Regulations.

### **2. DEFINITIONS**

**1) Workman** means any person employed by contractor directly or indirectly through a subcontractor with or without the knowledge of the Institute to do any skilled, semiskilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment are expressed or implied but does not include any person :

- a) Who is employed mainly in a managerial or administrative capacity: or
- b) Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercises either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature: or
- c) Who is an out worker, that is to say, person to whom any article or materials are given out by or on behalf of the principal employers to be made up cleaned, washed, latered, ornamental finished, repaired adopted or otherwise processed for sale for the purpose of the trade or business of the principal employers and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal employer.
- d) No person below the age of 14 years shall be employed to act as a workman.

**ii) Fair wages** means wages whether for time or piece work fixed and notified under the provisions of the Minimum Wages Act from time to time.

**iii) Contractors** shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a subcontractor.

**iv) Wages** shall have the same meaning as defined in the Payment of Wages Act.

- i) Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.
- ii) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid over time for the extra hours put in by him at double the ordinary rate of wages.
  - a) Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules 1960 as amended from time to time irrespective of whether such worker is governed by the Minimum Wages Act or not.
  - b) Where the minimum wages prescribed by the Government under the minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 days.
  - c) Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day on one of the five days immediately before or after the normal weekly holiday and pay wages to such worker for the work performed on the normal weekly holiday at overtime rate.

### **4. DISPLAY OF NOTICE REGARDING WAGES ETC.**

The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in a clear and legible condition in conspicuous places on the work, notices in English and in the local Indian languages spoken by the majority of the workers giving the minimum rates

of wages fixed under Minimum Wages Act, the actual wages being paid, the hours of work for which such wage are earned, wages periods, dates of payments of wages and other relevant information.

## **5. PAYMENT OF WAGES**

- i) The contractor shall fix wage periods in respect of which wages shall be payable.
- ii) No wage period shall exceed one month.
- iii) The wages of every person employed as contract labour in an establishment or by a contractor where less than one thousand such persons are employed shall be paid before the expiry of seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.
- iv) Where the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.
- v) All payment of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
- vi) Wages due to every worker shall be paid to him direct or to other person authorized by him in this behalf.
- vii) All wages shall be paid in current coin or currency or in both.
- viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.
- ix) A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgment.
- x) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the Junior Engineer or any other authorized representative of the Engineer-in-Charge who will be required to be present at the place and time of disbursement of wages by the contractor to workmen.

The contractor shall obtain from the Junior Engineer or any other authorised representative of the Engineer-in-Charge as the case may be, a certificate under his signature at the end of the entries in the "Register of Wages" or the "Wage-cum Muster Roll" as the case may be in the following form:

"Certified that the amount shown in column No .....has been paid to the workman concerned in my presence on .....at....."

## **6. FINES AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES**

- (i) The wages of a worker shall be paid to him without any deduction of any kind except the following:
  - a) Fines
  - b) Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
  - c) Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to his neglect or default.
  - d) Deduction for recovery of advances or for adjustment of overpayment of wages, advances granted shall be entered in a register.
  - e) Any other deduction which the Central Government may from time to time allow.
- ii) No fines should be impose on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.

**Note :-** An approved list of acts and omissions for which fines can be imposed is enclosed

iii) No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.

iv) The total amount of fine which may be imposed in anyone wage period on a worker shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.

v) No fine imposed on any worker shall be recovered from him by installment, or after the expiry of sixty days from the date on which it was imposed.

vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

## **7. LABOUR RECORDS**

f) The contractor shall maintain a Register of persons employed on work on contract in Form XIII of the CL (R &A) Central Rules 1971

g) The contractor shall maintain a **Muster Roll** register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971.

The contractor shall maintain a **Wage Register** in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971

(iv) Register of accident : The contractor shall maintain a register of accidents in such form may be convenient at the work place but the same shall include the following particulars :

- a) Full particulars of the labourers who met with accident
- b) Rate of wages
- c) Sex
- d) Age
- e) Nature of accident and cause of accident
- f) Time and date of accident
- g) Date and time when admitted in Hospital
- h) Date of discharge from the Hospital
- i) Period of treatment and result of treatment.
- j) Percentage of loss of earning capacity and disability as assessed by Medical officer.
- k) Claim required to be paid under Workmen's Compensation Act.
- l) Date of payment of compensation
- m) Amount paid with details of the person to whom the same was paid.
- n) Authority by whom the compensation was assessed.

### **Remarks**

v) The contractor shall maintain a **Register of Fines** in the Form XII of the CL (R &A) Rules 1971

The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omissions for which fines can be imposed

vi) The contractor shall maintain a **Register of deductions for damage or loss** in Form XX of the CL (R&A) Rules 1971

vii) The contractor shall maintain a **Register of Advances** in Form XXIII of the CL (R&A) Rules 1971

viii) The contractor shall maintain a **Register of Overtime** in Form XXIII of the CL (R&A) Rules 1971



## **8. ATTENDANCE CARD-CUM-WAGE SLIP**

- i) The contractor shall issue an **Attendance card – cum – wage slip** to each workman employed by him in the specimen form
- ii) The card shall be valid for each wage period.
- iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work..
- iv) The card shall remain in possession of the worker during the wage period under reference.
- v) The contractor shall complete the wage slip portion of the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
- vi) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself.

