

Name of work

**SITC of 2 x 10 HP variable refrigerant volume (VRV)
type AC system for Health center at IIT Kanpur.**

BID DOCUMENT



OFFICE OF EXECUTIVE ENGINEER, IWD
INDIAN INSTITUTE OF TECHNOLOGY
KANPUR, December, 2024

Indian Institute of Technology Kanpur

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Executive Engineer (AC)

1 Notice Inviting e-Tenders

The Executive Engineer on behalf of Board of Governors of Indian Institute of Technology Kanpur invites online percentage rate tenders from eligible Air conditioning contractor, satisfying the eligibility criteria mentioned in the document.

NIT No: 36/AC/EE/2024

1	Name of work	: SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur.
2	Estimated Cost exclusive of GST	: Rs. 9,60,056/-
3	Earnest Money Deposit (Rs.)	: Rs. 19,201/-
4	Duration of contract	: Two (2) months
5	Last Time & date of submission of bids (Up to)	: As per CPP portal data (https://eprocure.gov.in/eprocure/app)
6	Opening of bids	: As per CPP portal data
7	Time allowed for submission of requisite documents by lowest bidder	: Within One week of opening of financial bids

The bid forms and other details may be downloaded from Central Public Procurement Portal (<http://eprocure.gov.in/eprocure/app>). Aspiring bidders who have not enrolled / registered in e- procurement should enroll / register themselves before participating through web site <http://eprocure.gov.in/eprocure/app>. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at “Instructions for online bid submission.”

Bidders can access quotation / tender documents on the website (for searching in the NIC site), kindly go to quotation search option and type ‘IIT’. Thereafter, click on “GO” button to view all IIT quotations. Select the appropriate quotation / tender and fill them with all relevant information and submit the completed Quotation / Tender document online on the website <http://eprocure.gov.in/eprocure/app> as per the schedule given in the next page.

Note: No manual bids will be accepted. All bids (both Technical & Financial) should be submitted in the e-procurement portal.

Applicants are advised to keep visiting the above-mentioned websites from time to time (till the deadline for bid submission) for any updates in respect of the tender documents, if any. Failure to do so shall not absolve the applicant of his liabilities to submit the applications complete in all respect including updates thereof, if any. An incomplete application may be liable for rejection.

Executive Engineer

2 Information and Instructions for Bidders for E-Tendering

The Executive Engineer on behalf of Board of Governors of Indian Institute of Technology Kanpur invites online [percentage rate tenders from eligible Air conditioning Contractor](#), [satisfying the eligibility criteria mentioned in the document](#).

2.1 Schedule

1	Name of organization	:	Indian Institute of Kanpur	Techn ology
2	NIT No:	:	36/AC/EE/2024	
	Location	:	Indian Institute of Kanpur	Techn ology
3	Tender / Quotation type (open / limited / EOI / auction / single)	:	Open	
4	Tender / Quotation category (services / goods / works)	:	Works	
5	Type of Contract (work / supply / auction / service / buy / empanelment / sell)	:	Work	
6	Form of contract (IITK-7/8)	:	IITK-7	
7	Work Category (civil/electrical/AC/fleet management / computer systems)	:	AC	
8	Is multi-currency allowed?	:	No	
9	Date of publishing / issue / start	:	As per CPPP portal	
10	Document download start date	:	As per CPPP portal	
11	Document download end date	:	As per CPPP portal	
12	Date & time of pre-bid meeting	:	As per CPPP portal	
13	Venue of pre-bid meeting	:	As per CPPP portal	
14	Last date & time of uploading of bids	:	As per CPPP portal	
15	Date & time of opening of Technical bids	:	As per CPPP portal	
16	Bid Validity Days	:	90 days after opening of technical bid	
17	Earnest Money Deposit (EMD)	:	Rs. 19,201/- . Scanned copy of the proof of EMD deposition to be uploaded with the tender. The hardcopy of the EMD receipt shall be submitted in the office of Executive Engineer, IWD IIT Kanpur.	

18 Non- Refundable Processing Fee (Inclusive of GST @18%) as given in section 5.1	Rs. 2000/- for Non MSME/NSIC/Startup and Rs. 1500/- for MSME/NSIC/Startup to The Registrar, Indian Institute of Technology Kanpur. The proof of submission must be uploaded along with transaction slip with due mention of NIT No. in the CPP portal for valid tender submission as per format given in section 5.1
19 No. of Bids / Covers (1 / 2 / 3 / 4)	: 2
20 Address for communication	: Office of Executive Engineer IWD, Indian Institute of Technology Kanpur, Kanpur, U.P. Pin - 208016, Tel: 0512-259-7059
21 e-mail address	: vktiwari@iitk.ac.in

The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.

1. Information and instructions for bidders posted on website shall form part of bid document.
2. The bid document consisting of drawings, specifications, schedule of quantities of items to be executed, schedule of stages for payment as applicable and the set of terms & conditions of the contract to be complied with and other necessary documents can be seen and downloaded free of cost from www.eprocure.gov.in
3. But the bid can only be submitted after deposition of e processing fee and proof of submission of EMD.
4. Those contractors not registered on the website mentioned above, are required to get registered beforehand. Only e-bids shall be accepted in CPPP portal through e-tendering processes.
5. The intending bidder must have valid Class-III digital signature to submit the bid.
6. On opening date, the contractor can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
7. Contractor can upload documents in the form of JPG format and PDF format.
8. Contractor must ensure to quote rate of each item. The column meant for quoting rate in figures appears in pink colour and the moment rate is entered, it turns sky blue.

In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO).

However, if a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section /

sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.

9. The “Eligibility/technical Bid” shall be opened first on due date and time as per the evaluation scheme. The “Financial Bid” of bidders qualifying the technical bid shall be opened on a later date as to be announced in CPP portal.
10. The bidders are advised to visit the site before submission of bids to have more clarity about the site conditions and availability of space for execution of the work.
11. All modifications/addendums/corrigendum issued regarding this bidding process shall be uploaded on website only.
12. The department reserves the right to reject any or all bids without assigning any reason thereof and may restrict the list of qualified bidders to any number deemed suitable by it, if too many bids are received satisfying the minimum laid down criteria.
13. The rates for all items of work, shall unless clearly specified otherwise, include cost of all operations and all inputs of labour, material, T&P, wastages, watch and ward, other inputs, all incidental charges, all other taxes (exclusive of GST), cess, duties, levies etc. required for execution of the work.
14. The specialized works shall be in compliance with 3 Star GRIHA rating and as per environmental policies of Institute. Nothing extra shall be payable on this account.
15. If claimed, The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.
16. The description of the work is as follows: “[SITC of 2 x 10 HP variable refrigerant volume \(VRV\) type AC system for Health center at IIT Kanpur.](#)”
17. The work is estimated to cost **Rs. 9,60,056/-**. However, this estimate given is mere approximation for guide.
18. Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD7 which is available as a Govt. of India Publication and also available on website www.cpwd.gov.in. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
19. The time allowed for carrying out the entire work will be **Two (2) months** from the date of start as defined in Schedule “F” or from the first date of handing over of the site, whichever is later, in accordance with the phasing as detailed in special conditions of contract in the bid document.
20. The site for the work will be handed over as per the special terms and conditions of the document.
21. An approved programme of completion submitted by the contractor after award of work based on the milestone given in the tender.
22. The bid document consisting of NIT, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website www.eprocure.gov.in free of cost.

23. After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified.
24. While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he/she need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
25. Scanned copy of Earnest Money shall be uploaded to the e-Tendering website within period of submission
26. Earnest money can be paid in the form of Treasury Challan or Demand Draft or Pay order or Banker's cheque or Deposit at call receipt or Fixed Deposit Receipt drawn in favor of Director IIT Kanpur along with Bank Guarantee of any Scheduled Bank where applicable.

A part of earnest money is acceptable in the form of bank guarantee also in such case 50% of earnest money or Rs. 20 lacs, whichever is less, will have to be deposited in shape prescribed above and balance in shape of Bank Guarantee of any scheduled bank.
27. The receipt of e-processing fee shall also be uploaded to the e-tendering website by the intending bidder up to the specified bid. The Details of Institute Account for submitting e-processing fees is given in 5.1 under Section [Various Forms and Formats](#).
28. Copy of documents as specified in the bid shall be scanned and uploaded to the e-tendering website within the period of bid submission.
29. The bid submitted shall be opened at as per the details provided in the CPP portal at IWD office. The date of opening of Financial Bid shall be informed through web site after the opening of financial bid
30. [The bid submitted shall become invalid and e- processing fee shall not be refunded if:](#)
 - (i) The bidder is found ineligible.
 - (ii) The bidder does not upload scanned copies of all the documents stipulated in the bid document.
 - (iii) If a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
31. The contractor whose bid is accepted will be required to furnish performance guarantee of [5% of tendered value](#) within the period specified in Schedule F. This guarantee shall be in the form of Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the prescribed form.
32. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F' including the extended period if any, the contractor shall be suspended for [two years and shall not be eligible to bid for IITK tenders from the date of issue of suspension order](#).
33. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/ registrations or proof of applying for obtaining licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. If applicable and also ensure the compliance of afore said provisions by the sub-contractors, if any engaged by the contractor for the said work and program chart (Time and Progress) within the period specified in Schedule 'F'.

34. Intending Bidders are advised to inspect and examine the sites and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, making proper arrangements to the site for smooth operation, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. Bidder shall be deemed to have full knowledge of the sites whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Institute and local conditions and other factors having a bearing on the execution of the work.
35. Intending Bidders are advised to get familiarized with the specifications /rules related (i.e., [SITC of 2 x 10 HP variable refrigerant volume \(VRV\) type AC system for Health center at IIT Kanpur.](#)) to the work as approved by the competent authority and various policies related to C&D waste and other environmental guidelines of the institute pertaining to the. Bidder shall be deemed to have full knowledge of such rules and regulations whether he has read it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. In case of reduction of scope of work or no work is possible to carry out on account of such issues, no cost shall be payable to them. Submission of a bid by the bidder implies that he has read this notice and all other documents and has made himself aware of the Institute Regulations and other factors having a bearing on the execution of the work.
36. The competent authority on behalf of the Board of Governors does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without assigning any reason. Bids in which any of the prescribed conditions is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.
37. Canvassing whether directly or indirectly, in connection with bids is strictly prohibited and the bids submitted by the bidders who resort to canvassing will be liable to rejection.
38. The competent authority on behalf of the Board of Governors reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
39. The contractor shall not be permitted to bid for works in the [Office of Infrastructure and Planning / Institute Works Department responsible for award and execution of contracts](#), in which his near relative is posted as Divisional Accountant or as an officer/ staff in any capacity between the grades of [Superintending Engineer and Junior Engineer \(both inclusive\) in IWD and Office of Infrastructure and Planning](#). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Office of Infrastructure and Planning/ Institute Works Department. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
40. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or

Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be canceled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

41. The bids for the work shall remain open for acceptance for a period of **Ninety (90) days** from the date of opening of bids. If any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Institute shall, without prejudice to any other right or remedy, be at liberty to suspend the bidder for one year.
42. This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 7 days from the stipulated date of start of the work, will sign the contract.
43. The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto
44. Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.
45. The bid document will include the following components:
 - (a) CPWD-7 and CPWD-6 including **Schedule A** to F for all the components of the work, Standard General Conditions of Contract for CPWD 2023 as amended/modified up to last date of submission of the bid.
 - (b) General / specific conditions, specifications applicable to all components of the work.
46. The eligible bidders shall quote percentage rates after considering all the components of the work.
47. After acceptance of the bid by competent authority, the **Executive Engineer** shall issue letter of award on behalf of the Board of Governors to the contractor. After the work is awarded, the contractor will have to enter into one agreement **with Executive Engineer**. One such signed set of agreement shall be handed over to Engineer-In-Charge as applicable.
48. Entire work under the scope of bid shall be executed under one agreement.
49. The requirement of technical staff given in various specialized works is as per requirements given in clause 32 of NIT document. The actual deployment of these technical staff will be as per execution of work and direction of the **Executive Engineer, IITK**.
50. The bill for the work shall be facilitated by Engineer-in-Charge. The bill must be submitted to the Office of Executive Engineer, IIT Kanpur. Payment shall be based on the milestones as per Schedule F.
51. The work shall be treated as complete when all the components of the work are complete.
52. It will be obligatory on the part of bidder to sign the contract document for all components before the first payment is released.
53. In case of reduction in scope of work no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.

54. A team of officers from Indian Institute of Technology Kanpur may visit the office/ site of work of bidders for establishing their credibility and verification of submitted documents
55. The mentioned work is urgent as requested by client/Institute and to be completed strictly in given time schedule as per special terms and conditions. The contractor has to deploy the labour and supervisory staff in shifts to meet the targeted completion date. The work may be executed in extended shifts or two shifts. The rates quoted by the contractor will be deemed to be inclusive of any extra expenditures on account of this reason. Nothing shall be paid on this account.
56. **The competent authority on behalf of the Board of Governors reserves the right to terminate the contract if,**
 - (a) Any violation of labour law has been observed.
 - (b) Any of the construction workers engaged in the works under this contract is found also engaged in Service Contracts of the Institute at the same time.
57. **The competent authority on behalf of the Board of Governors reserves the right to disqualify an agency for**
 - (a) Non-compliance of Institute orders
58. **Violation of Institute policies as established by the Competent Authority in the best interests of the Institute.**

2.2 Instructions for Online BID Submission

This tender document has been published on the Central Public Procurement Portal (URL: <http://eprocure.gov.in/eprocure/app>). The bidders are required to submit softcopies of their bids electronically on the CPP portal, using valid Digital Signature Certificates (DSC). The instructions given below are meant to assist the bidders in registering on the CPP portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP portal.

