



Tender For

“Supply, Installation, Testing and
Commissioning of Alternate VRF
Air-conditioning facility for DUAL
BEAM SYSTEM LAB and DIMENSION
METROLOGY LAB Located in New
NMTC Building at CMTI, Bangalore”
(Revised Technical specifications
after Pre-Bid Conference)

By

Central Manufacturing Technology Institute
Tumkur Road, Bangalore-560022

सेन्ट्रल मैन्युफेक्चरिंग टेक्नोलॉजि इंस्टिट्यूट 

CENTRAL MANUFACTURING
TECHNOLOGY INSTITUTE

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CMTI - CENTRAL MANUFACTURING TECHNOLOGY INSTITUTE

Tumkur Road, Bangalore - 560022, Karnataka, INDIA

INVITATION FOR BIDS

Tender No. CMTI/PUR/0201/2024-25/HBS/SMPM

Date: 07.08.2024

1. CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bangalore - 560022, Karnataka, India, invites sealed Bids from Wholly-Owned Subsidiary of OEM in India or OEM's own Branch/Sales Office in India, for purchase of items listed below.

Sl. No.	Tender No.	Description of items	Qty	Two Bid	Bid Security (EMD) (Rs.)
1	CMTI/PUR/0201/2024-25/HBS/SMPM	Supply, Installation, Testing and Commissioning of Alternate VRF Air-conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB Located in New NMTC Building, at CMTI Bangalore.	1 No.	Two Bid System [Techno - Commercial)	Rs.60,000.00

2. Interested Bidders may obtain further information from the office of the Group Head, Purchase & Stores, CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru - 560022, Karnataka, India, mail: purchase@cmti.res.in
3. The Bidding Documents can be downloaded at www.tenderwizard.com/CMTI & <https://cmti.res.in/all-tender/>.
4. The Director, CMTI- Bengaluru, reserves the right to accept any or all tenders either in part or in full or to split the order without assigning any reasons therefore.
5. Please note that, As per GoI notification, EMD exemption will be conceded for (a) Micro and small Enterprises if registered with any government bodies specified by Ministry of Micro, Small & Medium Enterprises (M/o MSME) with valid certificate duly issued by GOI are exempted for submitting the tender fee and earnest money deposit (EMD). **It will be applicable for those bidders who shall produce their own goods or provide their own services, and not applicable for trading purpose.** No entrepreneur or memorandum of application form is acceptable. Kindly provide the valid Udyam MSME Certificate in order to avail EMD Exception otherwise you have to pay the EMD Money.
6. **Currency of Bidding:** For Imported Goods/Services if supplied directly from abroad, prices shall be quoted in respective foreign currencies like US Dollar or Euro or Pound Sterling or Yen etc., Bidders supplying indigenous goods shall be quoted in INR only.
7. Indication of Price in Technical Bid in any manner directly or indirectly may lead to disqualification of the respective tender.

Tender for Supply, Installation, Testing and commissioning of Alternate VRF Air-conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB Located in New NMTC Building, at CMTI Bangalore.

BID REFERENCE	CMTI/PUR/0201/2024-25/HBS/SMPM
DEADLINE FOR RECEIPT OF BIDS	28-08-2024 17:00 hours
DATE AND TIME OF OPENING OF BIDS (TECHNICAL BID ONLY)	28-08-2024 17:00 hours
DATE AND TIME OF OPENING OF PRICE BIDS	Will be Intimated to technically qualified bidders.
VENUE FOR BID OPENING	E-Tender online opening
ADDRESS FOR COMMUNICATION	Group Head, (Purchase & Stores) Central Manufacturing Technology Institute, Tumkur Road, Bengaluru-560022, Karnataka, India Email ID: purchase@cmti.res.in

N.B.:

1. All the pages of the Bidding Document should be signed, stamped with company seal and submitted with the offer.
2. This Bidding Document is non-transferable.
3. Bidding Document can be downloaded free of cost from our website <https://cmti.res.in/all-tender>.

CHAPTER - 1

INSTRUCTIONS TO BIDDER

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A-Introduction

1.1 Eligible Bidders

1.1.1 (a) Vendor shall be Wholly-Owned Subsidiary of OEM in India or OEM's own Branch/Sales Office in India or Authorized representatives of the OEM, (b) vendor shall have service center with trained service engineers in India preferably in Bangalore (c) vendor shall have supplied and installed XRD Operando System of similar specification in govt institutes/research organization/PSU in India, who fulfill the eligibility criteria mentioned in the Chapter-4.

1.1.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting Services for the preparation of the design, specifications, and other documents to be used for the procurement of the Goods to be purchased under this Invitation For Bids.

1.2 Cost of Bidding

1.2.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Purchaser, will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

1.3 Fraud and corruption

1.3.1 The Purchaser requires that the Bidders, Suppliers and Contractors observe the highest standard of ethics during the procurement process and execution of such contracts. In pursuit of this policy, the following are defined:

“**Corrupt practice**” means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement processor in contract execution;

“**Fraudulent practice**” means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

“**Collusive practice**” means a scheme or arrangement between two or more bidders, with or without the knowledge of the Purchaser, designed to establish bid prices at artificial, non- competitive levels; and

“**Coercive practice**” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract;

1.3.2 The Purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question.

B - The Bidding Documents

1.4 Cost of Bidding Documents

- 1.4.1 The Bidding Documents can be downloaded from Purchaser's website as indicate in the Invitation for Bids [IFB] free of cost.

1.5 Content of Bidding Documents

- 1.5.1 The Goods required, bidding procedures and contract terms are prescribed in the Bidding Documents which should be read in conjunction. The Bidding Documents, apart from the Invitation For Bids have been divided into 7 chapters asunder:

Chapter 1:	Instructions to Bidder (ITB)
Chapter2:	General Conditions of Contract (GCC) and Special Conditions of Contract (SCC)
Chapter3:	Schedule of Requirements
Chapter 4:	Specifications and Allied Technical Details PART A: Technical Specifications PART B: Acceptance Criteria
Chapter 5	Price Schedule Forms
Chapter 6	Contract Form
Chapter 7:	Other Standard Forms comprising: (a) Integrity Pact; (b) Bidder Information Form; (c) Bid Security Form; (d) Performance Statement Form; (e) Deviation Statement Form; (f) Service Support details Form; (g) Bid Form; (h) Performance Security Form; (i) Acceptance Certificate Form; (j) Eligibility Certificate Form; (k) Non-Black-Listed Self Certification Form

- 1.5.2 The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Documents. Failure to furnish all information required by the Bidding Documents or submission of a bid not substantially responsive to the Bidding Documents in every respect will be at the Bidder's risk and may result in rejection of its bid.

1.6 Clarification of Bidding Documents

- 1.6.1 A prospective Bidder requiring any clarification of the Bidding Documents shall contact the Purchaser in writing at the Purchaser's address specified in the Special Conditions of Contract (SCC). The Purchaser will respond in writing to request for clarification, provided that such request is received not later than ten (10) days prior to the deadline for submission of Bids. The Purchaser shall forward copies of its response to all those who have acquired the Bidding Documents directly from it, including a description of the inquiry but without identifying its source. Should the Purchaser deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so following the procedure under clause relating to amendment of Bidding Documents and Clause relating to Deadline for Submission of Bids. The clarifications and amendments issued would also be hosted on the website of the Purchaser for the benefit of the other prospective Bidders.

1.7 Amendment of Bidding Documents

- 1.7.1 At any time prior to the deadline for submission of Bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by an amendment.
- 1.7.2 All prospective Bidders who have received the Bidding Documents will be notified of the amendment in writing or by cable or by fax, or by e mail and the said amendment will be binding on them. The same would also be hosted on the website of the Purchaser and all prospective Bidders are expected to surf the website before submitting their Bids to take cognizance of the amendments.
- 1.7.3 In order to allow prospective Bidders reasonable time to take the amendment into account, while preparing their Bids, the Purchaser, at its discretion, may extend the deadline for the submission of Bids and host the changes on the website of the Purchaser.

C - Preparation of Bids

1.8 Language of Bid

- 1.8.1 The Bidder shall bear all costs of translation, if any, to the English language and all risks of the accuracy of such translation, for documents provided by the Bidder.