## **9. EMPLOYMENT CARD**

The contractor shall issue an Employment Card in Form XIV of the CL (R&A) Central Rules 1971 to each worker within three days of the employment of the worker.

## **10. SERVICE CERTIFICATE**

On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a Service certificate in Form XV of the CL (R&A) Central Rules 1971

## **11. PRESERVATION OF LABOUR RECORDS**

All records required to be maintained under Regulations Nos. 6&7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge or Labour Officer or any other officers authorised by the Ministry of Urban Development in this behalf,

## **12. POWER OF AUTHORISED PERSON TO MAKE INVESTIGATIONS OR ENQUIRY**

Any person authorised by Institute on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of Fair Wage clauses and the Provisions of these Regulations. He shall investigate into any complaint regarding the default made by the contractor or subcontractor in regard to such provision.

## **13. REPORT OF AUHTORISED PERSONS**

The persons authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Engineer-in-charge concerned indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages arid other dues be paid to the labourers concerned, In case an appeal is made by the contractor under Clause 13 of these regulations, actual payment to labourers will be made by the Engineer-in-charge after a decision has been given on such appeal

- i) The Engineer-in-charge shall arrange payments to the labour concerned within 45 days from the receipt of the report.

## **14. APPEAL AGAINST THE DECISION**

Any person aggrieved by the decision and recommendations of the person so authorised may appeal against such decision to the Chairman (EU) concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Executive Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

## **15. PROHIBITION REGARDING REPRESENTATION THROUGH LAWYER**

- i) A workman shall be entitled to be represented in any investigation or enquiry under these regulations by :

- a) An officer of a registered trade union of which he is a member.
  - b) An officer of a federation of trade unions to which the trade union referred to in clause (a) is affiliated.
  - c) Where the employer is not a member of any registered trade union, by an officer of a registered trade union, connected with the industry in which the worker is employed or by any other workman employed in the industry in which the worker is employed.
- ii) An employer shall be entitled to be represented in any investigation or enquiry under these regulations by :-
- a) An officer of an association of employers of which he is a member
  - b) An officer of a federation of associations of employers to which association referred to in clause (a) is affiliated.
  - c) Where the employers is not a member of any association of employers, by an officer of association of employer connected with the industry in which the employer is engaged.
- (iii) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these regulations.

#### **16. INSPECTION OF BOOKS AND SLIPS**

The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorised by the Central Government on his behalf.

#### **17. SUBMISSIONS OF RETURNS**

The contractor shall submit periodical returns as may be specified from time to time.

#### **18. AMENDMENTS**

The Central Government may from time to time add to or amend the regulations and on any question as to the application/Interpretation or effect of those regulations the decision of the Executive Engineer concerned shall be final.

**BASIS OF DESIGN ( QTY REQUIRED - 4 NOS)**

<b>SI No</b>	<b>Specification</b>	<b>Description</b>
1	Size - Cold Room - m	2.94-L x 2.06-W x 2.39-H - External
2	Product Stored	Vegetables / Milk
3	Max quantity of product storage	1600 kg
4	Daily incoming product load	300 kg
5	Daily outgoing product load	250 kg
6	Pull down time	12 hours
7	Designed Room Temperature	(+) 0 to (+) 4 Deg C
8	Ambient Temperature	40 Deg C
9	Product incoming temperature	Ambient
10	Average Occupancy	Two
11	Door openings per hour	4 times per hour
12	Material of Insulation	Reinforced Polyurethane Foam (RPUF)
13	RPUF blowing agent	CFC free
14	Panel Thickness	60mm thick, 0.5 mm Thick PPGI - In and Out
15	Density	40 Kgs/cm <sup>3</sup>
16	Wall Lamination In/Out	PPGI / PPGI
17	Ceiling Lamination In/Out	PPGI / PPGI
18	Serration on panel	No
19	Door Dimension - mm	1981 H x 864 W x 60 D
20	Type of Door	Panel type Swing Door – 60 mm thick, PP Lamination with internal safety release mechanism along with electrical safety buzzer switch
21	Door Accessories	Door Closer, Door Hinges, Human Safety Release knob, Door Handle, Posi-seal Closer, Anti Condensation Door Heater, Padlock system
22	Floor	50 mm thick RPUF material with PCC concreting and Kota stone covering.
23	Type of Refrigeration system	Split type
24	Compressor Type	Hermetically Sealed Scroll - Three phase
25	Evaporator Coil	Forced aircooled
26	Heat Load	8000 BTU / Hr
27	Compressor Capacity	10000 BTU / Hr
28	Standby Unit	No
29	Refrigerant	R-404A / 134a
30	Refrigerant Tubes	copper with aluminium fins
31	Material of cons for evaporator	SS Casing with Axial Fans
32	Electrical Panel for Ref System	Inbuilt in the condensing unit
33	Power Supply	415 V 50 Hz AC 3 Phase
34	Controller	Micro Processor Controller
35	Temp indicator cum controller	Micro processor based with high precision digital indicator
36	Lighting inside the rooms	Vapour proof CFL lights Suitable for 50 lux.- minimum 1 lights
37	Type of light fitting	Weather proof and Vapour proof