More information useful for submitting online bids on the CPP portal may be obtained at <http://eprocure.gov.in/eprocure/app>

2.2.1 Registration

1. Bidders are required to enroll on the e-procurement module of the Central Public Procurement portal (URL:<http://eprocure.gov.in/eprocure/app>) by clicking on the link, “click here to enroll”. Enrolment on the CPP portal is free of charge
2. As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for the accounts.
3. Bidders are advised to register their valid e-mail address and mobile number as part of the registration process. These would be used for any communication from the CPP portal.
4. Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (class 2 or class 3 certificates with signing key usage) issued by any certifying authority recognized by CCA India (e.g. Sify / TCS / nCode/ eMudhra etc.) with their profile.
5. Only one valid DSC should be registered by a bidder. Please note that bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
6. Bidder then logs in to the site through the secured log-in by entering their user ID Password and the password of the DSC / eToken.

2.2.2 Searching for tender documents

1. There are various search options built in the CPP portal to facilitate bidders to search active tenders by several parameters. These parameters could include tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP portal.
2. Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. The tenders can be moved to the respective “My Tenders” folder. This would enable the CPP portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
3. The bidder should make a note of the unique Tender ID assigned to each other; in case they want to obtain any clarification/help from the Helpdesk.

2.2.3 Preparation of bids

1. Bidder should take into account any corrigendum published on the tender document before submitting their bids.
2. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bids. Please note the number of covers in which the bid documents have to be submitted. Any deviations from these may lead to rejection of the bids.
3. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black & white option.
4. To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g., PAN card copy, annual reports, auditor's certificates, etc.) has been provided to the bidders. Bidders can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

2.2.4 Submission of bids

1. Bidder should log into the site well in advance for bid submission so that he / she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2. The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
3. Bidder has to select the payment option as "on-line" to pay the tender processing fee as applicable and enter details of the instrument.
4. A standard BOQ Format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BOQ file, open it and complete the white colored [unprotected] cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it online, without changing the filename. If the BOQ file is found to be modified by the bidder, the bid will be rejected.

OR

In some cases, financial bids can be submitted in PDF format as well (in lieu of BOQ).

5. The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
6. All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128-bit encryption technology. Data storage encryption of sensitive fields is done.
7. The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
8. Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
9. Add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

2.2.5 Assistance to bidders

1. Any queries relating to tender document and the terms and conditions contained therein should be addressed to the tender inviting authority for a tender or the relevant contact person indicated in the tender.
2. Any queries relating to the process of online bid submission or queries relating to CPP portal in general may be directed to the 24 x 7 CPP Portal Help Desk.

2.2.6 General instruction to bidders

1. The tenders will be received online through portal <https://eprocure.gov.in/eprocure/app>. In the technical bids, the bidders are required to upload all the documents in PDF format.
2. Possession of a valid class II / III Digital Signature Certificate (DSC) in the form of smart card / e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through <https://eprocure.gov.in/eprocure/app>. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the website <https://eprocure.gov.in/eprocure/app> under the link "Information about DSC".

Tenderers are advised to follow the instructions provided in the "Instructions to the tenderer" for the e-submission of the bids online through the Central Public Procurement Portal for e-procurement at <https://eprocure.gov.in/eprocure/app>.

Executive Engineer, IWD
Institute of Technology Kanpur

2.3 List of documents to be scanned and uploaded within the period of bids submission

The following mandatory documents to be submitted with online bid submission:

The Online bids (complete in all respect) must be uploaded online in two Envelops as explained here: -

2.3.1 Envelope - 1: Technical Bid

The following mandatory documents to be provided as **a single PDF** file in the same sequence as listed for evaluation:

1. Scan copy of EMD.
2. Proof of submission of Processing Fees [as per 5.1](#)
3. GST Registration Certificate or GST Undertaking [as per 5.2](#)
4. EPF & ESI Registration
5. Copy of PAN card
6. Affidavit for not being blacklisted/debarred/restrained [As per 5.3](#)
7. Performance report of works executed [as per 5.4](#)
8. Structure and Organization of the Agency [as per 5.5](#)
9. Declaration on Details of the Bidder(s) [as per 5.6](#)
10. Details of Similar Nature of Works Completed [as per 5.7](#)
11. Declaration about Site Inspection [as per 5.8](#)
12. Enlistment Order of the Contractor in appropriate class and category issued by CPWD or others or specialized agencies
13. Tender Certificate [as per 5.9](#)
14. Tender Acceptance Letter [as per 5.10](#)
15. Letter of Transmittal [as per 5.11](#)
16. CPWD- 7 [as per 5.12](#)
17. Turnover and Other Financial statement of the Agency [as per 5.13](#)

The hard copy of earnest money deposit receipt (EMD) shall be submitted in the office of Executive Engineer Elect & AC, Central office IWD IIT Kanpur before the opening of the technical bid on **10.01.2025** till 3:00 PM. In absence of the EMD in hardcopy, the bidder shall be not eligible for opening of their technical bid and shall be rejected.

2.3.2 Envelope - 2: Financial Bid

Price bid should be submitted in BOQ format

3 Eligibility Criteria

3.1 Eligibility criteria for contractors

Contractors who fulfill the following criteria shall be eligible to apply.

Eligible Bidders

Eligible bidders should satisfy the following criteria for an eligible bid:

1. Experience (value of work done shall be within a span of one year):

Firms/Contractors must have completed satisfactorily

i) One similar work of 80% value of the estimated cost put to tender

Or

ii) Two similar work of 60% value of the estimated cost put to tender

or

iii) Three similar work of 40% value of the estimated cost put to tender

Works completed during last 7 years ending on date **08.01.2025**.

Definition of similar work: Similar type of work means “SITC of VRF (Variable Refrigerant Flow) type AC system with AHU, FCU, refrigerant piping, ducting and associated AC works” done with any Central Government Department / Central Autonomous Body / Central Public Sector Undertakings /State Government / Establishment of repute in last 7 years.

2. Eligible bidders must also satisfy the following conditions and ensure submission of all documents mentioned in 2.3

- 1. Legal:** Unregistered Partnership Firm and Joint Venture or Consortium are not eligible.
- 2. Registration:** Bidder should be registered with the Income Tax Department, Employees Provident Fund (EPF) Organization, Employees State Insurance (ESI) Corporation & GST. Bidders are not eligible in absence of these documents.
- 3. Office:** Bidders have to establish its local accessible office registered with local GSTIN at IIT Kanpur to run the awarded work.

4 Bid Evaluation and Award

The following process will be followed for the Technical and Financial Bids Evaluation:

4.1 Technical Bid Evaluation

- Technical bids received complete in all respects covering the entire scope of work, will only be opened
- The technical bid evaluation is done only for bidders who satisfy the minimum criteria by submitting documentary proof supporting eligibility criteria and the bids of agencies who have not submitted these documents are liable to be rejected without notice

4.2 Financial Bid Evaluation

For financial bids, the following points shall be followed:

- After evaluation of Pre-Qualification Documents, a list of short listed agencies will be prepared.
- Thereafter the financial bids of only the qualified and technically acceptable bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives, if present.
- The bid shall remain valid for **Ninety (90) days** from date of opening of eligibility bids/Technical bid.

NOTE

The employer reserves the right, without being liable for any damages or obligation to inform the bidder, to:

- Amend the scope and value of contract to the bidder.
- Reject any or all the applications without assigning any reason.

Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

5 Various Forms and Formats

5.1 Format for submission of processing fees

Format for proof of submission to be uploaded along with transaction slip
(Scanned copy of this page to be uploaded at the time of submission of bid)

I/we have submitted the processing fess as per the following details:

NIT No	:	36/AC/EE/2024
Name of Agency	:	
GST number of Agency	:	
Date of transaction	:	
Total amount transferred	:	
UTR number	:	

.....
Signature of the Bidder(s)

Details of Institute Account for submitting processing fees are as follows:

Beneficiary Name: The Registrar,
IIT Kanpur
Bank Name: SBI, IIT Kanpur
Account Number:
30632766814
IFSC Code:
SBIN0001161

5.2 Undertaking regarding obtaining GST registration

Proforma for Undertaking regarding obtaining GST registration Certificate of The State in which work is to be taken up

(Undertaking to be furnished on a 'Non-Judicial' stamp paper worth Rs.100/)

(Scanned copy of this notarized undertaking to be uploaded at the time of submission of bid, if required)

If work is awarded to me, I/we shall obtain GST registration Certificate of the State, in which work is to be taken up within one month from the date of receipt of award letter or before release of any payment by IITK, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by IITK or GST department in this regard.

.....
(Signature of Bidder(s))

Or

.....
(An authorized Officer of the firm with stamp)

.....
(Signature of Notary with seal)

5.3 Affidavit for not being blacklisted/debarred/restrained

Proforma for AFFIDAVIT for not being blacklisted/debarred/restrained

(AFFIDAVIT to be submitted on a 'Non-Judicial' stamp paper worth Rs.100/)

(Scanned copy of this notarized affidavit to be uploaded at the time of submission of bid)

I/we undertake and confirm that our firm/partnership firm has not been blacklisted and/or debarred/restrained by any Central Govt./ State Govt. Agency/ Autonomous body of the Central or State govt./ PSU etc. Further that, if such information comes to the notice of the Institute, then I/we shall be debarred for bidding in the Institute in future forever. Also, if such information comes to the notice of the Institute on any day before date of start of work, the competent authority shall be free to cancel the agreement and to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

.....
(Signature of Bidder(s))

Or

.....
(An authorized Officer of the firm with stamp)

.....
(Signature of Notary with seal)

5.4 Performance report on work executed

Proforma of Performance report on works referred to in Financial Information (To be printed in Company's Letterhead)

(Scanned copy of the Performance Reports to be uploaded at the time of submission of bid)

1. Name of work/project & location:
2. Agreement no.:
3. Estimated cost:
4. Tendered cost:
5. Date of start:
6. Date of completion:
7. Stipulated date of completion:
8. Actual date of completion:
9. Amount of compensation levied for delayed completion, if any:
10. Amount of reduced rate items, if any:
11. Performance Report:
 - (a) Quality of work: Outstanding / Very Good / Good /Poor
 - (b) Technical Proficiency: Outstanding / Very Good / Good /Poor
 - (c) Resourcefulness: Outstanding / Very Good / Good /Poor
 - (d) General Behavior: Outstanding / Very Good / Good /Poor

Date:

Signature of Superintending Engineer or Equivalent

5.5 Structure and Organization of the Agency

Proforma of providing Structure and Organization of the Bidding Agency

(To be printed in Company's Letterhead)

(Scanned copy of the Structure and Organization Document to be uploaded at the time of submission of bid)

1. Name & address of the bidder:
2. Telephone no./Telex no./Fax no.:
3. Email address for Communication.:
4. Legal status of the bidder (attach copies of original document defining the legal status):
 - (a) An Individual:
 - (b) A proprietary firm:
 - (c) A firm in partnership:
 - (d) A limited company or Corporation:
5. Particulars of registration with various Government Bodies (attach attested photocopy)

Organization / Place of Registration No.

- 1.
- 2.
- 3.
6. Names and titles of Directors & Officers with designation to be concerned with this work.
7. Designation of individuals authorized to act for the organization
8. Has the bidder, or any constituent partner in case of partnership firm, ever been convicted by the court of law? If so, give details.
9. Any other information considered necessary but not included above.

(Signature of Bidder(s))

5.6 Declaration on Details of the Bidders

Proforma of Declaration on Details of the Bidders

(To be printed in Company's Letterhead)

(Scanned copy of the Performance Reports to be uploaded at the time of submission of bid)

DECLARATION

I/We, hereby declare that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I/we have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification.

Particulars of the bidder as per following details:

1	Name of the firm / organization	:	
2	Type of the firm / organization: Public Ltd. / Private Ltd. / Registered firm	:	
3	Registered address	:	
4	Address of office	:	
5	Contact people	:	
6	Name & Designation	:	
7	Landline & Mobile numbers	:	
8	E-mail IDs	:	
9	PAN No.	:	
10	GST No.	:	
11	EPFO Reg. No.	:	
12	ESIC Reg. No.	:	
13	Copy EMD receipt with signature	:	Yes/ No
14	Has the applicant ever been required to suspend any project for a period of more than six months continuously after Commencement of work?	:	If so, give the name of the project and reasons of suspension of project
15	Has the applicant ever been convicted by a court of law?	:	YES / NO, If yes, give details of the case
16	Details of any litigation in which the applicant is/was involved.	:	
17	All forms submitted as desired in the bid	:	Yes / No

18 Undertaking regarding no subletting of :
work

We further declare that our organization has not been blacklisted /delisted or put to any holiday by any Institutional agency / Govt. Department / Public Sector Undertaking in the last three years.

Date:

Signature of Bidder(s) with seal

5.7 Details of Similar Nature of Works Completed

Proforma for submission of Details of Eligible Similar Nature of Works Completed* during the Last Seven Years ending previous day of the last date of submission of tenders

The contractor needs to submit the supporting documents in the following tabular format:

Sr.No.	Name of work/project and location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation / arbitration cases / progress with details*	Name and address/ telephone number of officers to whom reference maybe made	Whether the work was done on back to back basis Yes / No
1	2	3	4	5	6	7	8	9	10

* Indicate gross amount claimed and amount awarded by the Arbitrator.