1.9 Documents Comprising the Bid

- 1.9.1 The Offer is to be submitted in two parts. One part will be the Un-Priced Techno-Commercial Bid and the other shall be the Priced Bid in the manner described at ITB Clause 1.18.
- 1.9.2 The Un-Priced Techno-Commercial Bid prepared by the Bidder shall include, among other Documents [like Technical Literature, brochures, drawings, all relevant commercial terms, data sheets etc.] the following:
- (a) Bidder Information Form;
 - (b) Bid Security as specified in the Invitation For Bids;
 - (c) Service support details form;
 - (d) Deviation Statement Form;
 - (e) Performance Statement Form;
 - (f) Documentary evidence establishing that the Bidder is eligible to bid and is qualified to perform the contract if its bid is accepted;
 - (g) Documents establishing Good eligibility and conformity to Bidding Documents;
 - (h) Current solvency certificate
 - (i) Eligibility Certificate
 - (j) Non-Blacklisted self-certificate
- 1.9.3 The Price Bid prepared by the Bidder shall include, among other Documents the following:
- (a) Bid form.
 - (b) Applicable Price Schedule Form (this forms shall be mandatorily be uploaded in the price bid)

1.10 Bid Form and Price Schedule Form

- 1.10.1 The Bidder shall complete the Bid Form and the appropriate Price Schedule Form furnished in the Bidding Documents. These forms must be completed without any alterations to its format and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.

1.11 Bid Prices

- 1.11.1 The Bidder shall indicate on the appropriate Price Schedule Form, the unit prices and total bid

prices of the Goods it proposes to supply under the contract.

1.11.2 Prices indicated on the Price Schedule Form shall be entered separately in the following manner:

(a) For Goods manufactured within India

- (i) The price of the Goods quoted ex - works including taxes already paid.
- (ii) GST and other taxes & duties which will be payable on the Goods if the contract is awarded.
- (iii) The charges for inland transportation, insurance and other local Services required for delivering the Goods at the desired destination.
- (iv) The installation, commissioning and training charges including any incidental Services, if any.

(b) For Goods manufactured abroad

- (i) The price of the Goods, quoted on EXW/ FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the Price Schedule Form.
- (ii) The charges for insurance and transportation of the Goods to the port/place of destination. The agency commission charges, if any.
- (iii) The installation, commissioning and training charges including any incidental Services, if any

1.11.3 The terms FOB, FCA, CIF, CIP etc. shall be governed by the rules prescribed in the current edition of the INCOTERMS published-by the International Chambers of Commerce, Paris.

1.11.4 Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offer shall be rejected as incomplete.

1.11.5 The price quoted shall remain fixed during the contract period and shall not vary on any account.

1.11.6 All lots and items must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Lots or items not listed in the Price Schedule shall be assumed to be not included in the bid.

1.11.7 The purchases made by the Purchaser for scientific purpose are exempt from Customs Duty at a concessional rate is livable [Government of India Notification No. 51/96 - Customs dated 22/07/1996].

1.11.8 The Purchaser shall not issue Exemption Certificates [Customs Duty Exemption Certificate / GST Exemption Certificate] for any raw materials / intermediary products that go into the manufacture of the Goods offered by Bidder.

1.12 Bid Currencies

1.12.1 Prices shall be quoted in **Indian Rupees** for offers received for supply within India and in freely convertible foreign currency in case of offers received for supply from foreign countries.

1.13 Documents Establishing Bidder's Eligibility and Qualifications

1.13.1 The Bidder shall furnish as part of its bid, documents establishing the Bidder's eligibility to bid and its qualification to perform the contract if its bid is accepted.

1.13.2 The documentary evidence of the Bidder's qualification to perform the contract if the bid is accepted shall establish to the Purchaser's satisfaction that; Bidder meets the qualification/eligibility Criteria listed in Bidding Documents, if any.

1.13.3 Conditional tenders shall not be accepted.

1.14 Documents Establishing Goods Eligibility and Conformity to Bidding Documents

1.14.1 To establish the Goods eligibility, the documentary evidence of the Goods and Services eligibility shall consist of a statement on the country of origin of the Goods and Services offered which shall be confirmed by a certificate of origin issued by a local chamber of commerce at the time of shipment.

1.14.2 To establish the conformity of the Goods and Services to the specifications and schedule of requirements of the Bidding Documents, the documentary evidence of conformity of the Goods and Services to the Bidding Documents may be in the form of literature, drawings and data, and shall consist of:

- (a) A detailed description of the essential technical and performance characteristics of the Goods;
- (b) A list giving full particulars, including available sources and current prices, of spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods following commencement of the use of the Goods by the Purchaser in the Priced - bid; and
- (c) An item-by- item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the Goods and Services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.

1.14.3 For purposes of the commentary to be furnished pursuant to above, the Bidder shall note that standard workmanship, material and equipment, designated by the Purchaser in its Technical Specifications are intended to be descriptive only not restrictive The Bidder may substitute these in its bid, provided that it demonstrates to the Purchaser's satisfaction that the Substitutions ensure substantial equivalence to those designated in the Technical Specifications.

1.15 Bid Security (BS) / Earnest Money Deposit (EMD)

1.15.1 The Bidder shall furnish, as part of its bid, a Bid Security (BS) / Earnest Money Deposit [EMD] for an amount as specified in the Invitation for Bids.

1.15.2 The Bid Security is required to protect the Purchaser against the risk of Bidder's conduct, which would warrant the security's forfeiture.

1.15.3 The Bid Security shall be in Indian Rupees for offers received for supply within India and denominated in the currency of the bid or in any freely convertible foreign exchange in the case of offers received for supplies from foreign countries in equivalent Indian Rupees. The Bid Security shall be in one of the following forms at the Bidder's option:

- (a) A Bank Guarantee [BG] issued by a Nationalized/Scheduled bank in the form provided in the Bidding Documents and valid for 45 days beyond the validity of the bid. In case a Bidder desires to submit a BG issued from a foreign bank, then the same should be confirmed by a Nationalized/Scheduled Indian bank, with all confirmation charges to the Bidder's account. Purchaser reserves the right to verify the authenticity of the Bank Guarantees from the issuing/confirming/controlling bank; or
- (b) Fixed Deposit Receipt pledged in favor of the Purchaser; or
- (c) Online payment in favor of the Purchaser.

1.15.4 The Bid Security shall be payable promptly upon written demand by the Purchaser in case the conditions listed in the ITB Sub-Clause 1.15.8 are invoked.

1.15.5 The Bid Security should be submitted in its original form. Copies shall not be accepted.

- 1.15.6 The Bid Security of the unsuccessful Bidder will be discharged/returned as promptly as possible positively within a period of 30 days after the expiration of the period of bid validity or placement of order whichever is later, without any interest.
- 1.15.7 The successful Bidder's Bid Security will be discharged upon the Bidder furnishing the Performance Security, without any interest. Alternatively, the BS could also be adjusted against PS, if it is paid through DD/BC.
- 1.15.8 The Bid Security may be forfeited:
- (a) If a Bidder withdraws or amends or impairs or derogates its bid during the period of bid validity specified by the Bidder on the Bid Form; or
 - (b) In case of a successful Bidder, if the Bidder fails to furnish Order Acknowledgement within 15 days of the order or fails to sign the contract and/or fails to furnish Performance Security within 21 days from the date of contract/ order.

1.16 Period of Validity of Bids

- 1.16.1 Bids shall remain valid for a minimum period of 180 days after the date of bid opening prescribed by the Purchaser. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 1.16.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by cable, telex, fax or e-mail). The Bid Security provided shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request will not be required nor permitted to modify its bid.
- 1.16.3 Bid evaluation will be based on the bid prices without taking into consideration the above corrections.

1.17 Format and Signing of Bid

- 1.17.1 Bids are invited on two-bid system, the Bidder shall submit the Bids in two separate parts. One part will be the Un-Priced Techno - Commercial Bid and the other shall be the Price Bid.

D – Submission of Bids

1.18 Submission of Bids

- 1.18.1 The Bidders may submit their Bids in the Tender Wizard portal as two separate bids.

E - Opening and Evaluation of Bids

1.19 Opening of Bids by the Purchaser

- 1.19.1 The Purchaser will open all Bids at a time in the Tender portal. The Price Bid shall be opened only after technical evaluation.

1.20 Confidentiality

- 1.20.1 Information relating to the examination, evaluation, comparison, and post-qualification of Bids, and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until publication of the Contract Award.
- 1.20.2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post-qualification of the Bids or contract award decisions may result in the rejection of its Bid.

1.21 Clarification of Bids

- 1.21.1 To assist in the examination, evaluation, comparison and post-qualification of the Bids, the

Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substance of the bid shall be sought, offered, or permitted. However, no negotiation shall be held except with the lowest Bidder, at the discretion of the Purchaser. Any clarification submitted by a Bidder in respect to its bid that is not in response to a request by the Purchaser shall not be considered.

1.22 Preliminary Examination

1.22.1 The Purchaser shall examine the Bids to confirm that all documents and technical documentation requested in ITB Clause 1.9 have been provided and to determine the completeness of each document submitted.