INSULATING MATERIAL SPECIFICATIONS		
SI No	Specification	Description
1	STANDARDS	BIS 12436
2	Foam Density	Not less than $40 \pm 2 \text{ kg/m}^3$
3	Foam Thermal conductivity (K value) of the insulation	$< 0.02 \text{ kcal/hr-m-}^\circ\text{C}$ at $\pm 10^\circ\text{C}$ .
4	Compressive strength	$1.5 - 2 \text{ Kg/cm}^2$
5	Tensile strength	$2.5 \text{ Kg/cm}^2$
6	Bending strength	$3.0 \text{ Kg/cm}^2$
7	Thickness of outer sheet	0.5 mm thick
8	Shear strength	$2.5 \text{ Kg/cm}^2$
9	Closed cell contents	90-95%
10	Water absorption	0.2% volume at 100% RH.-Max
11	Water Vapour permeability	$0.12 \text{ mg/pasm}$ at 88% RH & $38^\circ\text{C}$ -max.
12	Type of cam lock for panel locking	PVC
13	Type of sealant	Silicone

#### **BUY-BACK SCHEME :**

Buy-Back arrangement of the existing 4 Nos. Cold Rooms equipment complete on as-is-where-is basis subject to the following conditions. The rate Quoted for Buy back shall include the cost of dismantling the equipment also.

Note:

1. This rate will be used to deduct from the quoted value to arrive at the final rate offered by the vendor.
2. Vendors are advised to visit the site and inspect the existing system before submitting the quote. No further discussion will be entertained post tender submission.
3. IIT officials will decide the scope of items available under buy-back and when it can be taken away from the premises.
4. The items listed for buy-back scheme can be taken out of the premises only when the system under this tender consideration is fully handed over.
5. However the vendor shall fully co-operate and carry out the removal, shifting and safe storage of the existing system which will be dismantled as and when required to install the new system.
6. The prices for buy-back will be adjusted only in the very final bill of the vendor.

#### DESIGN CAPABILITIES :

The job involves design as part of the scope. The vendor should be fully capable of undertaking professional design of the system and submit good for construction drawings based on actual site measurements and requirements. The drawings furnished along with tender documents are only for guidance purposes and cannot be construed as good for construction drawings.

#### SCHEDULING OF SITE WORK :

It is to be understood that this is a fully functional site and hence prior planning for scheduling has to be done in close co-ordination with IIT Madras officials for minimum shutdown. All materials required for individual zone has to be properly arranged prior to shutdown so that the entire system can be completed within the allocated period.

PREFABRICATED MODULAR COLD ROOM FOR Mess			
TECHNICAL DATA SHEET			
S.No	Description	Unit	Vendor Data
<b>I</b>	<b>Indoor Unit</b>		
1	Cooling Capacity	BTU/H	
2	Power Supply	V/Ph/Hz	
3	Total Power Consumption	W	
4	Nominal Dimension(LxDxH)	mm	
5	Weight	Kg	
6	Fan Motor	W/Rpm/Qty	
7	Air Flow	cmh	
		cfm	
8	Air Throw	feet	
9	Refrigerant		
10	Expansion Device		
11	Mat. Of Body construction		
12	Mounting Distance (L*D)	mm	
13	Defrost Heater	W	
14	Suction End	Inch	
15	Liquid end	Inch	
16	Face Area	Sq.m	
17	No. of rows	Nos	
18	FPI		
19	Fins Material		
20	Thermostat		
21	Filter Drier		
<b>II</b>	<b>Outdoor Unit</b>		
22	No. Of Chasis	Nos	
23	Dimensions (LxDxH)	mm	
24	Weight/unit (Approx.)	Kg	
25	Mtg Distance (L x D)	mm	
26	Refrigerant		
27	Compressor Model		
28	Compressor Type		
29	Qty	Nos	
30	Power Supply	V/Ph/Hz	
31	Compressor	Watts/no.	
32	Fan Motor	W/Rpm/Qty	
33	Total Power Consumption	Watts	
34	Refrigerant Connections		
35	HP		

36	LP		
37	Mat. Of Body		
38	Condensor Face Area	Sq.m	
39	No. of Rows		
40	FPI		
41	Fins Material		
42	Gas Charged		
43	Liquid Line	Inch	
44	Suction Line	Inch	