Date:

Signature(s) of Bidder with seal

5.8 Declaration About Site Inspection

Declaration about Site Inspection

(By Bidder)

To

The Superintending Engineer

Subject: Submission of Tender for the work of “SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur..”

Dear Sir/Madam,

It is hereby declared that as per terms and conditions of this tender document, I/ We the bidder inspected and examined the subject site and its surrounding and satisfy myself / ourselves as to the nature of the ground and sub-soil (so far as is practicable), the forms and nature of the site./ ourselves before submitting the bid, the accommodation which may require and all necessary information as to risks, contingencies and other circumstances which may influence or affect our bid have been obtained. I/We the bidder shall have full knowledge of the site and no extra charge consequent upon any misunderstanding or otherwise shall be claimed in later date. I /We bidder shall be responsible for arranging and maintaining at own cost all materials,tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by me/us implies that I / We have read this notice and all other contract documents and has made myself /ourselves aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

Sincerely

(Duly authorized signatory of the Bidder)

5.9 Certificate for Tender

(To be given on Company Letter Head)

Date:

To,
Superintending Engineer
IIT Kanpur-208016

Sub: Certificate of compliance as per Rule 144 (xi) GFR's 2017

Tender Reference No:

Name of Tender / Work:

1. "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]"
2. "I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that this bidder fulfills all the requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority shall be attached.]"

Yours Faithfully,

(Signature of the Bidder, with Official Seal)

5.10 Tender Acceptance Letter

(To be given on Company Letter Head)

To,
Superintending Engineer
IIT Kanpur-208016

Date:

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No:

Name of Tender / Work:

Dear Sir,

- 5.10.1 I / We have downloaded / obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely:as per your advertisement, given in the above mentioned website(s).
- 5.10.2 I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No..... to (including all documents like annexure(s), schedule(s), etc .), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.
- 5.10.3 The corrigendum(s) issued from time to time by your department/ organisation too have also been taken into consideration, while submitting this acceptance letter.
- 5.10.4 I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.
- 5.10.5 I / We do hereby declare that our Firm has not been blacklisted/ debarred/ terminated/ banned by any Govt. Department/Public sector undertaking.
- 5.10.6 I / We certify that all information furnished by our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organization shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

(Signature of the Bidder, with Official Seal)

5.11 Letter of Transmittal

To

The Superintending Engineer
Indian Institute of Technology Kanpur
Kanpur, UP - 208016

SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur.

Dear Sir/Madam

Having examined details given in Notice and bid document for the above work, I/we hereby submit the relevant information.

- 5.11.1 I/We hereby certify that all the statements made and information supplied in the enclosed forms and accompanying statement are true and correct.
- 5.11.2 I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
- 5.11.3 I/We also authorize the Executive Engineer, Indian Institute of Technology Kanpur or his representative(s) to approach individuals, employers, firms and corporation to verify our competence, work experience, and general reputation.
- 5.11.4 I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible completed works:

Sl. No.	Name of work	Amount	Certificate issued by
1.			
2.			
3.			
4.			

CERTIFICATE

It is certified that the information given in the enclosed eligibility bid are correct. It is also certified that I/We shall be liable to be debarred, disqualified/ cancelation of enlistment in case any information furnished by me/us found to be incorrect.

Enclosures:

Date of submission:

Signature(s) of Bidder with seal

5.12 CPWD-7

CPWD-7

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the “SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur..”

- 5.12.1 To be uploaded as per details uploaded in CPP portal at www.eprocure.gov
- 5.12.2 To be opened in the presence of tenderers who may be present at the time of opening in the office of Executive Engineer, Institute Works Department IIT Kanpur.
- 5.12.3 The pre-qualification/Technical bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.

TENDER

(To be signed in Company's Letterhead)

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F Specifications applicable, Drawings & Designs, General Rules and Directions, General Conditions of Contract (For construction works) 2023, CPWD SOP 2024 corrected up to the last date of bid submission, CPWD works manual 2024 corrected up to the last date of bid submission and clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Board of Governors within the time specified in Schedule 'F' viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.

We agree to keep the tender open for Ninety (90) days from the due date of its opening and not to make any modification in its terms and conditions.

A sum of **Rs. 19,201/-** is here by forwarded in receipt treasury challan/ Deposit as call receipt of a scheduled bank / Fixed deposit receipt of scheduled bank/ Demand draft of a scheduled bank/ bank guarantee issued by scheduled bank as earnest money deposit. If I/we, fail to furnish the prescribed performance guarantee or fail to commence the work within prescribed period, I/ we agree that the said Board of Governors, IIT Kanpur or his successors in office shall without prejudice to any other right or remedy to be at liberty to forfeit the said earnest money absolutely. Further, if I/we fail of commence the work as specified , I/we agree that Board of Governors , IIT Kanpur or his successor in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by him towards security deposit to execute all the works referred to the tender documents upon the terms & condition contained or referred to therein and to carry out such deviations as may be ordered, up to maximum of the percentage mentioned in schedule "F" and those in excess of that limit at the rates to be determined in accordance with the provision contained in clause 12.2 and 12.3 of the tender form.

Further, If I/we, withdraws tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department after the last date of submission of bids, then the Institute shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money

absolutely irrespective of letter of acceptance for the work is issued or not.

Further, I/we agree that in case of forfeiture of earnest money or both earnest money & performance guarantee as aforesaid, I/we shall be debarred for participation in the retendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for tendering in Indian Institute of Technology Kanpur in future forever. Also, if such a violation comes to the notice of Indian Institute of Technology Kanpur before date of start of work, the **Superintending Engineer** shall be free to forfeit the entire amount of Performance Guarantee.

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 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 & integrity of IIT Kanpur

Date:

Signature(s) of Contractor(s) with seal

Address:

Occupation:

Yours Faithfully,

5.13 Financial Information

Proforma for providing Financial Information

(Scanned copy of the completed information sheet to be uploaded at the time of submission of bid)

Financial Analysis: Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last three financial years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Financial Years	2021-22	2022-23	2023-24
Gross Annual turnover			
Profit/Loss			

.....
Signature of Chartered Accountant with Seal

.....
Signature of the bidders(s)

6 Proforma of Schedules

PROFORMA OF SCHEDULES

(Tender)

6.1 SCHEDULE 'A': Schedule of Quantities

Schedule of Quantities : BOQ uploaded separately

6.2 SCHEDULE 'B': Schedule of materials to be issued to the contractor

Schedule of materials to be issued to the contractor: NIL

6.3 SCHEDULE 'C': Tools and plants to be hired to the contractor

Tools and plants to be hired to the contractor: NIL

6.4 SCHEDULE 'D': Extra schedule for specific requirements/document for the work, if any

Extra schedule for specific requirements/document for the work, if any: NIL

6.5 SCHEDULE 'E': Reference to General Conditions of Contract

Reference to General Conditions of Contract	:	General Conditions of Contract 2023 for Construction Works & Maintenance work and as amended / modified up to the last date of submission of Bid.
---	---	--

Name of Work	:	“SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur.”
--------------	---	--

Total Estimated cost of work	:	Rs. 9,60,056/-
------------------------------	---	----------------

Earnest Money	:	EMD Rs. 19,201/-
---------------	---	------------------

Performance Guarantee	:	5% of tendered value
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Security Deposit	:	2.5% of tendered value will be deducted from bill. Same would be released after successful completion of One year defect liability period and as mentioned in special conditions of the contract.
------------------	---	---

6.6 SCHEDULE 'F': General Rules and Directions

GENERAL RULES & DIRECTIONS:

Officer Inviting tender: Superintending Engineer, IWD

6.6.1 Definitions

1 Inviting Authority	:	Executive Engineer, IWD
2(v) Engineer-in-Charge	:	Executive Engineer
2(viii) Accepting Authority	:	EE/SE/DOIP
2(x) Percentage on cost of materials and Labour to cover all overheads and profits	:	15%
2(xi) Standard Schedule of Rates	:	DSR E & M, 2023 & MR with correction slips up to the last date of Bid
2(xii) Department	:	Institute Works Department, IITKanpur
9(ii) Standard CPWD Contract Form	:	General Conditions of Contract 2023, SOPs 2024, CPWD Form 7 as amended / modified up to the last date of submission of Bid.

6.6.2 Clauses

Clause 1

i. Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW welfare board or proof of applying thereof from the date of issue of the letter of acceptance : **7 days**

ii. Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the Period provided in (i) above : **7 days**

Clause 1A : **Applicable. The Defect liability period shall be One year from the date of handing over of the assigned works to the user/Institute**

Clause 2

Authority for fixing compensation under Clause 2 : Superintending Engineer, IIT Kanpur

Clause 2A

Whether Clause 2A shall be applicable : YES

Clause 5	:	
(i): Number of days from the date of issue of letter of acceptance for reckoning date of start	:	15 Days
ii: Milestones	:	Time allowed for execution of work alongwith the amount to be withheld in case of non-achievement of milestone are shown in Tables 6
Clause 6: Computerized Measurement Bill	:	Applicable
Clause 7	:	Applicable
Clause 10A	:	Applicable
Clause 10B (ii)	:	Not Applicable
Clause 10B (iii)	:	Not Applicable
Clause 10C	:	Not Applicable
Clause 10CA	:	Not Applicable
Clause 10CC	:	Not applicable
Clause 11	:	CPWD Specifications of all items(CPWD specification vol.1 and vol.2,2019), with correction Slips issued up to the last date of receipt of tenders and as per NIT for the Works .
Clause 12: Type of work	:	Original Work
Clause 12.2 & 12.3: Deviation limit beyond which clause 12.2 & 12.3 shall apply for Building work	:	NA
Clause 16 Competent Authority for deciding reduced rates: For Civil items and For Electrical items of work	:	As per Table 7
Clause 17 - Defect liability period completion of contract whichever is later	:	One year and those listed in Special Conditions of Contract
Clause 18 - List of mandatory machinery, tools & plants to be deployed by the contractor at site	:	As per the scope of the work
Clause 32 - Requirement of Technical Representative(s)	:	As per Table 9

If the Contractor commits default in commencing the execution of the work as aforesaid, the performance guarantee shall be forfeited.

Table 6: Major milestones of the project

Sl. No.	Description of Milestone (Physical)	Time allowed from date of start	Maximum Duration of work	Amount to be withheld in case of non-achievement of milestone(% of composite tendered amount)
1	SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur.	8 weeks	8 weeks	1.0

The detailed program chart approved by the engineer-in-charge shall indicate how the resources will be deployed by the contractor to maintain desired progress and for the completion of the work within the specified period. If the submitted program is approved, the milestone shall be redefined accordingly by the [Superintending Engineer, IWD Indian Institute of Technology Kanpur](#). The amount to be withheld in such a case, for non-achievement of milestone(s), shall remain unaltered i.e., 1% of tendered amount.

Time allowed for execution of work: Two (2) months

Table 7: Authority to decide

(i)	Extension of time (EOT)	:	EE, IIT Kanpur
(ii)	Rescheduling of milestones	:	Superintending Engineer, IWD, IIT Kanpur
(iii)	Shifting of date of start in case of delay in handing over of site	:	Superintending Engineer, IWD, IIT Kanpur

Table 8: Materials for which all India Wholesale Price Index to be followed

Sl.No	Material covered under this clause	Nearest Materials (other than cement, reinforcement bars and the structural steel) for which All India Wholesale Price Index to be followed	Base Price (without GST) of Materials, covered under clause 10 CA
	Portland Pozzolana		
1	Cement (PPC)/ Ordinary Pozzolana Cement	Nil	Nil
2	Steel for Reinforcement TMT Fe 500D Primary	Nil	
3	Manufacturer Structural Steel (Primary producers)	Nil	Nil

Table 9: Requirement of Technical staff as per Clause 32

Sl. No.	Qualification	Number	Minimum Experience in Year	Designation	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of Clause 32
1	Graduate/ Diploma (Electrical/ Mechanical)	1	5 Yrs	Project Planning/ Construction/ Quality/ Billing Engineer (Elect/Mech)	Rs. 15000 (Rupees Fifteen Thousand only) per month, per person

Note: Project/Site Engineer for Electrical/AC work mentioned must be required from the beginning of the work to meet the date of handover of site as per special terms and conditions. The details of the appointed site engineers have to be verified and approved by Engineer-in- Charge.

7 Scope of work

7.1 Brief of the works

SITC of 2 x 10 HP variable refrigerant volume (VRV) type AC system for Health center at IIT Kanpur.. In BOQ.

Note: The scope of the works listed above is indicative only. For the details of the works, please refer to the BoQ and the work has to be done strictly as per the specifications in the BoQ.

7.2 Materials Verification

The contractor shall inform the Engineer in charge in advance, for verifying the measurement of the concealed items like pipes, pipes laying, cable laying etc., done by the contractor on the very day of the above said events.

1.1 Technical Specifications for HVAC Works

PACKAGED TYPE AIR CONDITIONING PLANTS AND VARIABLE REFRIGERANT FLOW/ VOLUME SYSTEM

7.2.1 *Dx-TYPE AIRCOOLED VARIABLE REFRIGERANT FLOW UNIT*

Scope: The scope of this section comprises of supply, installation, testing and commissioning of self contained air cooled split type variable refrigerant flow packages each comprising of an outdoor and multiple indoor ductable/non-ductable cassette type units conforming to these specifications and in accordance with the requirement of drawings and schedule of quantities.