1.22.2 The Purchaser shall confirm that the following documents and information have been provided in the Bid. If any of these documents or information is missing, the offer shall be rejected.

- (a) Bid Form and Price Schedule Form, in accordance with ITB Clause 1.10. This condition pertains to the opening of Price Bid only;
- (b) All the Bids received will first be scrutinized to see whether the Bids meet the basic requirements as incorporated in the Invitation for Bids [IFB]. The Bids, that do not meet the basic requirements, are to be treated as unresponsive and ignored. The following are some of the important points, for which a tender may be declared as unresponsive and to be ignored, during the initial scrutiny:
 - (i) The Bid is unsigned.
 - (ii) Bid Security/ Earnest Money Deposit has not been furnished
 - (iii) The Bidder is not eligible.
 - (iv) The Bid validity is shorter than the required period.
 - (v) The Bidder has quoted for Goods manufactured by a different firm without the required authority letter from the proposed Manufacturer.
 - (vi) Bidder has not agreed to give the required Performance Security.
 - (vii) The Goods quoted are sub-standard, not meeting the required specification etc.
 - (viii) Against the schedule of Requirement (incorporated in the tender enquiry), the Bidder has not quoted for the entire requirement as specified in that schedule.
 - (ix) The Bidder has not agreed to some essential condition(s) incorporated in the tender enquiry.
 - (x) Bidder has not mentioned charges related to packing, forwarding, freight, insurance charges, taxes etc. as required under Instructions to Bidders Clause 1.11 thus rendering such offers as incomplete.

1.23 Responsiveness of Bids

1.23.1 Prior to the detailed evaluation, the Purchaser will determine the substantial responsiveness of each bid to the Bidding Documents. For purposes of this clause, a substantive responsive bid is one, which conforms to all terms and condition of the Bidding Documents without material deviations, reservations or omissions. A material deviation, reservation or omission is one that:

- (a) Affects in any substantial way the scope, quality, or performance of the Goods and Related Services specified in the Contract; or
- (b) Limits in any substantial way, inconsistent with the bidding documents, the purchase's rights or the bidder's obligations under the contract; or
- (c) If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive bids.

1.23.2 The purchaser's determination of a bid's responsiveness is to be based on the contents of the

bid itself without recourse to extrinsic evidence.

- 1.23.3 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation or omission.

1.24 Non-Conformity, Error and Omission

- 1.24.1 Provided that a Bid is substantially responsive, the Purchaser may waive any non-conformities or omissions in the Bid that do not constitute a material deviation.
- 1.24.2 Provided that a bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 1.24.3 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:
- (a) If there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
 - (b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
 - (c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.
- 1.24.4 Provided that a bid is substantially responsive, the Purchaser may request that a Bidder may confirm the correctness of arithmetic errors as done by the Purchaser within a target date. In case, no reply is received then the bid submitted shall be ignored and its Bid Security may be forfeited.

1.25 Examination of Terms & Conditions, Technical Evaluation

- 1.25.1 The Purchaser shall examine the Bid to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation.
- 1.25.2 The Purchaser shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 1.14, to confirm that all requirements specified in Schedule of Requirements of the Bidding Documents have been met without any material deviation or reservation.
- 1.25.3 If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with ITB Clause 1.23, it shall reject the Bid.

1.26 Conversion to Single Currency

- 1.26.1 To facilitate evaluation and comparison, the Purchaser will convert all bid prices expressed in the amounts in various currencies in which the bid prices are payable to Indian Rupees at the selling exchange rate established by any bank in India as notified in the Newspapers on the date of bid opening in the case of single part bidding and the rates prevalent on the date of

opening of the Price Bids in the case of two - part bidding. For this purpose, exchange rate notified in www.xe.com or www.rbi.org or any other website could also be used by the Purchaser.

1.27 Evaluation and comparison of Bids

1.27.1 The Purchaser shall evaluate each bid that has been determined, up to this stage of the evaluation, to be substantially responsive.

1.27.2 To evaluate a Bid, the Purchaser shall only use all the factors, methodologies and criteria defined below. No other criteria or methodology shall be permitted.

1.27.3 The Bids shall be evaluated on the basis of final landing cost which shall be arrived as under:
For Goods manufactured in India.

- a. The price of the Goods quoted ex -works including all taxes already paid.
- b. GST and other taxes & duties like excise duty etc. which will be payable on the Goods if the contract is awarded.
- c. Charges for inland transportation, insurance and other local Services required for delivering the Goods the desired destination.
- d. The installation, commissioning and training charges including incidental Services, if any.

For Goods manufactured abroad

- a. The price of the Goods, quoted on EXW [duly packed] / FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the Bidding Documents.
- b. The charges for insurance and transportation of the Goods to the port/place of destination.
- c. The agency commission etc., if any.
- d. The installation, commissioning and training charges including incidental Services, if any.

1.27.4 The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF/ CIP basis respectively. However, the CIF/CIP prices quoted by any foreign Bidder shall be loaded further as under:

- a. Towards customs duty and other statutory levies as per applicable rates.
- b. Towards custom clearance, inland transportation etc.

Note: Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offers shall be rejected as incomplete.

1.27.5 In the case of Purchase of many items against one tender, which are not inter-dependent or, where compatibility is not a problem, normally the comparison would be made on ex works, (in case of indigenous items) and on FOB / FCA (in the case of imports) prices quoted by the firms for identifying the lowest quoting firm for each item.

1.27.6 Orders for imported stores need not necessarily be on FOB/FCA basis. Rather it can be on the basis of any of the INCOTERMS specified in ICC INCOTERMS 2020 as may be amended from time to time by the ICC

1.27.7 Wherever the price quoted on FOB/FCA and CIF/CIP basis are the same, the Contract would be made on CIF / CIP basis only.

1.27.8 The GCC and the SCC shall specify the mode of transport i.e. whether by air/road/rail.

1.27.9 In case optional items are specified in the tendered specifications, the Purchaser reserves the right to buy or not to buy the optional items. In case the option is exercised to buy the optional

items after Bid opening, then the cost of optional items would be included to ascertain the Lowest Evaluated Responsive Bid. In case, the option is exercised not to buy the optional items, then the cost of the optional items would not be included in ascertaining the Lowest Evaluated Responsive Bid.

NOTE: Bidders not quoting the optional items entail the risk of their offer being summarily ignored in the event of the Purchaser deciding to buy the optional items after Bid opening.

1.28 Comparison of Bids

1.28.1 The Purchaser shall compare all substantially responsive Bids to determine the lowest-evaluated responsive bid, in accordance with ITB Clause 1.27.

1.29 Contacting the Purchaser

1.29.1 Subject to ITB Clause 1.21, no Bidder shall contact the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.

1.29.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the Bidder's bid.

1.30 Post qualification

1.30.1 In the absence of pre - qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clause 1.13.

1.30.2 The determination will take into account the eligibility criteria listed in the Bidding Documents and will be based up on Examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.

1.30.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the bidder's bid.

F- Award of Contract

1.31 Negotiations

1.31.1 There shall not be any negotiation normally. Negotiations, if at all, shall be an exception and only in the case of items with limited source of supply. Negotiations shall be held with the lowest evaluated responsive Bidder. Counter offers tantamount to negotiations and shall be treated at par with negotiations in the case of one-time purchases.

1.32 Award Criteria

1.32.1 Subject to ITB Clause 1.34 the Purchaser will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

1.33 Purchaser's right to vary Quantities at Time of Award

1.33.1 The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of Goods and Services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions. Further, at the discretion of the Purchaser, the quantities in the contract may be enhanced by 30% within the delivery period.

1.34 Purchaser's right to accept any Bid and to reject any or All Bids

1.34.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders.

1.35 Notification of Award

1.35.1 Prior to the expiration of the period of bid validity, the Purchaser will notify the successful Bidder in writing by registered letter or by cable or telex or fax or e-mail that the bid has been accepted and a separate Purchase Order shall follow through post.

1.35.2 Until a formal contract is prepared and executed, the notification of award shall constitute a binding contract.

1.35.3 Upon the successful bidder's furnishing of the signed contract form and performance security pursuant to ITB clause 1.38, the purchaser will promptly notify each unsuccessful bidder and will discharge its bid security

1.36 Signing of Contract

1.36.1 Promptly after notification, the Purchaser shall send the successful Bidder the Agreement/Purchase Order.

1.36.2 Within twenty - one (21) days of date of the Agreement / Purchase Order, the successful Bidder shall sign, date, and return it to the Purchaser.