## TENDER SPECIFICATION WALK-IN COLD ROOM

1.0	<b>WALK-IN COLD ROOM :</b>
	<b><i>Scope: Scope of this section comprises of the supply, installation, testing and commissioning of Walk-in Cold Room confirming to the specifications and in accordance with the requirement of drawings and of the Schedule of Quantities.</i></b>
1.1	<b>GENERAL CONDITIONS :</b>
1.1.1	The standard of equipments, machineries, accessories, procedures and / or practices wherever applicable shall conform to standards specified by ASHRAE. The Technology offered shall conform to or be better than these technical specifications.
1.1.2	The Cold Room offered shall be a compact type, incorporating Condensing units (Outdoor units), Evaporator Units (Indoor units), Control systems including display of specified parameters and all electrical works including lighting arrangements.
1.1.3	The Bidders shall note that, stipulated inside Temperature conditions shall be maintained in all seasons of the year, i.e., in Summer, Rainy, as well as Winter Seasons. All equipments shall be totally factory manufactured and finished. They shall be assembled at site. (No site fabricated items shall be acceptable ).
1.1.4	Bidders should furnish Electrical wiring diagrams, control wiring diagrams, literatures connected with compressors, condensers, pre- fabricated Cold Room, etc, of the DX type Refrigeration System for operation & maintenance. Bids which do not contain information by way of data, literature, etc., to enable technical assessment of the Bid are liable to be rejected as non-responsive.
1.1.5	Bidder should furnish a detailed operation and maintenance manual for the DX type Refrigeration System. Make of the compressors, Condensing Units and etc, which are indicated in the tender shall be supplied and certificate to that effect from the manufacturer shall be furnished.
1.1.6	The Cold Storage room should be a latest commercial proven model with sealed Compressor, Evaporator, air cooled condenser, insulated drain pan, assembly and drain pipe arrangement, capillary tube/thermostatic expansion valve, refrigerant filter drier with hand shut off valve, controls such as contactors, LP for all the motors. 3 Phase prevention, etc.
1.1.7	Providing drain piping from the evaporator units up to a point where it can be lead out is in the scope of the vendor.
1.1.8	Condensing units and evaporator units to be from the same manufacturer
1.1.9	To minimize penetrations, all electrical circuits shall enter the room via a minimum number of conduits, preferably one.
1.1.10	Prior to installation of walk-ins, the bidder may carefully inspect the installed site for all perquisite and sp. Installation site needs and verify that all such work is complete to the point where this installation may properly commence.
1.1.11	Any other work connected with Cold Room work which is deemed to have been included in the scope of their contract for the satisfactory performance of the Cold Room.
1.1.12	Coating and Protection : Necessary powder coating / non-corrosive painting to be done wherever required. It is to be protect against corrosion / damages under varying climate during operating conditions.



1.1.13	The electrical equipments such as fan motor, compressor, relays and other accessories shall be suitable for smooth and trouble free operation in the hot humid and dusty climates. Continuous current rating should be based on the average ambient temperature of 45°C .
1.1.14	The test certificates wherever applicable should be furnished at the time of inspection. A copy of the same shall be sent to the consignee direct through a separate mail.
1.1.15	The service connection namely electrical will be given at a specific points as follows, electrical connection through a switch gear and fuse of rated capacity. All further connections to the control cabinet and electrical equipment shall be responsible by the supplier under all safety standards.
1.1.16	All minor works connected with the installation viz., drilling holes in the walls, making drain pipes, providing supports including minor civil works, etc., will come under the scope of work.
1.2	<p><b>SYSTEM REQUIREMENTS :</b> The system shall generally consist of the following:</p> <ul style="list-style-type: none"> <li>• Three Phase, 415 Volts, 50 Hz Hermetic Scroll Compressor of Emerson Copeland / Bitzer/Bock/Danfoss Make and built with all the protections (Overload protector, Single phasing etc.).</li> <li>• Air-cooled condenser Unit of Blue Star/Rinac/Emerson Copeland/Bitzer/Bock Make designed for out door installation</li> <li>• Split type of evaporating unit of Blue Star/Rinac/Emerson Copeland/Bitzer/Bock Make for silent free operation inside the Cold Room.</li> </ul> <p><b>CONTROL AND ACCESSORIES :</b></p> <ul style="list-style-type: none"> <li>• Frost Free unit must be provided. This is necessary to avoid ice formation on the cooling coil.</li> <li>• The Refrigeration system should be an Air-cooled model and employ only, Refrigerant- 404A or 134a as the working medium. The system should be mounted in such a way so as to provide, easy accessibility for operation and maintenance.</li> <li>• The system should be assembled with components which are generally available in the markets so that, there should not be any problem for procuring the necessary spares in future.</li> <li>• The size of the Cold Room in the Annexure-I are approximate dimensions. So bidders shall offer panels for cold room which are more or less nearest to the specified dimensions.</li> </ul>
1.3	<b>COLD ROOM PANELS :</b>
1.3.1	The Cold Room chamber shall be constructed with prefabricated, easy to assemble, rigid poly Urethane Foam (RPUF) panels (Polyurethane foam sandwiched in position between two sheet metal skins). The foaming agent shall be CFC free .
1.3.2	Blue Star/Rinac/TSSC/Lloyds/Metecno Make panels shall be provided and local make panels will not be accepted. In this regard, manufacturer certificate has to be furnished.
1.3.3	The Cold Room should be constructed using pre-fabricated double skinned insulated panels for walls and ceiling.
1.3.4	The thickness of the insulation for walls, ceiling and floor of the Cold Room / Freezer Room should be as detailed in the BOQ and Basis of Design so as to keep the temperature swings inside the room due to the ambient temperature variation to a minimum..
1.3.5	For the walls & ceiling, the inside and outside wall skin shall be of 0.5 mm thick pre-painted Galvanized steel sheets.