Outdoor Unit:

Outdoor unit shall be factory assembled, good for outdoor installation, constructed out of heavy gauge MS panels with weather proof painting. The units shall be factory wired with necessary controls duly tested prior to dispatch conforming to the following specifications.

- a. The outdoor unit shall consist of multiple scroll compressors, all with DC inverter drive of variable speed, capable to operate even when one compressor is unserviceable.
- b. The units shall be provided with duty cycling arrangement for multiple inverter compressors.
- d. The outdoor unit shall be modular in design to facilitate installation one after another close to each other. Preference would be given to compact units having smaller footprint.
- e. Outdoor units should be rugged of anti-corrosion design.
- f. The outdoor unit shall comprise of sub cooling feature to effectively use the entire coil surface through proper circuit/bridge in order to prevent flushing of refrigerant owing to large length of piping.
- g. The condensing unit shall be provided with state-of-the-art microprocessor based control panel.

The outdoor unit shall be provided with Aero spiral design fan exhibiting low noise level characteristics complete with aero fitting grille to facilitate spiral discharge of airflow to effect reduction in pressure losses. The fan should be capable to respond to external static pressure of 5mm.

The condensing unit shall be designed to facilitate fail safe operation when connected to multiple indoor units.

Following safety devices shall be integral part of the outdoor unit: a. High pressure switch
b. Fan drive overload protection switch c. Fusible plug Overload relay including overload protection for inverter driven compressor.

Scroll Compressor:

The scroll compressor shall be an industrial quality rugged, cast iron, direct hermetic compressor with scroll plates, suction & discharge service valves. The compressor shall be complete with straight suction tube, centrifugal oil pump, oil charging valve, oil level sight glass, crank case heater and check valve on the scroll discharge port. The compressor shall be complete with the provision of two-point lubrication for each motor bearing. The compressor shall be completely enclosed in a chamber with no leakage path and providing the capability for scroll plates to separate. The compressor shall be provided with industrial solid motor mounts internal motor protection and vibration isolation pads. Each compressor shall be independently wired and piped to its own circuit for efficient operation & ease of maintenance. The compressor speed shall not exceed 3000 RPM.

The compressor shall be capable of functioning with inverter control. The inverter driven compressor shall preferably be with reluctance DC inverter for higher efficiency and reliability.

Condenser

Condenser shall be air-cooled type, suitable for outdoor installation and shall be suitable for operating at 46 deg C db and 24 deg C wb temperatures. Condenser shall be in copper tube & aluminium fin construction. Condenser coil shall be of minimum 4 rows deep and the fin spacing shall not exceed 2mm. The maximum face velocity across the coil shall not exceed 215 MPM. The condenser frame shall be constructed from heavy duty galvanized steel.

The condenser fan/s shall be of propeller type with 900 RPM variable voltage electric motor complete with IP-55 protection. Motor shall be speed controlled to ensure a stable operation for varying ambient, by a factory fitted direct acting head pressure activated variable speed drive. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied.

Anti Corrosion Protective Treatment associated with Condensing Units, piping, Joints and U bends & refrigerant piping between outdoor and indoor units.

All interconnecting piping, joints and U bends within the condensing unit shall be painted with two coats of clear transparent polymer coating for protection against corrosion from ambient air pollution.

Two coats of protective coating shall be applied. Each coat shall have dry film thickness of 35 micron or more. The coating shall be strong, flexible and durable. It shall have good

adhesive and abrasion resistance. It shall be resistant to moisture, UV, acid, alkali and other chemicals and capable of functioning between -250 C and 1500 C.

The polymer shall be obtained by the mixing of base / monomer with a hardener / polymerizer. It may brush applied or with the use of a suitable gun.

7.3.2 REFRIGERANT PIPING (VRF)

- (a) The copper refrigerant piping shall be carried out neatly to connect outdoor and group of indoor units and shall run along with wires/cables. The refrigerant piping shall be carried out using hard drawn copper pipes & ready made copper fittings for pipe diameter exceeding 19mm. Piping less than 19mm shall be carried out using soft seamless copper pipes. Joints shall be affected by soldering/brazing process using silver rods. Suitable sleeves shall be provided at all wall crossings as required. The refrigerant circuit shall include liquid line and gas shut-off valves besides solenoid valve at the end of condenser. The refrigerant piping shall be carefully sized with necessary headers and should consist of accessories including Y-joints.
- (b) After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at pressure of 21Kg/ Sqcm. Pressure shall be maintained in the system for 24 hours. The system shall then be evacuated to minimum vacuum equivalent to 700mm Hg and held for another 24 hours prior to commencement of gas charging.
- (c) All refrigerant pipes shall be properly supported and anchored on the cable tray, which in turn be supported to the building structure using steel hangers, anchors, brackets and supports which shall be fixed to the building element by means of inserts or expansion shields of adequate size and number to support the load imposed thereon.
- (d) The liquid and suction refrigerant lines including all fittings, valves, strainer etc. shall be insulated with 13 mm thick closed cell elastomeric insulation material preferably in tubing form as specified in Schedule of Quantities.
- (e) To protect nitrile rubber insulation associated with exposed copper piping from degrading due to ultra violet rays & atmospheric conditions, it shall be covered with polysield coating. Fiberglass tape shall be helically wrapped & applied with two coats of resin with hardener to give smooth finish.
- (f) The recommended wall thickness of copper pipes being used for VRF application using high pressure refrigerant, R 410 a, is as under:
- (g) The VRF indoor unit will be cassette (ceiling type) & split hi wall mounted type of nominal capacity as mentioned in the BOQ.
- (h) Machine will be operable on 380 415 volts, 3 phase, 50 Hz power supply with double earthing through proper isolator/MCB in each outdoor unit & 220+6% volt, 1 phase, 50 Hz stabilized power supply with double earthing in each VRF indoor units through proper switch.
- (i) The quantities of each item mentioned in schedule of quantities shall be on the measureable basis, any upward/downward variation shall be derived at the basis of unit rate of the corresponding item.

Copper Pipe dia (mm)	Outer	Copper tube wall thick- ness (mm) (Min. re- quirement)
Dia 6.4		0.8
Dia 9.5		0.8
Dia 12.7		0.8
Dia 15.9		1
Dia 19.1		0.8
Dia 22.2		0.8
Dia 25.4		0.88
Dia 28.6		0.99
Dia 31.8		1.10
Dia 34.9		1.21
Dia 38.1		1.32
Dia 41.3		1.43

7.3.3 DUCT WORK AND OUTLETS

(j) General:

The work under this part shall consist of furnishing labour materials, equipment and appliances as specified necessary and required to install all sheet metal and other allied work to make the air conditioning supply, ventilating, and exhaust system ready for operation as per drawings.

Except as otherwise specified all duct work and related items shall be in accordance with these specifications.

Duct work shall mean all ducts, casings, dampers, access doors, joints, stiffeners and hangers.

(k) Duct Materials:

The ducts shall be fabricated from galvanized steel sheets class VIII conforming to ISS:277- 1962 (revised) or aluminium sheets conforming to ISS:737-1955 (wherever aluminium ducts are specified).

All duct work, sheet metal thickness and fabrication unless otherwise directed, shall strictly meet requirements, as described in IS:655-1963 with amendment-I (1971 edition)

The thickness of the sheet shall be as follows :-

The gauges, joints and bracings for sheet metal duct work shall further conform to the provisions as shown on the drawings.

Ducts larger than 600 MM shall be cross broken, duct sections upto 1200 MM length may be used with bracing angles omitted.

Changes in section of duct work shall be affected by tapering the ducts with as long a taper as possible. All branches shall be taken off at not more than 45 DEG. Angle from the axis of the main duct unless otherwise approved by the Engineer-In-Charge.

Size of Duct	Sheet Thickness		Type of Joints	Bracing if any
Upto 750 mm	0.63 mm	24 Ga	G.I. Flange	
751 mm to 1000 mm	0.80 mm	22 Ga	25x25x3 mm Angle iron frame with 8 mm dia nuts & bolts	25x25x3 mm at the rate of 1.2 M from joints
1001 mm to 1500 mm	0.80 mm	22 Ga	40x40x5 mm Angle iron frame with 8 mm dia nuts & bolts	40x40x5 mm at the rate of 1.2 M from joints
1501 mm to 2250 mm	1.00 mm	20 Ga.	50x50x5 mm Angle iron frame with 10 mm dia nuts & bolts at 125 mm centre.	40x40x3 mm at the rate of 1.2 M to be Braced Diagonally
2251 mm and above	1.25 mm	18 Ga.	50x50x6 mm Angle iron frame with 10 mm dia nuts & bolts at 125 mm centre.	40x40x3 mm at the rate of 1.6 M from joints

All ducts shall be supported from the ceiling/slab by means of M.S. Rods of 9 MM (3/8")DIA with M.S. Angle at the bottom. The rods shall be anchored to R.C. Slab using metallic expansion fasteners.

(l) Installations During the construction, the contractor shall temporarily close duct openings with sheet metal covers to prevent debris entering ducts and to maintain opening straight and square, as per direction of Engineer-In-Charge.

- Great care should be taken to ensure that the duct work does not extend outside and beyond height limits as noted on the drawings.
- All duct work shall be of high quality approved galvanized sheet steel guaranteed not to crack or peel on bending or fabrication of ducts. All joints shall be air tight and shall be made in the direction of air flow.

The ducts shall be re-inforced with structured members where necessary, and must be secured in place so as to avoid vibration of the duct on its support.

- All air turns of 45 degrees or more shall include curved metal blades or vanes arranged so as to permit the air to make the abrupt turns without an appreciable turbulence. Turning vanes shall be securely fastened to prevent noise or vibration.
- The duct work shall be varied in shape and position to fit actual conditions at building site. All changes shall be subjected to the approval of the Engineer-In-Charge. The contractor shall verify all measurements at site and shall notify the Engineer-In-Charge

of any difficulty in carrying out his work before fabrication.

- Sponge rubber or approved equal gaskets of 6 MM maximum thickness shall be self adhesive installed between duct flanges as well as between all connections of sheet metal ducts to walls, floor columns, heater casings and filter casings. Sheet metal connections shall be made to walls and floors by means of wooden member anchored to the building structure with anchor bolts and with the sheet screwed to them.
- Flanges bracings and supports are to be black, mild steel and are to be painted with rust proof primer on all surfaces before erection. Accessories such as damper blades and access panels are to be of materials of appropriate thickness and the finish similar to the adjacent ducting, as specified.
- Joints, seams, sleeves, splitters, branches, takeoffs and supports are to be as per duct details as specified, or as decided by Engineer-In-Charge.
- Joints requiring bolting or rivetting may be fixed by Hexagon nuts and bolts, stove bolts or buck bolts, rivets or closed centre top rivets or spot welding. Self tapping screws must not be used. All jointing material must have a finish such as cadmium plating or Galvanized as appropriate.
- Fire retarding flexible joints are to be fitted to the suction and delivery of all fans. The material is to be normally double heavy canvass or as directed by Engineer-In-Charge. On all circular spigots the flexible materials are to be screwed or clip band with adjustable screws or toggle fitting. For rectangular ducts the material is to be flanged and bolted with a backing flat or bolted to mating flange with backing flat.
- The flexible joints are to be not less than 75 MM and not more than 250 MM between faces.
- The duct work should be carried out in a manner and at such time as not to hinder or delay the work of the other agencies especially the boxing or false ceiling contractors.
- Duct passing through brick or masonry, wooden frame work shall be provided within the opening. Crossing duct shall have heavy flanges, collars on each side of wooden frame to make the duct leak proof.

(m) Dampers

- At the junction of each branch duct with main duct and split of main duct, volume dampers must be provided. Dampers shall be two gauges heavier than the gauge of the large duct and shall be rigid in construction.
- The volume dampers shall be of an approved type, lever operated and completed with locking devices which will permit the dampers to be adjusted and locked in any positions and clearly indicating the damper position.
- The dampers shall be of splitter, butterfly or louver type. The damper blade shall not be less than 1.25 MM (18) Gauge, reinforced with 25 MM angles 3 MM thick along any unsupported side longer than 250 MM. Angles shall not interfere with the operation of dampers, nor cause any turbulence.
- Automatic and manual volume opposed blade dampers shall be completed with frames and bronze bearings as per drawings. Dampers and frames shall be constructed of 1.6 MM steel sheets and blades shall not be over 225 MM wide. The dampers for

fresh air inlet shall additionally be provided with fly mesh screen, on the outside, of 0.8 MM thickness with fine mesh.

- Wherever require for system balancing, a volume balancing opposed blade damper with quadrant and thumb screw lock shall be provided.
- After completion of the duct work, dampers are to be adjusted and set to deliver air flow as specified on the drawings.

(n) Fire Dampers

- Automatic fire dampers shall be provided wherever shown on the drawings. The damper shall be multi blade louvre type. The blades should remain in the air stream in open position and shall be constructed with minimum 1.8 MM thick galvanised sheets. The frame shall be of 1.6 MM thickness. Other materials shall include locking device, motorised actuator, control panel to trip AHU motor etc.
- The fire dampers shall be capable of operating automatically on receiving signal from a fire alarm panel. All control wiring shall be provided between fire damper and electric panel.

(o) Access panel

A hinged and gasketed access panel measuring at least 450 MM x 450 MM shall be provided on duct work before each reheat coil and at each control device that may be located inside the duct work.