1.37 Order Acknowledgement

1.37.1 The successful Bidder should submit Order Acknowledgement within 15 days from the date of issue of the Purchase Order / Contract, failing which it shall be presumed that the Supplier is not interested and his Bid Security is liable to be forfeited pursuant to clause 1.15.11 of ITB.

1.37.2 The Order Acknowledgement must be received within 15 days. However, the Purchaser has the powers to extend the time frame for submission of Order Acknowledgement and submission of Performance Security (PS). Even after extension of time, if the Order Acknowledgement /PS are not received, the contract shall be cancelled and limited tenders irrespective of the value shall be invited from the responding firms after forfeiting the Bid Security of the defaulting firm, where applicable, provided there is no change in specifications. In such cases the defaulting firm shall not be considered again for re-tendering in the particular case.

1.38 Performance Security

1.38.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish Performance Security in the amount specified in SCC, valid till 60 days after the warranty period. Alternatively, the PS may also be submitted at the time of release of final payment in cases where part payment is made against delivery & part on installation. The PS, where applicable, shall be submitted in advance for orders where full payment is to be made on Letter of Credit (LC) or on delivery. In this case, submission of PS at the time of negotiation of documents through Bank would be stipulated as a condition in the LC and the BS should be kept valid till such time the PS is submitted.

1.38.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

1.38.3 The Performance Security shall be denominated in Indian Rupees for the offers received for

supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries.

- 1.38.4 In the case of imports, the PS may be submitted either by the Principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the Manufacturer or their authorized dealer/Bidder.
- 1.38.5 The Performance Security shall be in one of the following forms:
- a. A Bank Guarantee [BG] or Stand- by Letter of Credit [SLC] issued by a Nationalized/Scheduled bank located in India or a Foreign bank [i.e. a bank located outside India] with preferably its operating branch in India. The BG shall be issued in the form provided with the Bidding Documents. In case of Performance Security being furnished in the shape of Bank Guarantee or Stand - by Letter of Credit issued by any foreign bank, the said BG/SLC shall have to be confirmed. All confirmation and other bank charges in this respect shall be borne by the Supplier. Purchaser shall independently verify the authenticity of the BGs from the issuing / confirming / controlling banks. Or;
 - b. Online payment in favour of the purchaser, or;
 - c. A Fixed Deposit Receipt pledged in favour of the Purchaser.
- 1.38.6 The Performance Security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC, without levy of any interest.
- 1.38.7 In the event of any contract amendment, the Supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the Performance Security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.
- 1.38.8 The Order Acknowledgement should be received within 15 days from the date of notification of award. However, the Purchaser has the powers to extend the time frame for submission of Order Acknowledgement and submission of Performance Security (PS). Even after extension of time, if the Order Acknowledgement /PS are not received, the contract shall be cancelled and limited tenders irrespective of the value would be invited from the responding firms after forfeiting the Bid Security of the defaulting firm, where applicable provided there is no change in specifications. In such cases the defaulting firm would not be considered again for re- tendering in the particular case.

CHAPTER - 2

CONDITIONS OF CONTRACT

A. GENERAL CONDITIONS OF CONTRACT (GCC)

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2.1. Definitions

2.1.1. The following words and expressions shall have the meanings hereby assigned to them:

- (a) "Contract" means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
- (b) "Contract Documents" means the documents listed in the Contract Agreement, including any amendments thereto.
- (c) "Contract Price" means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments
- (d) "Day Means" calendar day
- (e) "Completion" means the fulfillment of the related services by the Supplier in accordance with the terms and conditions set forth in the Contract.
- (f) "GCC" means the General Conditions of Contract
- (g) "Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.
- (h) "Related Service", means the services incidental to the supply of the Goods, such as transportation, insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.
- (i) "SCC" means the Special Conditions of Contract.
- (j) "Subcontractor" means any natural person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
- (k) "Supplier" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
- (l) The "Institute" means CMTI, Central Manufacturing Technology Institute registered under the Societies Registration Act, 1860 of Govt. Of India having its registered office at Tumkur Road, Bangalore - 560022, Karnataka, India and the "Purchaser" also means the above Institute situated at the above address in India as specified in SCC.
- (m) "Final Destination", where applicable, means the place named in the SCC.

2.2. Contract Documents

Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

2.3. Fraud and Corruption

2.3.1. The Purchaser requires that Bidders, Suppliers, contractors and consultants, if any, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy,

- (a) The terms set forth below are defined as follows:
 - (i) "**Corrupt practice**" means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;
 - (ii) "**Fraudulent practice**" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;
 - (iii) "**Collusive practice**" Means a scheme or arrangement between two or more

Bidders, with or without the knowledge of the Borrower, designed to establish bid prices at artificial, non-competitive levels; and

(iv) “Coercive practice” means harming or threatening to harm, directly or indirectly, persons or their Property to influence their participation in the procurement process or affect the execution of a contract;

(b) The Purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question.

2.4. Joint Venture, Consortium or Association

2.4.1. If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.

2.5. Scope of Supply

2.5.1. The Goods and Related Services to be supplied shall be as specified in the Schedule of Requirements.

2.6. Suppliers' Responsibility

2.6.1. The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with Scope of Supply Clause of the GCC, and the Delivery and Completion Schedule, as per GCC Clause relating to delivery and document.

2.7. Contract price

2.7.1. Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid.

2.8. Copyright

2.8.1. The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including Suppliers of materials, the copyright in such materials shall remain vested in such third party

2.9. Application

2.9.1. These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.

2.10. Standard

2.10.1. The Goods supplied and Services rendered under this Contract shall conform to the standards mentioned in the Technical Specifications and Schedule of requirements, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Good's country of origin and such standards shall be the latest issued by the concerned institution.

2.11. Use of Contract Documents and Information

2.11.1. The Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or

information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purposes of such performance.

- 2.11.2. The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated above except for purposes of performing the Contract.
- 2.11.3. Any document, other than the Contract itself, enumerated above shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Supplier's performance under the Contract, if so required by the Purchaser.

2.12. Patent Indemnity

2.12.1. The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 2.12.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

- (a) The installation of the Goods by the Supplier or the use of the Goods in India; and
- (b) The sale in any country of the products produced by the Goods.

2.12.2. If any proceedings are brought or any claim is made against the Purchaser, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may as its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claims.

2.13. Performance Security

2.13.1. Within 21 days of receipt of the notification of award/ PO, the Supplier shall furnish Performance Security in the amount specified in SCC, valid till 60 days after the warranty period. Alternatively, the PS may also be submitted at the time of release of final payment in cases where part payment is made against delivery & part on installation. The PS, where applicable, shall be submitted in advance for orders where full payment is to be made on Letter of Credit (LC) or on delivery. In this case, submission of PS at the time of negotiation of documents through Bank would be stipulated as a condition in the LC and the BS should be kept valid till such time the PS is submitted.

2.13.2. The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

2.13.3. The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries.

2.13.4. In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the Manufacturer or their authorized dealer/Bidder.

2.13.5. The Performance Security shall be in one of the following forms:

- (a) A Bank Guarantee [BG] or Stand - by Letter of Credit [SLC] issued by a Nationalized/Scheduled bank located in India or a Foreign bank with preferably its operating branch in India. The BG shall be issued in the form provided with the Bidding Documents. In case of Performance Security being furnished in the shape of Bank Guarantee or Stand - by Letter of Credit issued by any foreign bank, the said BG/SLC shall have to be confirmed by any nationalized bank of India. All confirmation and other bank charges in this respect shall be borne by the Supplier. Purchaser shall independently verify the authenticity of the BGs from the issuing / confirming / controlling banks. Or;
- (b) Online payment in favour of the Purchaser. Or;
- (c) A Fixed Deposit Receipt pledged in favour of the Purchaser.

2.13.6. The Performance Security will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC, without levy of any interest.

2.13.7. In the event of any contract amendment, the Supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the Performance Security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.

2.13.8. The order confirmation should be received within 15 days from the date of notification of award. However, the Purchaser has the powers to extend the time frame for submission of order confirmation and submission of Performance Security (PS)- Even after extension of time, if the order confirmation /PS are not received, the contract shall be cancelled and limited tenders irrespective of the value would be invited from the responding firms after forfeiting the Bid Security of the defaulting firm, where applicable provided there is no change in specifications. In such cases the defaulting firm would not be considered again for re- tendering in the particular case.

2.14. Inspections and Tests

2.14.1. The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in the SCC or as discussed and agreed to during the course of finalization of contract.

2.14.2. The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. The Technical Specifications and SCC shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.

2.14.3. The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no charge to the Purchaser.

2.14.4. Whenever the Supplier is ready to carry out any such test and inspection, it shall give reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or Manufacturer any necessary permission or

consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

- 2.14.5. Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the Goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
- 2.14.6. The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
- 2.14.7. The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 2.14.8. With a view to ensure that claims on insurance companies, if any, are lodged in time, the Bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the Bidder/ Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the Purchaser on the event of the delay.