1.3.6	The panels should be joined through tongue and groove profiled edges with embedded cam locks and easily operated by Allen Keys.
1.3.7	The joints of the panels shall be sealed with silicon sealing compound.
1.3.8	The RPUF Panels should have minimum foam density of 40 kg/cu.Mt. The panels should have a compressive strength of not less than 1.73 Kg/Sq. Mt.
1.3.9	The panels shall have a "K" value of not more than 0.02 W/m° C at 10° C.
1.3.10	All materials used for panel construction shall be scratch free, hard, cleanable and specifically resist deleterious effects of formalin which will be used for fumigation. The material used should also be rust & corrosion proof. They should inhibit formation of fungus, algae, mold, bacteria, etc.,
1.3.11	The chamber shall be provided with 2 Nos. Vapour Proof CFL type 27 Watts light fittings.
<b>1.4</b>	<b>COLD ROOM DOORS :</b>
1.4.1	The thickness of the Cold Room door should be compatible with the selected thickness of the wall. The door size will be 1981 mm Ht x 864 mm width x 60 mm Depth. For Freezer Room it shall be 1981 mm Ht x 864 mm width x 100 mm Depth.
1.4.2	Only Blue Star/Rinac/TSSC/Lloyds/ Metecno Make should be incorporated in the system.
1.4.3	The Cold Room should be provided with swing type insulated door of single leaf, hinged type with either right hand or left hand opening as per the site requirement..
1.4.4	The door shall be complete with necessary fittings i.e hinges and push rod type handles. Both the latches and the hinges shall be robust, rust proof, heavy duty industrial type.
1.4.5	Suitable capacity heater elements shall be embedded along with the periphery of the door to avoid sweating on the surface of the Cold Room door.
1.4.6	The door shall be fitted with magnetic gaskets for tight sealing. The latches for the door shall be provided in such a way that, they can be easily opened from inside, even when the door is locked from the outside.
1.4.7	The motor shall conform to IS:325 - 'Three phase induction motors'.
<b>1.5</b>	<b>COMPRESSOR :</b>
1.5.1	The Refrigeration system should incorporate Hermetic Scroll Compressors to operate on Three Phase, 415 Volts, 50 Hz Power supply. They should be fitted with suitable mountings for medium vibration and noise free operation.
1.5.2	The compressor should be Hermetically sealed Scroll compressor operating with R404A / 134a, with shut off valves, gas charging, vacuumising valves, Pr. Switches and other accessories essentially required for the safer and efficient operation of the compressor with necessary electrical and mechanical protective devices.
1.5.3	Only Three Phase Compressors of Emerson Copeland/ Bitzer/ Bock/ Danfos make should be incorporated in the system.
1.5.4	The system should be complete with suction and discharge shut off valves, relief valve, all safety devices like Hi-Low cut out with automatic reset, internal & external overload protection, crank case heaters, etc.,
1.5.5	Suitable interlocking wiring should be included to ensure that, the Compressor cannot be switched on before the Condenser fan.

<b>1.6</b>	<b>AIR-COOLED CONDENSER</b>
1.6.1	Air-cooled Condenser Units shall be designed for outdoor installation.
1.6.2	The Condenser Units shall be installed on the back side of the Cold Room or at suitable place.
1.6.3	Individual air cooled condenser units for each compressors of fin and tube type with necessary accessories essentially required for the safer and efficient operation of the condenser unit and should be rugged built and should be suitable for heavy duty industrial application with necessary corrosion prevention coatings.
1.6.4	The plat form for installation of Condenser Units shall be constructed by bidder and should be included in the scope of work.
1.6.5	Air- cooled Condensers shall be of a factory built item, comprising Condenser Coil, fan motor, drive, casing, supporting stand and receiver tank.
1.6.6	The Condenser Units of Blue Star/Rinac/Emerson Copeland/Bitzer/Bock Make should be incorporated in the System.
1.6.7	The Air-Cooled Condensers shall incorporate fans of adequate size and numbers to obtain the required air flow rate under operating conditions.
1.6.8	The casing and structure of the Air-cooled condenser shall be of robust construction. The panels shall be of heavy gauge, hot dip galvanized steel and they shall be assembled with folded joints.
1.6.9	The Fans shall be balanced both statically and dynamically. Bearing specifically suited for out door operation of the Condenser shall be used for the fan motors.
1.6.10	The coils shall be designed in such a way so as to get optimum performance with respect to the air flow rate, pressure drop, condensing temperature, power consumption, etc., Sub-cooling circuits shall preferably be included in the condenser coils.
1.6.11	The Condenser Coil shall be made out of copper tube and aluminium fins.
<b>1.7</b>	<b>EVAPORATOR</b>
1.7.1	Split type evaporating unit with stainless steel body shall be provided and shall be complete with cooling coils, drip trays, collector trays, drain connectors, defrosting arrangement if required, supporting arrangement, etc.
<b>1.8</b>	Only Blue Star/Rinac/Emerson Copeland/Bitzer/Bock Make Evaporator Units should be incorporated in the System.
1.8.1	The cooling coil shall be of copper tubes and aluminium fins. Fin spacing shall be 6 to 8 FPI approximate .
1.8.2	The drip trays shall lead to collector trays which can be fitted at either end.
1.8.3	The inclination and angle of the drip tray and the distance from the coil shall both be adjustable.
1.8.4	Insulated drain tray of stainless steel shall be provided for draining sweat water.
1.8.5	The expansion valve/ Capillary and other accessories and fittings shall also be provided with drip trays so as to avoid the chances of sweat water dropping down to the floor.
1.8.6	The Evaporator Unit shall be so designed that, it affords easy access for cleaning the drip tray, cooling coil, etc.,