(p) Miscellaneous

- All duct work joints are to be true right angle and with all sharp edges removed.
- Sponge rubber gaskets also to be provided behind the flange of all grilles.
- Each chute from the duct, leading to a grille, shall be provided with an air deflector to divert the air into the grille through the shoot.
- Diverting vanes must be provided at the bends exceeding 600 MM and at branches connected into the main duct without a neck.
- Proper hangers and supports should be provided to hold the duct rigidly, to keep them straight and to avoid vibrations. Additional supports are to be provided where required for rigidity or as directed by Engineer-In-Charge.
- The ducts should be routed directly with a minimum of directional change.
- The duct work shall be provided with additional supports/hangers, wherever required or as directed by the Engineer-In-Charge, at no extra cost.
- All angle iron flanges to be welded electrically and holes to be drilled.
- All the angle iron flanges to be connected to the GSS ducts by rivets at 100 MM centres.
- All the flanged joints, to have a sponge rubber packing stuck to the flanges with suitable adhesive.
- The G.S.S. ducts should be lapped 6 MM across the flanges.

- The ducts should be supported by approved type supports at a distance not exceeding 2.0 Metres.

(q) Standard Grilles

The supply and return air grilles shall be fabricated from extruded aluminium sections. The supply air grilles shall have single/double louvers. The front horizontal louvers shall be of extruded section, fixed/adjustable type. The rear vertical louvers where required shall be of aluminum extruded sections and adjustable type. The return air grille shall have single horizontal extruded section fixed louvers. The grilles may or may not be with an outer frame.

The damper blades shall also be of extruded aluminium sections. The grill flange shall be fabricated out of aluminium extruded section. Grilles longer than 450 MM shall have intermediate supports for the horizontal louvers.

(r) Diffusers

- The ceiling type square diffusers shall be of aluminum extruded sections with flush or step down face, as specified with fixed pattern and neck.
- All supply diffusers shall be provided with extruded aluminium dampers, with arrangement for adjustment from the bottom.
- The slot diffusers shall be of aluminium extruded sections with diffusion plate and sliding damper.

(s) Linear Diffusers/Grilles

- The linear diffusers/grilles shall be fabricated from Aluminium extruded sections.
- The diffusion blades shall be extruded, flush mounted type with single or double direction air flow.
- The frame shall be of aluminum extruded section and shall hold the louvers tightly in fixed position.
- The dampers as described under grilles shall be provided wherever specified.

(t) Exhaust Grilles

The exhaust grilles shall be fabricated from aluminum extruded sections.

The exhaust grilles shall be horizontal fixed bar grilles with 150 blade inclination.

(u) Sensor Terminal

Sensor mounting terminal with cap shall be provided for taking temperature, pressure or other measurement in ducts or AHUs.

The terminal shall be fabricated from gun metal stock, duly threaded with check nut, nut and washers.

(v) Painting and Vision Barrier

All grilles, and diffusers shall be powder coated, before installation, in approved colour.

All ducts immediately behind the grilles/diffusers etc. are to be given two coats of black paint in matt finish.

The return air and dummy portion of all linear grilles shall be provided with a vision barrier made of 24 gauge galvanised sheets. The vision barrier shall be fixed to the false ceiling frame with self tapping screws and shall be given two coats of black paint in matt finish. Care shall be taken to ensure that the return air path is not obstructed.

(w) Testing

After completion, all duct system shall be tested for air leakage.

The entire air distribution system shall be balanced to supply the air quantity as required in various areas and the final tabulation of air quantity through each outlet shall be submitted to the Engineer-In-Charge for approval.

7.3.4 INSULATION

7.3.4.1 General

The Insulation of water piping, air handling units, ducting, chillers & refrigerant piping etc., shall be carried out as per specifications given below:

7.3.4.2 Materials

The materials to be used for insulation shall be as follows, unless some other material is specifically mentioned elsewhere. The detailed specifications of the materials are listed under respective sub heads.

Pipe Insulation : Rigid Polyurethane Foam (PUF) Drain Pipe Insulation : Polyethylene Foam (Kinney Foam) Duct Insulation : Resin Bonded glass wool Acoustic Treatment : Resin Bonded glass wool Equipment Insulation : Expanded Polystyrene (SE) (EP). Refrigerant Pipe : Nitrile rubber insulation

7.3.4.3 Duct Insulation

The materials for duct insulation shall be resin bonded fibre glass, as described earlier but conforming to I.S. 8183 of 1976. The density of insulation shall not be less than 24 kg/cubm and material shall be in the form of blankets/rolls of uniform thickness. The 'K' value at 10o C. Shall not be less than 0.031 W/mK. It shall be factory faced with aluminium foil on one side reinforced with kraft paper and fused to the insulation material. The thickness of duct insulation shall be as follows : a. Duct in conditioned space - 25 mm thick b. Duct in unconditioned space - 50 mm thick

7.3.4.4 Acoustic Treatment

The material for acoustic treatment of ducts, rooms, roofs etc. shall be resin bonded fibre glass, as described earlier, conforming to I.S. 8183 of 1976. The density of fibre glass shall be 32 kg/cub.m and the material shall be in the form of boards of uniform density. The 'k' value at 10oC shall not be less than 0.03 W/mK. Facing shall be provided with 0.5 mm perforated aluminium sheet held with G.I. Nuts bolts or nailed to the batten work as required. The thickness of insulation shall be as follow unless otherwise specified elsewhere:

a. Duct Acoustic : 25 MM b. Room Acoustic : 50 MM

7.3.4.5 Installation

7.3.4.5.1 Drain Piping

The pipe shall be thoroughly cleaned with a wire brush and rendered free from all rust and grease. Coat the pipe with one layer of red oxide primer. Then two layer of 6mm thick insulation shall be wrapped on the pipe. Then it shall be tied with 1 mm thick G.I. wires.

7.3.4.5.2 Ducting

Clean the surface with a wire brush and make it free from rust and oil. Apply two coats of CPRX compound on the cleaned surface. Wrap the duct with insulation blankets of the thickness mentioned in item 3.3.2 above and covered with 0.63 mm/19 mm wire mesh netting on the outside. The joints shall be sealed with aluminium tape before covering with wire netting. The Ducts in areas exposed to the weather shall be additionally covered with one layer of tar felt B.H. The tar felt shall be stuck with Hot Bitumen.

7.3.4.5.3 Duct Acoustic Lining

The duct surface shall first be cleaned from inside. Then 25 mm square section made of 18 Ga (1.2 mm) thick G.I. sheet should be fixed on both ends of the duct piece. The insulation slabs should be fixed between these sections of ducts using adhesive compound and stick pins. The insulation shall the be covered with RP tissue, sealing all joint so that no fibre is visible. The insulation shall then be covered with 0.5 mm perforated aluminium sheets. The sheet of insulation shall be secured to the duct by means of stick pins as mentioned above.

7.3.4.5.4 Equipment

The surface shall first be cleaned with wire brush. Then two layers of hot bitumen shall be applied. The insulation shall then be fixed in one layer and sealing them with hot bitumen. The insulation shall then be covered with 0.63 mm/ 19 mm mesh wire netting which shall be fixed to the insulation with brass 'U' nails. The final finish shall be 0.50 mm aluminium cladding.

7.3.4.5.5 Room Acoustic

Fix 40 mm x 50 mm G.I. channels at 0.5 metre interval longitudinally then fix cross battens at 1.0 metre centre using suitable gutties, and brass screws. Fill each rectangle with 50 mm glass wool and covered with RP tissue. Tie with 24 gauge G.I. Wires at 300 mm intervals. Then cover with 22 gauge (0.80 mm) perforated Aluminium sheet having 3 mm perforations at 6 mm centres. Overlap all joints and provide beading of 25 mm by 2 mm flats. All corners joints shall be covered with 25 x 25 x 2 mm thick aluminium angles.

7.3.5 ELECTRIC CABLING

7.3.5.1 General:

The electric cable connections of motors and earthing of all equipments shall be carried out, as per specifications, given hereunder.

7.3.5.2 Cabling

7.3.5.2.1 The cabling of various equipment shall be carried using PVC Insulated and armoured cables.

7.3.5.2.2 The PVC armoured power cable for use on 415 volts system shall be 3 or 3.5 Core with aluminium conductors and be of 660/1100 volts grade, as per IS 1554 (Part I) 1964. The cross section of the cable shall be to suit the load and rating of the equipment. The cables shall be of aluminium conductor, PVC insulated, strip armoured with overall PVC sheathing.

The cables shall be laid as per IS-1255/1967, Indian standard code of practice. The cables shall be laid, as per drawings in the ducts/pipes/trays etc. along a short and convenient route between switch board and the equipment, (either in trenches, on wall or on hangers, supported from the slab). Cable routing shall be checked at the site of work to avoid interference with structure, equipment etc. Where more than one cables are running close to each other, proper spacing should be provided between them. The radius of bends of the cable should not be less than 12 times the overall dia. of cable in order to prevent undue stress and damage at the bends, the cables should be supported with wooden cleats on M.S. Supports, when laid in trenches, or wall/ceiling suspended hangers. When laid underground the cables should be covered with fine soft earth and protected with 2nd Class bricks. Suitable G.I. Pipe shall be used wherever cables are laid under the roads etc. Wooden bushes shall be provided at the ends of pipes through which cables are connected through.

7.3.5.3 Surface Wiring

7.3.5.3.1 The surface wiring shall be cased in conduits which shall be of 1100 volts grade and conform to IS 9587-1987 (revised to date) The conduits used shall be of high quality & all joints shall be made with sockets. The bends and elbows shall have inspection covers fixed with grease free screws. The joints shall be water tight. Approved metal saddles shall be used to secure the exposed conduits at a space of 1 meter or less. The connection of the conduits to switches etc., shall be secured by check nuts and ebonite bushes provided at the ends of conduits. The M.S. conduits shall be heavy duty and rigid type-ISI marked/conforming to IS specifications. The wall thickness shall not be less than 2 mm. For conduits above 32 mm dia. Metallic conduits of 19 mm dia. and below shall not be used. Conduit accessories (Boxes etc.) shall conform to IS-5133-1968 and IS-2667-64 (amended-revised to date). Conduit pipes shall be jointed, wherever necessary by means of screwed couples and screwed accessories only. In Long distance straight, run of conduits inspection type couplers at suitable intervals shall be provided. Threads on conduit pipes shall be between 13 mm to 19 mm long. The wiring shall be carried-out as per IS 732-1989 (Amended and revised to date).

7.3.5.3.2 Flush inspection covers shall be provided in case of Concealed, recessed conduits. The staples for the conduits shall not be spaced more than 0.60 meters apart. Before filling up the chase with concrete the conduits should be given a coat of rust proof paint.

7.3.5.3.3 The wires shall be drawn only after all the conduits have been properly fixed in position. Fish wires (steel wire : 16 SWG) shall be laid in conduits for drawing of wires subsequently.

7.3.5.4 Control Cabling/wiring

Control cables shall be 1100 volts grade, as per IS 1554, made from copper conductor of 1.5 Sq mm PVC insulated single Core, strip armoured with an overall PVC sheathing.

The cables and conduits wiring shall be carried out as per details given under 2.2 and 2.3 above.

7.3.5.5 Earthing : All equipment connected with electric supply shall also be provided with double earthing continuity conductors. The size of G.I. earthing conductors shall be :-

Size of phase wire sq.mm Aluminium	Size of G.I. conductor Tape/Wire (Swg)
185	25 mm x 6 mm (strip)
150	25 mm x 6 mm (strip)
120	25 mm x 6 mm (strip)
95	4 Swg
70	4 Swg
50	6 Swg
35	6 Swg
25-6	6 Swg
4	6 Swg

Note : Aluminium earthing conductors of equivalent Size may be used in lieu of GSS conductors mentioned above.

7.3.5.6 Miscellaneous

- 7.3.5.6.1 The final connections to the equipment shall be through Flexible connections in case of conduit wiring and also where the equipment is likely to be moved back and forth, such as on slide rails.
- 7.3.5.6.2 An isolator switch shall be provided at any motor which is separated from the main switch panel by a wall or partition or other barrier or is more than 15 metres away from the main panel.
- 7.3.5.6.3 Two separate and distinct earthing conductors shall be Connected from the equipment upto the main switch board panel.
- 7.3.5.6.4 The branch lines from the main panel to each equipment shall be separated and should not criss cross other lines.
- 7.3.5.6.5 The entire installation shall be tested as per Electricity rules and I.S.S. 732-1973 with amendments 1,2&3 prior to the commissioning of the plant and a suitable test report furnished by a competent and authorized person. The test report will be obtain by contractor himself at his own expenses.
- 7.3.5.6.6 All exposed switch board panels, conduits, hangers etc. shall be given 2 coats of suitable paint of approved colour, when all work has been completed.

7.3.6 TESTING AND COMMISSIONING

7.3.5.7 General

The contractor must perform all inspection and tests of the system as a whole and of components individually as required, under the supervision of the architect, in accordance with the provisions of the applicable ASHRAE standards or approved equal in addition to furnish necessary test certificates from manufacturers.

The system shall then be commissioned, tested and balanced to fulfil the intent and purpose for which it is designed.

In addition continuous Run Tests shall be carried out during peak weather condition.

7.3.5.8 Compressors Condensers/Chillers/Evaporators/Pumps etc.

Hydraulic test for various components and assembled equipments at 1.5 times design pressure or double the operating pressure, whichever is higher.

Pneumatic leak test after assemblies at design pressure

Static and dynamic balancing on electronic precision machine for rotating parts, links, impellor/ crank shaft assemblies etc.

Testing of oil passages in compressor at 1.5 times pump discharge pressure.

Pressure drop test for condenser, chiller and evaporator.

For compressor assembly, electronic leak, air running test, pneumatic test with dry nitrogen and leak test in water.