2.15. Packing

- 2.15.1. The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling **during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage**. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.
- 2.15.2. The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract including additional requirements, if any, specified in SCC and in any subsequent instructions ordered by the Purchaser.

2.16. Delivery and Documents

- 2.16.1. Delivery of the Goods and completion and related Services shall be made by the Supplier in accordance with the terms specified by the Purchaser in the contract. The details of shipping and/ or other documents to be furnished by the Supplier are specified in SCC.
- 2.16.2. The terms FOB, FCA, CIF, CIP etc. shall be governed by the rules prescribed in the current edition of the INCOTERMS published by the International Chambers of Commerce, Paris.
- 2.16.3. The mode of transportation shall be as specified in SCC.

2.17. Insurance

- 2.17.1. Should the Purchaser elect to buy on CIF/CIP basis, the Goods supplied under the Contract shall be fully insured in Indian Rupees against any loss or damage incidental to manufacture or acquisition, transportation, Storage and delivery in the manner specified in SCC.

- 2.17.2. Where delivery of the Goods is required by the Purchaser on CIF or CIP basis the Supplier shall arrange and pay for Cargo Insurance, naming the Purchaser as beneficiary and initiate & pursue claims till settlement, on the event of any loss or damage.
- 2.17.3. Where delivery is on FOB or FCA basis, insurance would be the responsibility of the Purchaser.
- 2.17.4. With a view to ensure that claims on insurance companies, if any, are lodged in time, the Bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the Bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the Purchaser on the event of the delay.

2.18. Transportation

- 2.18.1. Where the Supplier is required under the Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Purchaser or other agreed point shall be arranged and paid for by the supplier, and the cost thereof shall be included in the Contract price.
- 2.18.2. Where the Supplier is required under the Contract to deliver the Goods CIF or CIP, transport of the Goods to the port of destination or such other named place of destination in the Purchaser's country, as shall be specified in the Contract shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price.
- 2.18.3. In the case of supplies from within India, where the Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance and storage, as specified in the Contract, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.

2.19. Incidental Services

- 2.19.1. The Supplier may be required to provide any or all of the Services, if any, specified in SCC.

2.20. Spare Parts

- 2.20.1. The Supplier shall be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
- (a) Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
 - (b) In the event of termination of production of the spare parts:
 - (i) Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
 - (ii) Following such termination, furnishing at no cost to the Purchaser, the blueprints,

drawings and specifications of the spare parts, if requested.

- (c) In case of OEM Supplier companies merges, amalgamation, take over or bifurcation etc., it is the responsibility of the Original Supplier to maintain the spare parts requirements for 10 years with the new Entity.

2.21. Warranty

- 2.21.1. The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
- 2.21.2. The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.
- 2.21.3. Unless otherwise specified in the SCC or technical specifications, the warranty shall remain valid as specified in the contract.
- 2.21.4. The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.
- 2.21.5. Upon receipt of such notice, the Supplier shall, within a reasonable period of time, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
- 2.21.6. If having been notified, the Supplier fails to remedy the defect within the reasonable period of time, the Purchaser expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
- 2.21.7. Goods requiring warranty replacements must be replaced on free of cost basis to the Purchaser at Purchaser site.

2.22. Terms of Payment

- 2.22.1. The method and conditions of payment to be made to the Supplier under this Contract shall be as specified in the SCC.
- 2.22.2. The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and the Services performed, and by documents, submitted pursuant to Delivery and document Clause of the GCC and upon fulfillment of other obligations stipulated in the contract.
- 2.22.3. Payments shall be made promptly by the Purchaser within a reasonable time after submission of the invoice or claim by the Supplier.
- 2.22.4. Payment shall be made in currency as indicated in the contract.

2.23. Change Orders and Contract Amendments.

- 2.23.1. The Purchaser may at any time, by written order given to the Supplier pursuant to Clause on Notices of the GCC make changes within the general scope of the Contract in any one or more of the following:
- (a) Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
 - (b) The method of shipping or packing;
 - (c) The place of delivery; and/or
 - (d) The Services to be provided by the Supplier.
 - (e) The delivery schedule.

2.23.2. If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within fifteen (15) days from the date of the Supplier's receipt of the Purchaser's change order.

2.23.3. No variation or modification in the terms of the contract shall be made except by written amendment signed by the parties.

2.24. Assignment

2.24.1. The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.

2.25. Sub contracts

2.25.1. The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or duties or obligation under the Contract.

2.26. Extension of time

2.26.1. Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser.

2.26.2. If at any time during performance of the Contract, the Supplier or its sub-contractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may, at its discretion, extend the suppliers time for performance with or without penalty, in which case the extension shall be ratified by the parties by amendment of the Contract.

2.26.3. Except as provided under the Force Majeure clause of the GCC, a delay by the Supplier in the performance of its delivery Obligations shall render the Supplier liable to the imposition of penalty pursuant to Penalty Clause of the GCC unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.

2.27. Penalty clause

2.27.1. Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services or contract value for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage specified in SCC. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause on Termination for Default. The SCC shall also indicate the basis for ascertaining the value on which the penalty shall be applicable.

2.28. Termination for Default

2.28.1. The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part

- (a) If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause on Extension of Time; or
- (b) If the Supplier fails to perform any other obligation(s) under the Contract; or
- (c) If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent or collusive or coercive practices as defined in GCC Clause on Fraud or Corruption in competing for or in executing the Contract.

2.28.2. In the event the Purchaser terminates the contract in whole or in part, he may take recourse to any one or more of the following action:

- (a) The Performance Security is to be forfeited;
- (b) The Purchaser may procure, upon such terms and in such manner as it deems appropriate, stores similar to those undelivered, and the Supplier shall be liable for all available actions against it in terms of the contract.
- (c) However, the Supplier shall continue to perform the contract to the extent not terminated.

2.29. Force Majeure

2.29.1. Notwithstanding the provisions of GCC Clauses relating to extension of time, penalty and Termination for Default the Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

2.29.2. For purposes of this Clause, “Force Majeure” means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

2.29.3. If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within 21 days of its occurrence. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

2.29.4. If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of force majeure for a period exceeding 60 days, either party may at its option terminate the contract without any financial repercussions on either side.

2.30. Termination for Insolvency

2.30.1. The Purchaser may at anytime terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.

2.31. Termination for Convenience

2.31.1. The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time. The notice of termination shall specify that termination is for the Purchaser’s convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

2.31.2. The Goods that are complete and ready for shipment within 30 days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

- (a) To have any portion completed and delivered at the Contract terms and prices
- (b) To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.

2.32. Settlement of Disputes

2.32.1. The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

2.32.2. If, after twenty – one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as herein after provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

2.32.3. The dispute settlement mechanism/arbitration proceedings shall be concluded as under:

- (a) In case of Dispute or difference arising between the Purchaser and a domestic Supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re - enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, Central Manufacturing Technology Institute and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
- (b) In the case of a dispute between the Purchaser and a Foreign Supplier, the dispute shall be settled by arbitration In accordance with provision of sub - clause (a) above. But if this is not acceptable to the Supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.

2.32.4. The venue of the arbitration shall be the place from where the purchase order or contract is issued.

2.32.5. Notwithstanding any reference to arbitration herein,

- (a) The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
- (b) The Purchaser shall pay the Supplier any monies due the Supplier.

2.33. Governing Language

2.33.1. The contract shall be written in English language which shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the English language only.

2.34. Applicable Law

2.34.1. The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction as specified in SCC.

2.35. Notices

- 2.35.1. Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX, e-mail or and confirmed in writing to the other party's address specified in the SCC.
- 2.35.2. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

2.36. Taxes and Duties

- 2.36.1. For Goods manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India.
- 2.36.2. For Goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/production.
- 2.36.3. If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

2.37. Right to use Defective Goods

- 2.37.1. If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the Goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such Goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the purchaser's operation.

2.38. Protection against Damage

- 2.38.1. The system shall not be prone to damage during power failures and trip outs. The normal voltage and frequency conditions available at site as under:
- a) Voltage 230 -V Single phase
 - b) Frequency 50 Hz.

2.39. Integrity Pact

As per directive of CVC all organizations have to adopt an Integrity Pact (IP) to ensure transparency, equity and competitiveness in major Public procurement activities. The integrity Pact envisages an agreement between the prospective Bidders/Vendors with the buyer committing the persons/officials of both the parties with the aim not to exercise any corrupt influence on any aspect of the contract. Only these Bidders/Vendors who are willing to enter into such an Integrity Pact with the buyer i.e, CMTI would be competent to participate in the bidding.