1.8.7	The cooling coils shall be of copper tubes and aluminium fins.
1.8.8	The fan guards shall be of plastic coated steel construction.
<b>1.9</b>	<b>CONTROL PANEL AND ACCESSORIES</b>
1.9.1	The refrigeration system shall be built with necessary controls and accessories, such as shut off valves, filter drier, sight glass, liquid line solenoid valve, thermostatic expansion valve, operating thermostat, etc.,
1.9.2	Status indicating lamps should be provided wherever necessary
1.9.3	Automatic digital display for Temperature shall be provided for Cold room in the suitable place/selected by the purchaser.
1.9.4	Provision for Digital display of the inside design conditions also will be incorporated in the controller.
1.9.5	The customer should be able to set the required Temperature setting as well as the tolerance limits of the Cold Room as per his requirement in the controller of the Cold Room.
1.9.6	Emergency signal shall be provided for Temperature condition, when the value go beyond permissible limits.
1.9.7	<p>Good practices for piping installation :</p> <ul style="list-style-type: none"> <li>• Ensure that the pipes are flushed before use to remove dust and other foreign particles.</li> <li>• Use only refrigeration grade copper tubing and specified pipe thickness.</li> <li>• Always route pipes through wall panels only at the back of the IDU.</li> <li>• Locate suitable type oil traps at the base of each suction riser and at every 3 metres.</li> <li>• When brazing refrigerant lines, pass dry N2 through the line at low pressure (2 psig) to prevent scaling and oxidation inside the tubing.</li> <li>• Cover exposed pipe insulation with poly-tape to protect against vapour barrier and UV.</li> <li>• Install refrigerant piping supports in a neat manner.</li> <li>• Avoid pipe routing through ceiling panels.</li> <li>• Do not used short radius bends/elbows.</li> </ul>
<b>1.10</b>	<b>CONDENSATE DRAIN :</b>
	<p>Condensate water that forms in the Indoor Unit will need to be drained out of the Cold Room. It must also be ensured that the drain lines do not bring in any impurities. The following steps to be taken up for proper drain piping :</p> <ul style="list-style-type: none"> <li>• Provide a slope of a minimum of 4 inches per foot to ensure proper drainage.</li> <li>• Trap all condensate drain lines outside the Cold Room, and run into an open drain. Never connect them directly into a sewer system or the foul smell may get into the Cold Room.</li> <li>• Provide a U-trap at the tail end of the drain pipe to prevent entry of odour, insects or air from the outside.</li> <li>• Always trap single evaporator systems drain lines individually to prevent vapour migration.</li> <li>• Two Indoor unit drains should not be connected together.</li> <li>• Provide 1/100 slope in all drain lines</li> </ul>

<b>1.11</b>	<b>REFRIGERANT PIPE INSULATION :</b>
	<p>Once the pipes are in place, and before flaring the ends, insulate them as follows:</p> <ul style="list-style-type: none"> <li>• Use insulation sleeve of thickness as per table below.</li> <li>• Measure exact length of piping that needs insulation sleeve</li> <li>• Cut that same measure off a roll of insulation sleeve</li> <li>• Slip the insulation sleeve over the piping from one end and pull across till the other end</li> <li>• Flare the pipes only after the insulation has been put in place</li> <li>• If any cut sections of insulation sleeve have had to be used, seal gaps or joints with adhesive sealant</li> </ul>
<b>1.12</b>	<b>WARRANTY :</b>
1.12.1	The vendor should warrant that the Goods supplied under the contract are new, unused of the recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the contract.
1.12.2	The Vendor should further warrant that the Goods supplied under this contract shall have no defect arising from design, materials or workmanship or from any act or omission of the supplier, that may develop under normal use of the supplied Goods.
1.12.3	This warranty shall remain valid for 12 months from the date of handing over.
1.12.4	During warranty period, the supplier shall carry all the maintenance works, replacing of defective parts if any, attending the defects as & when called by IIT promptly with free of cost.
<b>1.13</b>	<b>INSPECTION AND TEST :</b>
1.13.1	The purchaser or his authorized representatives shall have the right to inspect or to test the Goods to confirm their conformity to the Contract. The Technical Specifications shall specify the details of various test readings that are to be taken at the time of continuous running of the Cold Room.
1.13.2	Should any inspected or tested goods fail to confirm to the specifications, the purchaser may reject them and the supplier shall either replace the rejected goods or make all alterations necessary to meet the specification requirements or services free of cost to the purchaser.
<b>1.14</b>	<b>SPARES</b>
1.14.1	Spares for next 5 yrs should be available with the suppliers
<b>1.15</b>	<b>TRAINING</b>
1.15.1	Necessary training to operate / maintaining of the equipment shall be provided free of cost during commissioning of the equipment.
<b>1.16</b>	<b>TECHNICAL DOCUMENTATION</b>
1.16.1	<p><b>Along with the quotation :</b></p> <ul style="list-style-type: none"> <li>• Three sets of the Catalogs and Brochures should be supplied along with the quotation.</li> <li>• Heat Load Calculations.</li> </ul> <p><b>After placement of order :</b></p> <ul style="list-style-type: none"> <li>• Details Good for Construction Layout.</li> <li>• Line sketch and details about the basic equipment, etc.</li> <li>• Line sketch and details of the equipment wiring and electrical components, etc.</li> <li>• Manufacturer's standard operation instruction manual.</li> </ul>