7.3.5.9 Air Handling Units

7.3.5.9.1 Blowers Dynamic/static balancing of impellers. Performance test as per applicable codes.

7.3.5.9.2 Coils Pneumatic test.

7.3.5.9.3 Filters Test of filter elements as per B.S. 2831 B.S. 1701 as applicable. This is to ascertain filtration efficiency by weight at inlet and outlet. Manufacturer's test certificates also to be produced for the assembled A.H.U. Final dimensional check will be done. Inspection may be done during assembly of components for quality of workmanship, painting etc.

7.3.5.9.4 Piping Materials check for specifications and size.

7.3.5.9.5 Valves Hydraulic./pneumatic test certificates.

7.3.5.9.6 Motors Manufacturer's test certificate as per motor data sheet.

7.3.5.9.7 Instruments and Controls Visual examination.

7.3.5.9.8 Special Note Vendor to note that above procedure is to be followed in addition to the specifications attached with the tender.

7.3.5.10 Associated Works at Site.

7.3.5.10.1 All electrical items will be subjected to inspection at any stage during manufacturing activity. Routine electrical test as per relevant codes. Inspection of manufacturer's test certificates.

- 7.3.5.10.2 Inspection of raw materials to be used for fabrication and assembly and inspection of manufacturer's certificates.
- 7.3.5.10.3 Inspection of welding including welders qualification as desired by inspection engineers. Inspection of fabricated items.
- 7.3.5.10.4 Pressure testing of pipe fittings used for the refrigerant and water and other services.
- 7.3.5.10.5 Pressure testing, leak testing of complete piping network for chilled water. (Condenser water and refrigerant/services).
- 7.3.5.10.6 Checking of electrical circuits (power & controls) and checking functioning of controls of refrigerant systems and other circuits of air conditioning plant.
- 7.3.5.10.7 Checking of calibration of controls and instrumentation
- 7.3.5.10.8 Checking of assemblies or electrical control panel, instruments panels, local panels (dimensional and functional) annunciator panels etc.
- 7.3.5.10.9 Inspection of complete electrical installation at site.
- 7.3.5.10.10 Performance testing of complete A.C. Plant as per specifications.

7.3.5.11 Vendor Responsibility

The above inspection procedure is given for general guidance and information of vendors. The inspection of purchaser/consultant is strictly not limited to these.

The inspection engineer of purchaser/consultant will have full right, to have detailed inspection at any stage right from placement of order to completion of project, as and when desired by inspection engineer.

Co-ordination of inspection agency of purchaser/consultant with his factory/subvendor's factory/erection site will be the sole responsibility of successful vendor, subsequent to placement of order for complete air conditioning plant, covered under these technical specifications.

7.3.5.12 Piping System

In general pressure tests shall be applied to piping only before connection of equipment and appliances. In no case shall piping, equipment or appliances be subjected to pressure exceeding their test ratings.

Tests shall be completed and approved before any insulation is applied.

After tests have been completed, the system shall be drained and cleaned of all dust and foreign matter. All strainers, valves and fittings shall be cleaned of all dirt, fittings, and debris.

Water Piping

All water piping shall be tested and proven tight under Hydrostatic pressure of 11 Kg/Cm (150 PSI) or 1.5 times the design pressure which ever is more unless stated otherwise in the specifications. The prescribed pressure shall be maintained for eight hours. In case leaks are detected, the pressure test will be repeated, after the repair of the leaks.

7.3.5.13 Duct Work

All branches and outlets shall be tested for air quantity, and the total of the air quantities shall be within plus five percent (5%) of fan capacity.

Fire dampers, volume dampers and splitter dampers shall be tested for proper operation.

7.3.5.14 Electrical Equipment

7.3.5.14.1 All electrical equipment shall be cleaned and adjusted on site before application of power.

7.3.5.14.2 The following tests shall be carried out: Cables and Wires continuity tests.

Insulation resistance tests, phase to phase and phase to earth, on all circuits and equipment, using a 500 Volts meggar. The meggar reading shall be not less than one megaohm.

Earth resistance between conduit system and earth must not exceed half (1/2) CMH.

Phasing out and phase rotation tests.

Operating tests on all protective relays to prove their correct operation before energising the main equipment.

Operating tests on all starters, circuit breakers etc.

7.3.5.15 Plant Audit & Certification work

7.3.5.15.1 The work of plant audit & certification shall be done by an approved outside agency.

7.3.5.15.2 The whole system balancing shall be tested with microprocessor based Hi-tech instruments with an accuracy of + 0.5

7.3.5.15.3 The instrument shall be capable of storing data and then downloading into a PC. The agency shall provide a minimum but not limited to the following instruments.

Microprocessor based velocity calculation meter to measure DB and WB temperature, RH and dew point.

Velocicalc meter to measure air volume and air velocity.

Pitot tube.

Electronic Rotary Vane Anemometer.

Accubalance Flow Measuring Hood.

7.3.5.15.4 The outside agency shall analyse all the data and shall be responsible for the capacity and performance audit and certification of the plant.

7.3.5.15.5 The successful Bidder shall be responsible to provide necessary sockets and connections for fixing of the Testing Instruments, probes etc.

7.3.5.16 Commissioning of the System

7.3.5.16.1 The system shall be commissioned by adopting the following procedure.

7.3.5.16.2 The installation as a whole shall be balanced and tested upon completion, and all relevant information, including the following shall be submitted to the architects.

Air volume passing through each unit, duct, grilles, apertures.

Static pressure in each air duct.

Water flow passing through each condenser, chiller, AHU etc.

Differential pressure readings across each filter, fan and coil, and through each pump.

Electrical current readings, in amperes of full and average load running and starting, together with name plate current of each electrical motor.

Continuous recording over a specified period, of ambient wet and dry bulb temperatures under varying degrees of internal heat loads and use and occupation, in each zone of each part of the building.

7.3.5.16.3 Daily records should be maintained of hourly readings, taken under varying degrees of internal heat load and use and occupation, of wet and dry bulb temperatures, upstream "On-Coil" of each cooling coil. Also suction temperatures and pressures for each refrigerating unit. The current and voltage drawn by each machine.

7.3.5.16.4 Any other readings shall be taken which may subsequently be specified by the architect.

7.3.5.17 Air Balancing

All air handling/ ventilation equipments, duct work and outlets shall be adjusted and balanced to deliver the specified air quantities, at each inlet and outlet as indicated on the drawings.

If these air quantities cannot be delivered without exceeding the speed range of the pulley or the available horse power, the architect shall be notified, before proceeding with the balancing of air distribution system.

A proper record shall be maintained as per Test Proforma given elsewhere.

7.3.5.18 Water Balancing

The output of water pumps shall be checked using the balancing valves, provided on the pumps, for this purpose, to ensure the output and pressures match the specified requirement.

Then flow to Condensers/Chillers, Air handling units etc. shall be individually adjusted and balanced to match the flow rate as given in specifications/ drawings to meet the requirement.

The balancing valves, provided on the equipments, shall be used for adjustment.

7.3.5.19 Miscellaneous

7.3.5.19.1 The above tests and procedures are mentioned herein, for general guidance and information only, but not by way of limitation to the provisions of conditions of contract and specification.

7.3.5.19.2 The date of commencement of all tests listed above, shall be subject to the approval of the architect and in accordance with the requirements of this specification.

7.3.5.19.3 The contractor shall supply the skilled staff and all necessary instruments and carry out any test of any kind on a piece of equipment, apparatus, part of system or on

a complete system, if the architect requests such a test for determining specified or guaranteed data, as given in the specification or on the drawings.

- 7.3.5.19.4 Any damage resulting from the tests shall be repaired and/or damaged material replaced, to the satisfaction of the architect without any extra cost.
- 7.3.5.19.5 In the event of any repair or any adjustment having to be made, other than normal running adjustment, the tests shall be void and shall be recommenced after the adjustment or repairs have been completed.
- 7.3.5.19.6 The contractor must inform the architect when such tests are to be made, giving sufficient notice, in order that the architect or his nominated representative may be present.
- 7.3.5.19.7 Complete records of all tests must be kept and 3 copies of these and location drawings must be furnished to the architect.
- 7.3.5.19.8 The contractor may be required to repeat the test as required, should the Ambient conditions at the time, do not give, in the opinion of the architect, sufficient and suitable indication of the effect and performance of the installation as a whole or of any part, as required.

7.3 List of approved Makes for HVAC Installation Works (as applicable).

S. No.	Items	Makes
1	Air handling unit/ Treated Fresh Air Unit	System Air/Flaktwood/ Zeco/Edgetech
2	Exhaust Air Unit	System Air/Flaktwood/ Zeco/Edgetech/Zair
3	Blower	Nicotra/Comferi/ Kruger
4	Cooling coil	Zeco/Edgetech/ AHRI Certified
5	Hepa Filter	Thermadyne /Anfilco/ Dyna Air Filtration
6	Fan Coil Units	Cruise/Zeco/Edgetech/Kubic Midea/Trane
7	Duct (factory fabricated)	Rola Star / Techno Fabri-duct/Zeco/Ductofab
8	Water strainers (Y- strainer/pot strainer)	Emerald/Sant/DS Engineering / Advance/Maharaj castings
9	Proportional thermostat	Siemens /Honeywell/Johnson
10	3 Way Motorized/ Mixing / Diverting valves	Siemens /Honey-well/Johnson/Anergy/ Rapid Control/Danfoss
11	Pressure gauges for water line/Refrigerant	Emerald / Fiebeg/ H. Guru
12	Thermometers	Emerald/ Japsin
13	V-Belts	Fenner India/ Dunlop
14	Fibre glass wool	UP Twiga /Ownes Corning
15	Nitrile Rubber insulation (Open/close cell) with specific- ation as per BOQ.	Armacell/ K-flex/ A-flex/ Supreme/Aerolam
16	Fire retardant flexible duct connection	Air flow / Twiga/ATCO/GP spira/caryaire
17	Gasket for ducts	Prima Kool / Nuprine
18	Anchor Fasteners	Hilti / Fischer
19	Extruded Aluminum grilles & diffusers Fresh air louvers/Dampers	Caryaire/ Ravi Star/ Air Flow/Air master/Titus/System air
20	Fire damper	Ravi Star/Air Flow/ Mapro/System air/Ruskin Titus/Greenheck
21	Duct attenuator	AirFlow/Ravi Star/ Contin-ental/Mahajan
22	Vibration isolators	Resistolex /Gerb / Base/ Dunlop
23	Motors	Siemens/Crompton/ABB/Bharat Bijlee
24	Fuse switch unit/switch fuse unit/HRC fuse	Larsen Toubro / Siemens / Schneider (MG)/Havells
25	Humidistat	Honeywell/Danfoss/Penn
26	Condenser/ Chiller	Trane/Carrier/York/Daikin
27	Polyurethane Foam (PUF)	Malanpur/ Lloyd /Best Opuf
28	Thermocole	Pioneer/Styrin
29	Chemical Reagent	Antiscalant/ Descalant / Antifungal Hibird / 50acid/ Maic
30	VFD with sensors	ABB/DANFOSS/ Siemens
31	Cooling Tower	Paharpur/Mihir/ Flow air-tech

		Pvt.Ltd/Advance/Towertech
32	Cooling Tower PVC Fills	Paharpur/Mihir/As per Indian Standard
33	Window/Split Air conditioner/ Hi-wall split AC	Voltas/ Carrier/Panasonic/Blue star/ Toshiba/Daikin
34	Dosing pump	M/s Ion Exchange (I) Ltd/ Milton Royal
35	Tower AC units	Voltas/ Carrier/Panasonic/Blue star/ Toshiba/Daikin
36	Inverter VRF system	Voltas/ Carrier/Panasonic/Blue star/ Toshiba/Daikin/ Mitsubishi Electric
37	Hi wall type chilled water FCU	Cruise/Zeco/Edgetech/Kubic Midea/Trane
38	Wet scrubber	Zeco/Edgetech/ZAIR
39	Air washer (Evaporative cooling unit)	Carryaire/Zeco/Zair/Edgetech/Airflow
40	Pre-Insulated Pipe	Zeco/Sevenstar-aircon/AGS Engineering/Permapipe
41	VAV Boxes	Ruskin Titus/Honeywell/Trox/Trane/Johnson Controls/Tristar
42	Self-Cooled PAC server Rack	Schneider/Emersion/ Stulz/Vertiv
43	Victaulic coupling	Sevcon/Victaulic/Smith Copper
44	Dehumidifier	Bry-Air/Munters/Bri
45	PICV valve	Advance/Siemens/Denfoss/Honeywell
46	Axial Fans	Krugar/Nicotra/Comefri/Green Deck/Airflow
47	Spiral Flat Oval Duct (with GSS sheets of preferred make)	Dustech/GP spira/Spiral Tubes/Western air ducts/ Ductofab/Seven star
48	Silicone flexible duct connector	Easyflex/Airflow//Resistoflex/Dustech
49	Motorized butterfly valve/ Modulating Valve/Solenoid valve	Advance/Danfoss/Belimo/Johnson Control/Zoloto/Tyco/Victaulic/Honeywell
50	Expansion Bellow	Easyflex/Resistoflex/Cori
51	Fire rated vane Axial/Fire rated tube Axial/Vane Axial/Tube Axial Fan	Nicotra/Comferi/Kruger/Greenheck/Airflow/system air/Zair
52	Inline Fan	Nicotra/ Kruger/Greenheck/Airflow/system air
53	Propeller fan	Nicotra/ Kruger/Caryaire/Crompton/GE
54	Butterfly valve	Audco / Advance / C&R/Honeywell/ Kirloskar
55	Check Valve (Non return valve)	Audco/SKS/Advance/ Zoloto/ Honeywell
56	Balancing valve	Advance /Audco/ Honey- well/Danfoss
57	Centrifugal pump / Monobloc Pump	Grundfoss/Armstrong/Willo/Xylem
58	Water Softening Plant	Ion Exchange Ltd. / Milton Royal
59	Pressure switch	Indfoss / Honewell Indfoss / Honey- well
60	Bronze ball valve	Emerald/ Zolto / Leader/ Sant/Advance
61	Bronze ball valve with Y strainer	Emerald / Rapid control/ BAP/Advance
62	Suction guide	Anergy instrument Pvt.Ltd./Johnson
63	Water cooled screw chilling unit	Trane/Carrier/York/Daikin
64	Chemical reagent	Eco friendly bio clean pond clarifier/Volga
65	Sand filter	M/s Ion Exchange (I) Ltd / Pentair
66	Compressor	Emerson/Tecumsseh/Bohn/Danfoss
67	Cold room/Deep freezer	Danfoss/Blue Star/Bohn
68	Air-cooled ductable split/ceiling mounted Cassette type air-	Voltas/ Carrier/Panasonic/Blue star/ Toshiba/Daikin