2.40. Site preparation and installation

The Purchaser is solely responsible for the construction of the equipment sites in compliance with the technical and environmental specifications defined by the Supplier. The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the Equipment, if required. The Supplier shall inform the Purchaser about the site preparation, if any, needed for installation, of the Goods at the Purchasers site immediately after notification of award/contract.

B. SPECIAL CONDITIONS OF CONTRACT (SCC)

The following Special Conditions of Contract (SCC) shall supplement and/or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

GCC 2.1(l)	The <i>Purchaser</i> is: CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru - 560022, Karnataka, India
GCC 2.1 (m)	The <i>Final Destination</i> is: CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru - 560022, Karnataka, India,
GCC 2.14.1	<p><i>Inspection and Acceptance Tests at Final Destination:</i></p> <p>The Inspection and Acceptance Tests at Buyer’s site (Final Destination) are as follows:</p> <p>The acceptance test will be conducted after the equipment/system is installed at Purchaser’s site by Supplier’s representatives to check conformity with the technical specifications and acceptance criteria. The acceptance will involve trouble free operation. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment/system is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified. In the event of the ordered item failing to pass the acceptance test, a period not exceeding two weeks will be given to rectify the defects and clear the acceptance test, failing which, the Purchaser reserves the right to get the equipment /system replaced by the Supplier at no extra cost to the Purchaser. Successful conduct and conclusion of the acceptance test for the installed Goods and equipment /system shall also be the responsibility and at the cost of the Supplier. Before the Goods and equipment /system are taken over by the Purchaser, the Supplier shall supply operation and maintenance Manuals together with Drawings of the Goods and equipment /system built. These shall be in such details as will enable the Purchase to operate, maintain, adjust and repair all parts of the works as stated in the specifications. The Manuals and Drawings shall be in the ruling language (English) and in such form and numbers as stated in the Contract. Unless and otherwise agreed, the Goods and equipment /system shall not be considered to be completed for the purposes of taking over until such Manuals and Drawing have been supplied to the Purchaser. On successful completion of acceptability test, receipt of deliverables, etc. and after the Purchaser is satisfied with the working of the equipment /system, the acceptance certificate signed by the Supplier and the representative of the Purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the equipment /system.</p>
GCC 2.15.2	<p><i>Packing</i></p> <p>The marking and documentation within and outside the packages shall be: Each package should have a packing list within it detailing the part No.(s), description, quantity, etc.</p> <p>Outside each package, the contract No., the name and address of the Purchaser and the final destination should be indicated on all sides and top. Each package should be marked as 1/x, 2/x,3/x.....x/x, where “x” is the total no of packages contained in the consignment. All the sides and top of each package should carry an appropriate indication / label / stickers indicating the precautions to be taken while handling / storage</p>

<p>GCC 2.16.1</p>	<p><i>Shipping/Dispatch documents</i></p> <p>Details of Shipping and other Documents to be furnished by the Supplier are</p> <p><u>A. For Goods manufactured within India</u></p> <p>Within 24 hours of dispatch, the Supplier shall notify the Purchaser the complete details of dispatch and also supply following documents by registered post / speed post and copies thereof by FAX/ E-mail.</p> <p>(a) Two copies of Supplier’s Invoice indicating, inter - alia description and specification of the Goods, quantity, unit price, total value;</p> <p>(b) Packing list;</p> <p>(c) Certificate of country of origin;</p> <p>(d) Insurance certificate, if required under the contract;</p> <p>(e) Railway receipt/Consignment note;</p> <p>(f) Manufacturer’s guarantee certificate and in- house inspection certificate;</p> <p>(g) Inspection Certificate issued by Purchaser’s inspector, if any and</p> <p>(h) Any other document(s) as and when required in terms of the contract.</p> <p>Note: 1. The nomenclature used for the item description in the invoices(s), packing list(s) and the delivery note(s) etc. Should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s)</p> <p>Note: 2. The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses</p> <p><u>[B] For Goods manufactured abroad</u></p> <p>Within 24 hours of dispatch, the Supplier shall notify the Purchaser the complete details of dispatch and also supply following documents by Registered Post/courier and copies thereof by FAX.</p> <p>(a) Two copies of Supplier’s Invoice giving full details of the Goods including quantity, value, etc.;</p> <p>(b) Packing list;</p> <p>(c) Certificate of country of origin issued by a local chamber of commerce;</p> <p>(d) Manufacturer’s guarantee and Inspection Certificate;</p> <p>(e) Inspection certificate issued by the Purchaser’s Inspector, if any;</p> <p>(f) Insurance Certificate, if required under the contract;</p> <p>(g) Name of the Vessel/Carrier</p> <p>(h) Port of Loading;</p> <p>(i) Date of Shipment;</p> <p>(j) Port of Discharge & expected date of arrival of Goods and</p> <p>(k) Any other document(s) as and when required in terms of the contract</p>
	<p>Note: 1.The nomenclature used for the item description in the invoices(s), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s)</p> <p>Note: 2. The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses</p>

GCC 2.16.3	<p>Transportation/ Dispatch</p> <p>In case of supplies from within India, the mode of transportation shall be by Air/Rail/Road. In case of supplies from abroad, the mode of transportation shall be by Air. For supplies from abroad, Supplier shall ensure that the Goods are transported through the authorized freight forwarder of Purchaser, whose name and other contact details shall be made available to Purchaser.</p> <p>Purchaser shall not accept dispatch / transportation of Goods through any other forwarder. Payment by L/C shall only be released against presentation of the House Air Way Bill issued by the authorized freight forwarder of Purchaser.</p>
GCC 2.17.1	<p>Insurance</p> <p>The Insurance shall be for an amount equal to the 110% of the CIF or CIP value of the contract from within “warehouse to warehouse (final destination)” on “ALL- RISKS basis including strikes, riots and civil commotion”</p>
GCC 2.19.1	<p>Incidental Services</p> <p>The Incidental Services to be provided are:</p> <ol style="list-style-type: none"> 1. Pre-dispatch Equipment Audit. 2. Installation and Commissioning of Goods/ Equipment. 3. Training on use/application. 4. Warranty Support [to be effective from the date of final acceptance at site, [CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru, Karnataka, India-560022] <p>The Cost of the above incidental services shall be included in the Contract Price and a Price Break-up shall also be given</p>
GCC 2.21.3	<p>Warranty</p> <p>The period of validity of Warranty shall be effective from the date of acceptance of the Goods to the entire satisfaction of the Purchaser. The Warranty shall be Comprehensive in nature. The warranty period shall be for the period as stipulated in the Technical Specifications</p>
GCC 2.22.1	<p>Payment</p> <p>The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:</p> <p><u>Payment for Goods supplied from abroad:</u></p> <p>Payment of foreign currency portion shall be made in the currency of the contract in the following manner:</p> <ol style="list-style-type: none"> (i) On Shipment: 80% (Eighty) percent of the Contract Price of the Goods shipped shall be paid through irrevocable letter of credit opened in favour of the Supplier in a bank in its country, upon submission of shipping documents specified in GCC Clause 2.16.1 (ii) On Acceptance: 20% (Twenty) percent of the Contract Price of Goods received shall be paid after successful installation & commissioning at CMTI upon submission of acceptance certificate.

GCC 2.22.1	<p>The L/C will be confirmed at the Suppliers cost, if requested specifically by the Supplier. All bank charges abroad shall be to the account of the beneficiary i.e. Supplier and all bank charges in India shall be to the account of the opener i.e. Purchaser. If L/C is requested to be extended/ reinstated for reasons not attributable to the Purchaser, the charges thereof would be to extended/ reinstated for reasons not attributable to the Purchaser; the charges thereof would be to the Suppliers' account. Payment of local currency portion shall be made in Indian Rupees within thirty (30) days of presentation of claim supported by a certificate from the Purchaser declaring that the Goods have been delivered and that all other contracted Services have been performed. The LC for 100% value of the contract shall be established after deducting the agency commission payable if any, to the Indian agent from the FOB /FCA /CIF value.</p> <p><u>[B] Payment for Goods and Services supplied from India:</u></p> <p>40% of payment PO value will be made after successful supply of outdoor units, AHU unit and control panel at CMTI.</p> <p>60% will be made after completion of installation of all items commissioning, testing, validation and certification from statutory bodies.</p>
GCC 2.27.1	<p>Liquidated Damages</p> <p>(i) The penalty shall be: [0.5%] Percent per week or part of a week towards late delivery and towards delay in installation and commissioning.</p> <p>(ii) The maximum amount of liquidated damages shall be: [10%] TEN Percent. The liquidated damages shall be levied on the delivered price of the delayed Goods or unperformed Services or contract value.</p>
GCC 2.34.1	<p>The place of jurisdiction is BENGALURU [KARNATAKA]</p>
GCC 2.35.1	<p>For notices, the Purchaser's address is: Attention: Group Head(Purchase & Stores) CMTI–Central Manufacturing Technology Institute, Tumkur Road, Bengaluru - 560022, Karnataka, India Email: purchase@cmti.res.in</p>