	<ul style="list-style-type: none"> <li>• Complete / detailed maintenance manual for mechanical, electrical components and other accessories</li> <li>• Detailed electrical manual containing details of the electrical elements control instruments and complete circuit diagram for all the circuits employed for operation and control of the plant.</li> <li>• Spare Parts manual</li> <li>• Trouble shooting chart</li> <li>• Dimensions design diagram / drawings / catalogues for all the vital spares.</li> <li>• Copy of guarantee certificate for compressor, motor, electrical components, etc.</li> </ul>
<b>1.17</b>	<b>SAFETY</b>
<b>1.17.1</b>	<p>The first and foremost responsibility of the vendor is to ensure safety at site. It is very important that all aspects of safety are taken care of as listed below :</p> <ol style="list-style-type: none"> <li>1. All technicians/contractors must be properly qualified and trained.</li> <li>2. All safety labels and notices must be followed strictly.</li> <li>3. Technicians must wear safety gear like goggles and gloves when at work.</li> <li>4. Always isolate mains power, remove fuses before working on electrical systems.</li> </ol>
<b>1.17.2</b>	<p>Equipment Safety :</p> <ol style="list-style-type: none"> <li>1. Ensure safe delivery to customer site.</li> <li>2. Take special care when shifting units to elevated locations.</li> <li>3. Do not topple unit from truck etc. as unit can explode.</li> <li>4. Unpack factory packing only after reaching actual site.</li> <li>5. Follow instructions on carton/crate strictly.</li> </ol>
<b>1.17.3</b>	<p>Installation Safety :</p> <ol style="list-style-type: none"> <li>1. Use proper structures for installing IDU/ODU.</li> <li>2. Do not position units so as to endanger service personnel.</li> <li>3. Consider all necessary fire prevention precautions.</li> <li>4. Use good quality materials of standard specifications for every job.</li> </ol>
<b>1.17.4</b>	<p>Electrical Safety ;</p> <ol style="list-style-type: none"> <li>1. Ensure cables are properly sized.</li> <li>2. Use crimped wire terminations.</li> <li>3. Use correct rating MCBs and fuses.</li> <li>4. Switch off power when carrying out checks.</li> <li>5. Earth units well.</li> <li>6. Use only ISI/TAC approved electrical materials.</li> <li>7. Do not insulate power cables and copper tubes together.</li> </ol>
<b>1.18</b>	<b>ELECTRICAL CHECKS :</b>
<b>1.18.1</b>	<ol style="list-style-type: none"> <li>1. Use only ISI approved cables</li> <li>2. Use only branded &amp; ISI marked SFUs/MCBs</li> <li>3. Use correct ratings of SFUs/MCBs, not over- or under-rated units</li> <li>4. Use proper earthing to avoid shock. Use only GI as per IEC</li> <li>5. Use 3 lengths GI-8 gauge as earthing for all outdoor condensing units.</li> </ol>
<b>1.19</b>	<b>PRE-INSTALLATION SITE CHECKS :</b>
<b>1.19.1</b>	<p>The following steps must be taken by the VENDOR to ensure that every thing at site is ready for the installation even before the material arrives:</p> <ul style="list-style-type: none"> <li>• Visit the site with all details: the final offer, the Purchase Order, costing sheet, copies of drawings if submitted, minutes of meeting, etc.</li> <li>• Meet the right person – customer / consultant at site.</li> <li>• Verify the site layout.</li> <li>• Prepare Pre-installation Plan.</li> <li>• Prepare a Bar Chart of the list of activities, date of start / finish, engineering of the project (revalidation of pipe sizing, selection of cables, pipe insulation, supports for cables, pipes, panels, drain pipe, drain heaters).</li> </ul>

	<ul style="list-style-type: none"> <li>• Prepare a bill of materials required at site and submit to client for approval.</li> <li>• Locate storage spaces for the materials to be placed when they arrive.</li> </ul>
<b>1.20</b>	<b>TESTING AND COMMISSIONING - LEAK TEST</b>
1.20.1	<ul style="list-style-type: none"> <li>• After the refrigerant piping is completed, the entire system must be leak tested if there is no refrigerant in the outdoor unit.</li> <li>• In case of precharged outdoor units, test field piping and indoor unit.</li> <li>• Always use the pressure regulator at the cylinder outlet.</li> <li>• Raise the pressure in the system up to 50 Psig.</li> <li>• Check all the joints for leaks by soap solution test.</li> <li>• If no leaks are found, increase the pressure to 100 psig and hold for one hour.</li> <li>• If no pressure drop is observed, charge the unit to maximum test pressure 400 psig (for R404a/134a).</li> <li>• Keep the unit under pressure for 24 hours.</li> <li>• If the system is holding the pressure, proceed further for evacuation.</li> <li>• Raise the pressure to 5 psig with the refrigerant and remove the vacuum pump.</li> </ul>
<b>1.21</b>	<b>VACUUMISING</b>
1.21.1	<ul style="list-style-type: none"> <li>• We recommend a final minimum evacuation to 500 microns.</li> <li>• Good evacuation processes include frequent vacuum pump oil changes (change oil for every 24 working hours of the pump) and ¼" diameter copper pipe connections to both high and low sides of the system.</li> <li>• Use a vacuum pump capable of creating a blank off vacuum of less than 25 microns.</li> <li>• If the compressor has service valves, they should remain closed. A vacuum gauge should be attached to the system for pressure readings.</li> <li>• A line solenoid valve with a 1 minute time delay NRV should be connected to the vacuum pump.</li> <li>• A shut off valve between the gauge connection and vacuum pump should also be provided to allow the system pressure to be checked after evacuation.</li> </ul>
<b>1.22</b>	<b>REFRIGERANT CHARGING</b>
1.22.1	<p>System checks prior to starting the unit for refrigerant charging ;</p> <ul style="list-style-type: none"> <li>• Check all the electrical &amp; refrigeration connections. Be sure they are all firmly fixed.</li> <li>• Check the wiring as per the approved wiring diagram.</li> <li>• Check the fan motor connection, rotation. Fan motor mountings should be carefully Checked for tightness and proper alignment.</li> <li>• Check the oil level before start up. The oil level should be at or slightly above the 3/4 level of the sight glass.</li> <li>• Check high and low pressure controls, oil pressure safety controls, and all other safety controls, and adjust if necessary.</li> <li>• Check the room thermostat for normal operation and adjust if required.</li> <li>• Remove the out put wires from the contactor to the compressor. Insulate the exposed wires.</li> <li>• Start the unit without compressor and check all aspects as referred above. Re-connect the compressor wires.</li> <li>• Activate the crank case heater for 6 hours prior to start up of the compressor. If no crank case heater is present, then direct 500 watts heat lamp or other heat sources on the lower shell of the compressor for approximately 60 minutes. This is to prevent oil slugging during the first start up.</li> </ul>
1.22.2	<p>Refrigeration charging instructions</p> <ul style="list-style-type: none"> <li>• Charge the system on the high side with liquid refrigerant upto the standing pressure of the refrigerant through a separate liquid line drier.</li> <li>• Weigh the refrigerant cylinder before charging so as an accurate record can be kept of the weight of refrigerant charged in the system.</li> <li>• If the refrigerant must be added to the system through the suction side of the compressor, charge in vapour form only.</li> </ul>