	conditioning unit	
69	PVC water tank	Syntex/ Polycon
70	Water Cooler/Drinking water Fountain	Blue Star/Usha/Sidwal/Voltas/Oasis
71	Control cables	CCI/ Fort Gloster/ Universal/ Incab/ Havells/KEI
72	Modular type Variable Refrigerant Flow/ Variable Refrigerant Volume air cooled Out- door units with specification as per BOQ	Voltas/ carrier/Panasonic/Blue star/Daikin/Mitsubishi Electric
73	High static pressure VRF/VRV ceiling mounted ductable type Indoor Unit with specification as per BOQ.	Voltas/ carrier/Panasonic/Blue star/Daikin/Mitsubishi Electric
74	Copper refrigerant piping with specification as per BOQ	Mandev/Rajco/ Maxflow
75	uPVC plumbing drain pipe with specification as per BOQ.	Supreme /Finolex
76	Fabricated GSS/GI Sheet with specification as per BOQ.	Jindal/Tata/SAI/Bhushan
77	80Amp, 4P, 300 Ma Weather proof RCB with specification as per BOQ.	L&T, Schneider, ABB
78	XLPE Class-O tubular insulation with specification as per BOQ.	Supreme / K-Flex/ A-Flex
79	PAC Unit with specification as per BOQ	Schneider (Uniflair)/StulzChspl (In- dia) Pvt.Ltd /Emerson Climate Technologies/ Bluebox/Vertiv
80	Electrical Panel with specification as per BOQ.	Siemens /L&T/Schneider / Le grand/Tecnic / ABB/ C&S/Neptune Milestone switchgear/Tricolite/ Excel/Morden switch gear/Adlec
81	Portable type dehumidifier with Specification as per BOQ.	White Westinghouse/Power Pye Electronics/Bryair/Munter
82	GI volume control duct damper with specification as per BOQ.	Airmaste Equipment Emirates/Omega/Airflow
83	Soft duct (Fabric Duct)	Duct Sox/Prihoda
84	Smoke cum fire damper (Bare Damper)	Dynacraft/Mapro/Servex/Ruskin
85	Smoke cum fire damper (Actuator)	Belimo/Joventa/Honeywell/Siemens

Any other item not covered in the above list shall be ISI marked and as approved by Engineer In Charge.

8 Special Conditions of Contract

8.1 Timely Completion

1. The work included in this tender is of urgent nature.
2. The work of all components must be started simultaneously and has to be delivered together or early within the given time schedule.
3. The contractor has to deploy the labor and supervisory staff in shifts to meet the targeted completion date. The work may be executed in extended shifts or two shifts.
4. Number of days from the date of issue of letter of acceptance for reckoning date of start shall be as per Schedule. *If the Contractor commits default in commencing the execution of the work as aforesaid, the performance guarantee shall be forfeited.*
5. The detailed program chart approved by the engineer-in-charge shall indicate how the resources will be deployed by the contractor to maintain desired progress and for the completion of the work within the specified period. If the submitted program is approved, the milestone shall be redefined accordingly by the Superintending Engineer, IITK. The amount to be withheld in such a case, for non-achievement of milestone(s), shall remain unaltered. Any delay in achieving the milestone must be compensated within the limitations of time imposed in the Contract document.
6. The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work, as required.

8.2 Rates

1. Unless otherwise provided in the schedule of quantities of the work the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building (Exclusive of GST) and nothing extra shall be payable to him on this account.
2. The rates for all items of work shall, unless clearly specified otherwise, include cost of all labours, materials and other inputs involved in the execution of the item irrespective of whether they have been specifically mentioned in the tender document or not.
3. In case the same item (s) appear more than once in the schedule of work / BOQ under the same sub head or among the different subhead of works, the lowest rate quoted for that item (s) shall be considered for the particular item(s) wherever appeared in any part of BOQ / Schedule of works for the purpose of tender evaluation although the generated price bid may incorporate different quoted rate for same item(s) as per the quoting pattern of the tenderer. The tendered amount thus worked out shall be final & shall be binding on the contractor.
4. The rates quoted by the contractor will be deemed to be inclusive of any extra expenditure of this reason. The contractor has to increase the manpower or other tools etc. to do the work as per requirement of the work at his own expenses. Nothing shall be paid on this account.
5. The contractor shall provide at his own cost suitable weighing, surveying and leveling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.
6. Other agencies may also simultaneously execute and install the works and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be available as specified elsewhere in the contract) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
7. All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
8. Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to approved manufacturers specifications where CPWD Specifications are not applicable. The contractor should get the materials (fixtures/fittings) tested from approved labs wherever required at his own cost.
9. The contractor shall be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the client department. No extra payment shall be made on this account.
10. The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profile, establishment of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, preparatory works, working during monsoon, working at all depths, height, lead, lift and location etc until / unless specified otherwise and any other incidental works required to complete this work. Nothing extra shall be payable on this account.

8.3 Quality and Workmanship

1. The contractor shall be entirely responsible and answerable for all the works done by him regarding quality, adherence to the laid down specifications, terms and conditions, warranty/guarantee etc. and he shall be liable to bear any compensation that may be levied by the department under any of the clauses of the agreement.
2. The materials having ISI mark shall have precedence over the one conforming to IS Specifications.
3. The proposed is for Institute premises and quality of work is paramount importance. Contractor shall have to engage well experienced skilled labour and deploy modern T & Pand other equipment to execute the work.
4. Samples of all materials and fittings to be used in the work in respect of brand manufacturer and quality shall be approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work.
5. All materials used in the work shall be new and of good quality, conforming to the relevant specifications as per good engineering practice. All the materials proposed to be used in the work should be approved from Engineer in Charge before use in work.
6. Articles bearing BIS certifications mark shall only be used unless no manufacturer has got BIS/ISI mark for the particular material. Any material/fitting whose sample has not been approved in advance and any other unapproved material brought by the contractor shall be immediately removed as soon as directed. Where the make of any particular material is not specified in the Contract document, the material shall be supplied as per makes desired by the engineer-in-charge.
7. It will be the responsibility of the contractor / bidder to ensure use of genuine materials in the work. The department reserves the right to get (any / all materials / components) inspected by the manufacturer or their authorized representatives at any stage of the execution of work. If any of the materials, supplied and used in work is found spurious at any stage, then the department reserves the right to ask the contractor to replace it by genuine one and make suitable recovery till it is done, even if any payment against that material is already made.
8. The contractor should get the make/TDS documents approved before procuring any material at site. The TDS/Make once approved shall not be changed without any valid recorded reasons. No material to be brought and used at site without the prior knowledge & approval of Engineer-in-Charge.
9. The department may ask for any valid document like manufacturer's test certificate, document for purchase of the material, document for import/shipment of imported materials etc. as deemed fit by the engineer-in-charge to ascertain genuineness of material supplied by/used in the work by the contractor. The contractor shall remain bound to submit all such documents to the department failing which payment may not be made or if already paid may be recovered/ withheld from subsequent running account payment.
10. All equipment and their components, and all the materials to be used in the work shall be suitable for the environmental conditions at the location of the work.

11. The contractor shall ensure quality control measures on different aspects of construction including materials, workmanship and correct construction methodologies to be adopted. He shall have to submit quality assurance programme within two weeks of the award of work. The quality assurance programme should include method statement for various items of work to be executed along with check lists to enforce quality control.
12. The contractor shall get the source of all other materials, not specified elsewhere in the document, approved from the Engineer-in-Charge. The contractor shall stick to the approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost. Similarly, the contractor shall submit brand/ make of various materials not specified in the agreement, to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it.
13. **Other Laboratories:** The contractor shall arrange carrying out of all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and shall bear all charges in connection therewith including fee for testing. The said cost of tests shall be borne by the contractor/department in the manner indicated below.
 - (a) By the contractor, if the results show that the test does not conform to relevant CPWD Specifications / BIS code or specification mentioned elsewhere in the documents.
 - (b) By the department, if the results conform to relevant CPWD Specifications / BIS code or specification mentioned elsewhere in the documents.

If the tests, which were to be conducted in the site laboratory, are conducted in other Laboratories for whatever the reasons, the cost of such tests shall be borne by the contractor.
14. Sample of building materials fittings and other articles required for execution of work shall be got approved from the Engineer-in-Charge. Articles manufactured by companies of repute and approved by the Engineer-in-Charge shall only be used. Articles bearing BIS certification mark shall be used in case the above are not available, the quality of samples brought by the contractor shall be judged by standards laid down in the relevant BIS specifications. All materials and articles brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work.
15. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-Charge.
16. BIS marked materials except otherwise specified shall be subjected to quality test at the discretion of the Engineer-in-Charge besides testing of other materials as per the specifications described for the item/materials. Wherever BIS marked materials are brought to the site of work, the contractor shall if required, by the Engineer-in-Charge furnish manufacturers test certificate or test certificate from approved testing laboratory to establish that the material produced by the contractor for incorporation in the work satisfies the provisions of BIS codes relevant to the material and/or the work done.
17. The contractor shall procure all the materials at least in advance so that there is sufficient time to testing and approving of the materials and clearance of the same before use in work.
18. All materials brought by the contractor for use in the work shall be got checked from the

Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use.

19. The contractor shall be fully responsible for the safe custody of the materials issued to him even if the materials are in double lock and key system.

8.4 Natural calamity:

No payment will be made to the contractor for any damage caused by rain, snow fall, floods, dampness, fire, sun or any other natural cause whatsoever during the execution of work. The damage to the work due to above reason, if any, shall have to be made good by the contractor at his own cost and no claim on this account shall be entertained.

8.5 Stocking and Disposal of Materials & Debris

1. The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, compound wall, services etc. are to be constructed.
2. After completion of work the agency shall remove materials and debris etc. from site as per the direction of Engineer-in-Charge, at no extra cost.
3. Contractor's job will also include removing of all malba and debris arising in the process of painting including washing of floor to remove stains of paint, at no extra cost.
4. The contractor shall conduct work so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.
5. For construction/renovation works which are likely to generate malba/rubbish to the tune of more than a tempo/truck load, contractor shall dispose of malba, rubbish & other unserviceable materials and wastes at their own cost to the notified/specified dumping ground and under no circumstances these shall be stacked/dumped, even temporarily outside the construction premises.
6. Dismantled but useful materials/components/equipment, if any, should be returned to the Institute as per the direction of Engineer-in-Charge.

8.6 Safety and Security

1. The contractor has to follow all safety norms as laid down in National Building Code of India. All the workers shall be equipped with the required safety gadgets while working at site such as ISI marked helmets, Shoes and safety belts, gumboots, gloves etc.
2. The contractor, the authorized representative(s), workmen etc., shall strictly observe orders pertaining to fire precautions prevailing in the area.
3. The contractor shall be fully responsible for the safe custody of materials brought by him/ issued to him even though the materials may be under double lock key system.

4. Contractor will arrange proper metal ladders, M.S. double scaffolding (for working, painting, etc. at higher levels) at his own cost and will take all safety measures like double harness safety belt, mechanized electrically operated platform etc. If it is observed that work is proceeding without adequate safety precautions, work may be stopped by Engineer-in-charge and in such cases, contractor will be solely responsible for delay and its consequences thereof.
5. The contractor shall be responsible for the watch and ward/guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. No extra payment shall be made on this account.
6. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night speed limit boards red flags, red lights and providing barriers. He shall be responsible for all dangers and incidents caused to existing / new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
7. It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard.
8. The Institute shall not have any responsibility or liability in case of any accident injury to the personnel to the contractor at work site or to the general public at the work site due to mishandling equipment by the personnel of the contractor or any other similar reason. The responsibilities and liabilities for such accidents and incidents shall be borne by the contractor.

8.7 Approach to Site

1. The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost.
2. Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost.

8.8 Water and Flooding

1. The contractor shall have to arrange water of desirable quality for the construction purpose for which he may have to install water purifier at site or might have to bring/ purchase water from outside as per decision of Engineer-in-charge. Nothing extra shall be paid on this account.
2. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do it and nothing extra shall be paid except otherwise provided in the items of schedule of quantities.
3. In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any.

4. The water charges (for water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the Institute or any other statutory body, the consequent sewerage charges shall be borne by the contractor.