I. Additional conditions

1. The Tender is strictly on Item Rate basis.
2. Bidders are advised to visit the site at their cost, conduct survey of existing conditions so as to familiarize themselves with the site conditions, nature of works etc. and get all clarifications as may be necessary from CMTI before quoting the rates.
3. Quantities mentioned in the schedule of quantities may vary to any extent or may be deleted without assigning any reasons and as such, the rates quoted should be firm, workable, reasonable and should include all kinds of Taxes, Duties, Work Contract Tax, Octroi, GST etc. as applicable, overheads and profit etc. No separate charges for carriage or labour would be made. There is no question of extra payment above the quoted rate under any circumstance. In case of any variation in quantity or value, the same will not be made as a subject matter for dispute by the bidder.
4. No escalation shall be allowed on the rates of this contract.
5. The BIS / CPWD specifications shall be followed as applicable and in the absence of the same the decision of CMTI shall be final. The work has to be carried out only by OEMs or principles who are possessing valid authorization from the OEMs.
6. The contractor shall at the instructions of the CMTI within such time as notified, open up for inspection any work and should the contractor refuse or neglect to comply with such instructions, the CMTI may employ other workman to open of the same. Such work if it is found not in accordance with approved specifications, or the instructions, expenses of opening up and redoing if required shall be borne by and recoverable from the Contractor from any money due or which may become due to the contractor.
7. The successful tenderer is bound to carry out any or all items of work necessary for the completion of the job even though such items are not included in the quantities and rates.
8. The Contractor shall make necessary arrangement for watch and ward.
9. The bidders should quote their rates strictly adhering to Terms and Conditions stipulated in the Tender Document. Unsolicited correspondence after opening of the Tender shall not be entertained.
10. No bidder will be allowed to withdraw his Tender during the validity period.
11. Rates should be filled in the Bidders Schedule of Quantity in the Price –Bid neatly and no correction shall be made. Corrections, if any should be duly authenticated by the signing authority. The rates quoted should be written legibly in words and figures. If on check, differences are observed between the rates given by the Contractor in words and figures or in the amount worked out by him, the following procedure shall be followed.
 - a. When there is a difference between the rates in figures and in words, the rates, which corresponds to the amounts worked out by the Contractor shall be taken as correct.
 - b. When the amount of an item is not worked out by the Contractor or it does not correspond with the rate written either in figures or in words, then the rate quoted by the Contractor in words shall be taken as correct.

- c. When the rates quoted by the Contractor in figures and in words tallies, but the amount is not worked out correctly, the rate quoted by the Contractor shall be taken as correct and not the amount.
12. No advance shall be paid towards mobilization and cost of materials.
13. No compensation shall be admissible for any loss suffered by the Contractor during the execution of the work. It shall be the Contractor's sole responsibility to protect CMTI's staff, his employees and property against accidents from any cause and he shall indemnify CMTI against any claims for damage for injury to person or property, resulting from any such accidents with necessary Insurance cover.
14. Any damages caused to the building / premises during the execution of the work shall be made good by the Contractor at his risk and cost and if necessary, through suitable Insurance cover.
15. The work is to be undertaken only during working days and during the office timings. The work cannot be undertaken on Saturday, Sunday and any declared holidays except with the written approval of the CMTI.
16. The contractor has to make his own arrangement of stay for his employees outside the CMTI premises.
17. The Contractor shall use necessary safety equipment and maintain all safety measures during the execution of works and ensure compliance of Safety Code as per Rules and Regulations in force.
18. The Contractor shall engage necessary qualified and experienced supervisory staff at his cost during the execution of the work for attending to day-to-day affairs.
19. The Contractor shall submit the bills along with the accepted and jointly recorded measurement sheets duly certified by CMTI's Engineer.
20. The Contractor should have necessary Contract License and comply with the Labour Laws as applicable.
21. Notwithstanding anything stated above, CMTI reserves the right to assess the bidder's capability and capacity to perform the contract, should the circumstances warrant such assessment in the overall interest of CMTI.
22. The decision of CMTI in awarding the work shall be final and cannot be subjected to arbitration.
23. CMTI reserves the right to accept / negotiate / reject any Quotation either in whole or in part without assigning any reasons therefore whatsoever and without entering into any further correspondence and hence, CMTI shall be under no obligation to accept the lowest or any other Quotations received in response to this Quotation. The decision of CMTI in this regard shall be final and indisputable.
24. CMTI reserves the right of supersession of any of the conditions stipulated in the Quotation Document.
25. The contractor shall require shifting some of the furniture, electrical items, etc., to some other places within the office premises during the time of work and may also be required to place them in the appropriate place after completing the work. This may be

factored while quoting the bid, no extra payment shall be made for those works, beyond bid price.

26. There will be other works being carried out by various contractors in the said office premises. Hence Care should be taken not to damage any other works and also to coordinate with the other work contractors.
27. Measurement Book: The payment for all works done and for all materials supplied shall be made on the basis of detailed measurements recorded in MBs.
28. Testing of Materials: The contractors are required to submit samples of various materials, items, fittings, etc for the approval of the CMTI. The materials of brand names, if any, given in the contract shall only be selected.
29. Final bill: The final bill has to be submitted by the contractors as early as possible after the completion of the work along with completion of recording the final measurements.
30. Co-ordination and Monitoring: The contractor's site supervisor/ engineer will be coordinating and monitoring the project and report the progress to CMTI on weekly basis.
31. Site order book: Site order book shall be maintained on the site for issuing instructions to the contractor in the course of day to day supervision of the work.
32. Hindrance register: A hindrance register shall be maintained at the site to have a record of hindrances in the progress of work which may result in delays.
33. Idle Labour Clause:

I. In case the proposed work is held up for any site conditions not attributable to the contractor or for any decisions/ instructions/ want of details from CMTI or for any of the untoward situation, the contractor shall be allowed reasonable extension of time by the CMTI but any additional/ extra claim for payment to idle labour/ tools/ establishment/ plant etc, during this period shall not be the liability of the CMTI. The quoted rates should include for all such contingencies.

II. Whatever the reasons be, no claim for idle labour, additional establishment, cost of labour charges of tools and plants would be entertained under any circumstances.

2. SPECIAL CONDITIONS - HVAC

1. Tenderer is expected to visit the site before submission of the quotations. He must go through all the drawings and documents and fully acquaint himself with various conditions. No claim later account of lack knowledge of the site and working conditions will be entertained.
2. Owners/Project Manager/Architects/Consultants reserve the right to call upon any bidder to furnish explanations regarding the calculations and clarifications on any details. They have the right to visit the office of the bidder and the various works carried out by the bidder and all reasonable assistance in this regard shall be afforded by the tenderer.
3. Prices should be for an indivisible works contract basis and rates quoted shall include all royalties, taxes, octroi, entry tax and any other taxes leviable by the Government or local

statutory bodies, in effect, and the rates shall be all inclusive and no claim whatsoever will be entertained in this respect. However, customs and excise duty shall not be included in the prices.

4. A bill of quantities accompanies the tender documents. It shall be understood that the quantities in the schedule are only approximate and are liable to alterations at the discretion of the Owners/Project Manager/Architects/Consultants.
5. The supplier shall carry out the work under the direction and supervision of the Owners/Project Manager/Architects/Consultants or their representative at the site who shall guide the Project Manager from time to time. The supplier shall intimate the names of his Engineers who would be supervising the construction in line with the requirements as specified in the tender and would be responsible for taking the instructions and carrying out the work.
6. The tenderer is responsible for the due and proper execution of all the works, terms and conditions stipulated under this contract. He must examine the designs and satisfy himself of their feasibility. The responsibility of maintaining the conditions will rest with the supplier.
7. The Owners/Project Manager/Architects/Consultants or their representative at site shall have access to the workshop of the successful supplier to assure themselves of the quality of material and workmanship.
8. The Owners/Project Manager/Architects/Consultants decision about the quality of the material and workmanship will be final and binding and any material rejected and not complying with the specifications shall be immediately removed from the site by the Supplier.
9. The tenderer shall include in his rates all material, labor, tools, plant and equipment and transport which may be required in preparation and entire execution and full completion of the work.
10. In interpreting the specifications, the following order of decreasing importance shall apply:
 - 1) Schedule of quantities
 - 2) Particular specifications & Special Conditions
 - 3) Drawings
 - 4) General specifications

In case of discrepancy between the bill of quantities, the specifications and/or the drawings, the Owners/Project Manager/Architects/Consultants shall be the deciding authority as to which shall prevail, and their decision shall be final and conclusive.