1.22.3	<p>For R 404a / 134a applications:</p> <ul style="list-style-type: none"> <li>• R 404A / 134a must always be charged in only during the liquid phase.</li> <li>• Charge before starting the compressor.</li> <li>• Slowly add refrigerant in liquid phase on LP side, as far away from running compressor as possible. It is recommended to charge the liquid through a capillary so that the liquid evaporates before entering the low side.</li> <li>• Fix manifold gauge and connect to both suction and discharge sides of the system.</li> <li>• Engage the clamp meter on incoming cable to monitor the current drawn by the compressor.</li> <li>• Start the unit and monitor the current drawn by compressor and motors.</li> <li>• Monitor the system pressure during charging and initial operation. Do not add oil while the system is short of refrigerant unless oil level is dangerously low.</li> <li>• For polyester oil systems, cleanliness and low moisture content are critical factors.</li> <li>• Only clean and dehydrated copper tubes should be used.</li> <li>• Use tools (i.e. charging line, vacuum pump) dedicated to this refrigerant only.</li> </ul>
<b>1.23</b>	<b>TESTING, ADJUSTING &amp; BALANCING THE SYSTEM</b>
1.23.1	<p>Check the entire system as follows:</p> <ul style="list-style-type: none"> <li>• Check the discharge and suction pressures. Take corrective action if it is not within system design.</li> <li>• Observe the oil level in crank case sight glass. Maintain the oil level at 3/4 of the sight glass.</li> <li>• Check the voltage and amperage at the compressor terminals. Voltage must be within the 10% of that indicated on the name plate. If necessary recommend suitable stabilisers.</li> <li>• Check to see balanced load is drawn by each phase in case of 3 phase compressors.</li> <li>• Ideally the HP cut out should be at 420 psig for R404a systems.</li> <li>• Check the HP control</li> <li>• Check crank case heater operation.</li> </ul>
<b>1.24</b>	<b>HANDING OVER</b>
1.24.1	<p>Once the commissioning and testing is completed follow the procedures detailed below:</p> <ul style="list-style-type: none"> <li>• Submit the Handing over report.</li> <li>• Hand over 3 sets of User Manual of the Cold Room.</li> <li>• Explain the working of the Cold Room, and all components, especially safety features.</li> <li>• Take a complete set of readings on the entire system for the record.</li> </ul>



**LIST OF APPROVED MAKES:**

- |     |  |  |
|-----|--|--|
| 1.  | Air Conditioners   | : Blue Star/Voltas/Hitachi                     |
| 2.  | Supply & Return<br>Diffusers & Grilles/Jet diffusers/Damfers | : Airmaster / Ravi Star / Dynacraft /<br>ARROW |
| 3.  | Motors   | : Kirloskar/ Siemens/Crompton                  |
| 4.  | Factory fabricated duct                                      | : Rolastar                                     |
| 5.  | Fibreglass material  | : KIMMCO/UP Twiga                              |
| 6.  | Vibration isolators  | : Dunlop                                       |
| 7.  | Control Switch / Indication Lamp                             | : SIEMENS /KAYCEE/SALZER                       |
| 8.  | Flexible Ducts   | : ATCO / Supaflex / Polyaire                   |
| 9.  | GSS ducting  | : TATA / SAIL / JINDAL                         |
| 10. | PVC Drain pipe   | : FINOLEX/AVONPLAST                            |
| 11. | LTUG Aluminium/Copper Cables                                 | : POLYCAB / UNIVERSAL /<br>GLOSTER / TRUPODURE |
| 12. | Brass Cable Gland  | : Dowells/Cabend/Jainson/Comet                 |

**Signature of the contractor**

**Consultant (Elect)**

**Executive Engineer (E)**