8.9 Acts and Laws

1. The Contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / MC etc. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work.
2. The Contractor shall also adhere to all traffic restrictions notified by the local authorities.
3. All statutory taxes, levies, charges (including water and sewerage charges, charges for temporary service connections and / or any other charges, as applicable) payable to such authorities for carrying out the work, shall be borne by the Contractor.
4. The Contractor shall arrange to give all notices as required by any statutory / regulatory authority and shall pay to such authority all the fees that is required to be paid for the execution of work. He shall protect and indemnify the Institute and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself/herself or by his/her employees or his/her authorized representatives. Nothing extra shall be payable on these accounts.
5. The fee payable to statutory authorities for obtaining the various permanent service shall be borne by the Institute.

8.10 Labour and Laws

1. The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc. under various labour laws and other regulations applicable to the works, at his site office.
2. Huts for labour are not permitted within the premises of the Institute. No extra cost shall be payable even if the contractor provides such accommodation at a place as is acceptable to the local body.

8.11 Nondisclosure Agreement

1. The Agency shall take all precautions not to disclose, divulge and/or disseminate to any third party any confidential information, proprietary information on the Institute business or security arrangements (including but not limited to the Assignment instructions, Schedules and other subsequent Arrangements) and/or business of the Institute. The obligation is not limited to any Scope and the Agency shall be held responsible in case of breach of the confidentiality of Institute's information.
2. If the Agency receives enquiries from Press/Media/Radio/Television or other bodies/persons, the same shall be referred by the Agency to Institute immediately on receipt of such queries.

8.12 Indemnification:

1. The agency shall be directly responsible to indemnify the Institute against all charges, dues, claims, etc. arising out of the disputes relating to the dues and employment of the personnel deployed and further for any claim/compensation against all damages and accidents caused due to negligence on the part of the agents, employees and other personnel of the agency.
2. That the contractor shall keep the IITK indemnified against all claims whatsoever in respect of the employees deployed by the contractor. In case any employee of the contractor so deployed enters in dispute of any nature whatsoever, it will be the primary responsibility of the contractor to contest the same. In case IITK is made party and is supposed to contest the case, IITK will be reimbursed for the actual expenses incurred towards Counsel Fee and other expenses which shall be paid in advance by the Contractor to IITK on demand. Further, the contractor shall ensure that no financial or Any other liability comes on IITK in this respect of any nature whatsoever and shall keep IITK indemnified in this respect.

8.13 Force Majeure:

If at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract is prevented or delayed by reasons of any war, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosion, epidemics quarantine restriction, strikes, lockouts or acts of god (hereinafter referred to as events) provided notice of happenings of any such event, is served by party seeking concession to the other as soon as practicable, but within 21 days from the date of occurrence and termination thereof. Provided the Party satisfies Institute adequately of the measures taken by it. Neither party shall, by reason of such event, be entitled to terminate this contract, nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance. Further, the services under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist and the decision of Institute as to whether the services have to resume or not shall be final and conclusive, provided further, that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 60 days, Institute may at his option, terminate the contract.

8.14 Dispute resolution

1. The institute reserves the right to amend rules whenever and wherever considered necessary and appropriate. The same shall be intimated to the agency in due course.
2. Any dispute arising out of and in relation to this agreement shall be referred to the arbitration by sole arbitrator to be appointed by Director of the Institute. The arbitration would be conducted and governed by and under the provisions of Arbitration Act, 1996 and its amendments. Any legal dispute will be subject to jurisdiction of Kanpur Courts only and no other court shall have the jurisdiction.
3. Any dispute arising out of and in relation to this agreement shall be referred to the arbitration by sole arbitrator to be appointed by Director of the Institute. The arbitration would be conducted and governed by and under the provisions of Arbitration Act, 1996. Any legal dispute will be subject to jurisdiction of Kanpur Courts only and no other court shall have the jurisdiction.

8.15 Arbitration

1. Except as otherwise provided anywhere in this Agreement, if any dispute, difference, the question of disagreement or matter, whatsoever, arises between the parties, as to the meaning, operation or effect of the Agreement or out of or relating to the Agreement or breach thereof, the same shall be referred to a Sole Arbitrator, to be appointment by the Director of the Institute at the time of the dispute.
2. If the Arbitrator, to whom the matter is originally referred, dies or refuses to act or resigns for any reasons from the position of arbitration, it shall be lawful for the Director of the Institute to appoint another person to act as Arbitrator in the manner aforesaid. Such person shall be entitled to proceed with the reference from the stage at which it was left by its predecessor, provided both the parties consent to this effect, failing which, the arbitrator shall be entitled to proceed on the matter de- novo.
3. It is a term of the Agreement that the party invoking the arbitration shall specify all disputes to be referred to arbitration at the time of invocation of arbitration under the clause.
4. It is a term of the contract that the cost of arbitration shall be borne by the parties themselves.
5. The place of the arbitration shall be Kanpur Nagar, Uttar Pradesh, India.
6. Subject as aforesaid, the provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications, amendments or re-enactment thereof and rules made thereunder and for the time being in force, shall apply to the arbitration proceeding under this clause.
7. Except as otherwise provided anywhere in this Agreement, the Arbitration proceedings shall be conducted in English and the Agreement shall be constructed, interpreted and governed by the law of India, for the time being in force.

8.16 Jurisdiction of Courts

The court(s) at Kanpur Nagar, Uttar Pradesh, shall have the exclusive jurisdiction to try any all the disputes(s) between the parties arising out this Agreement.

8.17 Other Terms & conditions

1. In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:
 - (a) Schedule of quantities
 - (b) Technical specifications of the NIT
 - (c) Approved Drawing (If any)
 - (d) CPWD General specifications Part-I (Internal) 2014, BIS Codes amended up to date, practices.
 - (e) CPWD General Specifications for Electrical Works Part-II (External), 2014 amended up to date.
 - (f) Relevant IS or other international code in case IS code is not available.
 - (g) Indian Electricity Act 2003 and Indian Electricity Rules 1956 amended up to date.
 - (h) Local Fire Regulations applicable at the place of installation. Relevant and applicable foreign standards and specifications amended up to date.
 - (i) Any other relevant act or rules and local by-laws.
2. contractor will identify one of the supervisors for taking care of implementation of Safety systems.
3. Smoking is strictly prohibited at workplace.
4. Nobody is allowed to work without wearing safety helmet. Chin strap of safety helmet shall be always on. Drivers, helpers and operators are no exception.
5. 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.
6. No one is allowed to work without adequate foot protection.
7. 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-coordinator insists eye protection has to be provided.
8. All safety appliances like Safety shoes, Safety gloves, Safety helmet, Safety belt, Safety goggles etc. shall be arranged before starting the job. .
9. All excavated pits shall be barricaded & barricading to be maintained till the backfilling is done. Safe approach to be ensured into every excavation.
10. Adequate illumination at workplace shall be ensured before starting the job at night.
11. All the dangerous moving parts of the portable / fixed machinery being used shall be adequately guarded.
12. Ladders being used at site shall be adequately secured at bottom and top. Ladders shall not be used as work platforms.
13. 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.
14. Other than electricians no one is allowed to carry out electrical connections, repairs on electrical equipment or other jobs related thereto.
15. All electrical connections shall be made using 3 or 5 core cables, having a earth wire.
16. Inserting of bare wires for tapping the power from electrical sockets is completely prohibited.
17. A tools and tackles inspection register must be maintained and updated regularly.
18. Debris, scrap and other materials to be cleared from time to time from the workplace and at the time

of closing of work every day.

19. All the unsafe conditions, unsafe acts identified by contractors, reported by site supervisors and / or safety personnel to be corrected on priority basis.
20. No children shall be allowed to enter the workplace.
21. All the lifting tools and tackles shall be stored properly when not in use.
22. Clamps shall be used on Return cables to ensure proper earthing for welding works.
23. Return cables shall be used for earthing.
24. All the pressure gauges used in gas cutting apparatus shall be in good working condition.
25. Proper eye washing facilities shall be made in areas where chemicals are handled.
26. Connectors and hose clamps are used for making welding hose connections.
27. All underground cables for supplying construction power shall be routed using conduit pipes.
28. Spill trays shall be used to contain the oil spills while transferring / storing them.
29. Tapping of power by cutting electric cables in between must be avoided. Proper junctionboxes must be used.
30. All the E & M works shall be carried out as per direction and to the satisfaction of the Engineer-in-charge.
31. If the specifications for any item or its component are not available in the CPWD specifications cited above, relevant BIS specification as amended up to date shall be followed, whether or not the specific reference of a particular BIS specification has been made in this specification/ tender document.
32. Wherever any reference to any Indian Standard specification occurs in the document relating to this contract the same shall be inclusive of all amendments issued there to or revisions thereof, if any, upto the date of opening of tenders.
33. All materials should conform to relevant BIS specifications wherever the same exists in absence of stipulation in this tender document.
34. Where manufacturers furnish specific instructions / recommendations relating to the materials used in this job and/or their installation, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases and shall be deemed to be included in the schedule of work whether they have been specifically mentioned or not.
35. All chase cuttings in the wall, for recessed conduits & boxes and drilling the holes shall be done with power operated machines only. No chase shall be allowed to be cut manually with the use of hammer & chisel.
36. All cuttings in cement plaster and brick shall be made good by using cement mortar 1:3 (1 part cement, 3-part coarse sand) The cut surfaces shall be repaired by an experienced mason only so as to match the repaired plaster with the original. All such repaired surfaces shall be cured for 3 to 4 days to keep the surfaces wet, using water spray machine (hand/motor operated) and avoid unnecessary flooding of the area.
37. The structural and architectural drawings shall at all times be properly co-related before executing any work.

38. For the purpose of recording measurements and preparing running account bills, the abbreviated nomenclature indicated in the publications Abbreviated Nomenclature of Items of DSR 2022 shall be accepted. The abbreviated nomenclature shall be taken to cover all the materials and operations as per the complete nomenclature of the relevant items in the agreement and relevant specifications. In case of items for which abbreviated nomenclature is not available in the aforesaid publication and also in case of extra and substituted items for which abbreviated nomenclature are not provided for in the agreement, full nomenclature of item shall be reproduced in the measurement books and bill forms for running account bills. For the final bill, however, full nomenclature of all the items shall be adopted in preparing abstract in the electronic measurement books and in the bill forms.
39. The following drawings must be submitted to Office of Executive Engineer within seven days of award of work.
 - (a) G.A and schematic drawings of Air handling unit, fan coil unit, CDU, TFA, layout showing material and size of sheet steel, technical data sheet, test certificate and make and ratings etc
 - (b) Duct designing, Insulation materials, control valve technical data sheet to be submitted.
40. On completion of works and before issuance of completion certificate, the contractor submit completion drawings in the form of three complete set of originals (reproducible).
 - (a) As built G.A and schematic drawings of Air handling unit, fan coil unit, CDU, TFA, layout showing material and size of sheet steel, technical data sheet, test certificate and make and ratings etc.
 - (b) Duct designing, Insulation materials, control valve technical data sheet to be submitted.
 - (c) Technical literature, test certificates and operation and maintenance manuals required
41. Works Inspection and Testing of Equipment (If applicable): Prior to dispatch of equipment the Institute reserves the right to inspect the same at the manufacturer's works and the contractor shall provide and secure every reasonable access and facility at the manufacturers works for inspection, for witness of all acceptance and routine tests as per relevant Indian Standards. Contractor shall give a reasonable notice of about 15 days for the purpose of test, and witness of all major equipment.
42. Pre-commissioning test: All routine tests shall be carried out on the electrical equipment. Protective & measuring devices should be checked for calibration of MCCB's/MCB's, network rack panel & cable meggaring, earthing measurements etc.
43. The defect liability shall be for **One year** from the actual date of completion of the work.

केन्द्रीय लोक निर्माण विभाग
कार्यालय झापन

No. DG/MAN/410

ISSUED BY AUTHORITY OF DIRECTOR GENERAL, CPWD

NIRMAN BHAWAN, NEW DELHI

DATED: 22.10.2021

Subject: Addition of new Para 4.10.2 in CPWD Works Manual 2019 regarding testing charges to be borne by contractor.

It has been noticed that following provisions are sometimes being made in the NITs / Agreements by the NIT approving authorities:


"The cost of test shall be borne by contractor/ department in the manner as below:

- i. By the contractor, if the result shows that material does not conform to the relevant codes/ specification.
- ii. By the department, if the results show that the material conforms to relevant codes/ specification."

It has been decided by the competent authority that testing charges shall be borne by the contractor in all cases. Accordingly following new para is added in CPWD Works Manual -2019.

Existing Provision	Modified Provision
4.10 Preparation of NIT	4.10 Preparation of NIT
4.10.2 No Provision	4.10.2 Testing charges to be borne by contractor
	Following provision shall be incorporated by the NIT approving authority in the NIT: All expenditure to be incurred for testing of samples e.g. packaging, sealing, transportation, loading, unloading etc. including testing charges shall be borne by the contractor. The NIT shall have list of approved laboratories for testing as approved by ADG / SDG.

This issues with the approval of competent authority.


(वी.पी. सिंह) 22/10/2021

अधीक्षण अभियंता(सी.एंड एम.)

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प्रतिलिपि: सभी केलोनिवि तथा लोनिवि दिल्ली के अधिकारियों को आवश्यक सूचना एवं कार्यवाही हेतु। (केलोनिवि वेबसाईट के माध्यम से).

Figure 1: Modified provisions in CPWD works manual 2019 regarding testing charges to be borne by contractor.