11. The supplier must take necessary and effective measures and caution to prevent death and injuries to his laborer's or to any third party. He is solely responsible for the consequences arising out of deaths or injuries or robbery or any other losses of any sort caused through his carelessness or that of agents, representatives, or his laborer's. The supplier is bound to pay all compensations including workmen's compensation, ESI, PF, claims etc., in every case for the harm that befalls the owner from the demands, claims and expenses which are caused by his

execution of the contract. The successful supplier shall take out Supplier's All Risk (CAR) Insurance policy jointly in the name of the owner and the air-conditioning Supplier and the original policy shall be deposited with the employers. The supplier shall cover in the policy against loss or damage due to any causes such as fire, tempest, floods, earthquake, riots, civil war, and insurrection and against damage by aircraft.

12. Any item which is not covered in the Schedule of Rates, but required to be carried out on site, shall be paid as per the actual cost of materials, labor and tools and plant, plus 15% towards overhead and profit. The rates noted in the schedule of rates will apply for the entire project.
13. The supplier shall guarantee that all equipment's shall be free from defect due to defective materials and bad workmanship and that the equipment shall operate satisfactorily and the performance and efficiencies of the equipment shall not be less than the guaranteed values. The guarantee shall be valid for a period of 18 months after taking over and any parts found defective shall be replaced free of cost by the supplier. This period shall be known as defects liability period and shall be reckoned from the date the consultants certify the plant taking over as laid down in the tender conditions. The services of the air-conditioning supplier's personnel if requested during this period for such work shall be made available free of any cost. If defects are not remedied within a month of their occurrence, Owners may proceed to do as to the supplier's expenses, to be mutually agreed upon, without prejudice to any other rights.

DRAWINGS

14. The drawings furnished to the tenderer shall be interpreted using given dimension and nomenclature only; they shall not be scaled under any circumstances. Drawings to a large scale have precedence over those to a smaller scale. These drawings are general in nature and cannot be regarded as working drawings.
15. The equipment offered shall be accommodated within the space provided. If additional space is required for the equipment offered by the tenderers, they shall bring out this point clearly in the tender itself. They shall note that claims for additional space at a later stage will not be entertained.
16. Space allocated for major air-conditioning equipment shall be taken into consideration before ordering the equipment and they shall fit into the space provided with required clearances all round as per relevant regulations.
17. The drawings attached to these specifications are general in nature and cannot be regarded as working drawings. The supplier shall prepare his own detailed working drawings and get them approved by Owners/Consultant before execution. Prior to submission for approval, the supplier shall be responsible for thoroughly checking all drawings to ensure that they comply with the intent and the requirements of the contract specifications and that they fit in with the overall building layout.
18. After installation is completed, 6 sets of "As built drawings" shall be prepared in full incorporating all the changes and submitted to Owners/ Consultants along with 2 sets of soft copies on CDs within 1 month of the date of completion of installation.

LIST OF SIMILAR INSTALLATIONS & CAPABILITIES

19. The tenderer shall bring out specifically in the tender about his set up available in Indore for execution of the job. He shall bring out the list of installations of similar jobs carried out. He shall also identify the Engineer who will be assigned for the execution of the job. The Engineers proposed by the supplier has to be formally Accepted by the Owners/Project Manager/Architects/Consultants.

WORKMANSHIP

20. Specific emphasis is made as far as the quality of the workmanship is concerned. The successful supplier has to co-ordinate properly with the Owners / consultants for ensuring the best workmanship. In case the quality of the work of the supplier is not acceptable to the Owners/Project Manager/Architects/Consultants the same shall be redone to the utmost satisfaction of the Owners / Consultants, failing which Consultants have the liberty to get the job executed on his own/or through other agencies and the supplier will be debited accordingly.

ACCEPTANCE OF EQUIPMENTS & MATERIALS

21. The major equipment's proposed by the tenderer should have proved its performance at least for a period of one year satisfactorily elsewhere. The Owners/ Consultants have the liberty to acquire more data to ascertain the performance of the equipment for which the supplier has to render reasonable assistance. The decision of accepting or rejecting the equipment's/materials will rest with the Project Manager/Owners/Project Manager/Architects/Consultants.
22. In case the tenderer is proposing alternate make of equipment's and materials, he should bring out the salient features and advantages of such items over the proposed make of equipment's / materials. The decision of the Owners/Consultant in this regard is final and binding.

TESTING

23. After manufacture of the equipment, all the necessary routine tests shall be carried out as per the relevant standards as listed in the Particular specifications. Routine and type tests for the various items of equipment shall be performed at the supplier's/manufacturer's works and test certificates shall be furnished. The Owners/consultant may depute their authorized representatives to be present during these tests if they desire to do so. The supplier shall provide all test equipment's, labor and other service required for these tests free of cost.
24. On completion of the installation the supplier shall conduct under the direction of Owners/Project Manager/Architects/Consultants and in the presence of the Owners and Consultant or their representatives perform tests on the plant as per the "Testing Procedures" in the Particular specifications. In the event full load due to appliances/product load as specified in the design data is not available and/or if the date of test does not coincide with peak summer or monsoon or winter conditions as the case may be, the supplier shall nevertheless conduct tests in the prevailing conditions both shall also repeat them as and when full load due to appliances materializes and during the peak seasons during the Defect Liability period. During such tests the plant shall be kept running continuously for a period of 48 hours. In case the performance does not meet the full intent of the specifications and further tests are considered necessary, the supplier shall bear all expenses thereof.

OPERATING INSTRUCTIONS & TRAINING

25. The supplier shall furnish a neatly typed set of operating instructions securely framed. These instructions shall include information and guidance on operating pressures, temperatures, air quantities etc. The supplier shall submit 2 copies of operating and maintenance manuals. Such manuals shall include the equipment catalogues, technical details as per the form Ats in the tender, wiring diagrams, list of spare parts, part numbers and other relevant information.
26. The supplier shall train the Owner's operating and maintenance staff in the operation, repairs and maintenance procedures during installation and maintenance period. Routine operation of the plant for a period of 30 days after handing over the plant shall be done by the Supplier along with the Owner's operating staff. Supplier has to impart training during planning, installation, testing and commissioning of the plant also.

STANDARDS

27. Wherever reference has been made to various standards in the particular specifications, the latest version of the same at the time of tendering shall be applicable.

WORKS TO BE DONE BY THE TENDERER

28. The tenderer shall include the following works along with the other works mentioned in the tender:
 - a. All foundation bolts, vibration isolation pads, etc. for the equipment.
 - b. Any other works connected with air-conditioning which is deemed to have been included in the scope of this contract for ensuring satisfactory performance of the plant.

WORKS CARRIED OUT BY OTHER AGENCIES

Electrical Panels, cabling and earthing. Civil works such as construction of AHU rooms, foundation for equipment's, making openings for entry of pipes, ducts etc. However, detailed drawings shall be furnished by the supplier as required at stipulated time.

POST WARRANTY MAINTENANCE

29. Tenderers shall quote separately for post warranty maintenance of the air- conditioning system on a comprehensive basis inclusive of materials and labor. They shall also quote alternatively only on labor basis in case the spares are provided by Project Manager. They shall indicate the list of spares to be arranged by Project Manager in this regard.

IMPORTED EQUIPMENTS

30. Tenderers are required to note that forms regarding concessional/ nil excise/customs duty will be provided by the owners.
As such the tenderers are required not to include the excise duty/customs duty in their offer. However they shall indicate separately the quantum of excise duty/customs duty applicable. Tenderers who are offering imported equipment's are also required to exclude the customs duty in their quotation, but shall indicate the quantum of customs duty applicable and the exchange rate of the currency considered in their offer. The tenderers are required to include

along with the imported equipment's, their rates for clearing the consignment till site including freight, insurance, installation, testing and commissioning charges in Indian Rupees. No L.C will be opened by Owners and only 100% wire transfer on receipt of materials at site is applicable. The successful supplier has to provide all assistance to the Owners and submit the required documents and clear the consignments on behalf of the Owners.

SUBMITTALS

31. The successful supplier shall prepare the technical submittals for approval before ordering the materials. It is likely that such submittals may change the makes of certain equipments/items even though the same was proposed by the supplier during the tender stage, when such items do not comply fully with the specifications and requirements. No escalation in price is feasible under such circumstances. Samples and catalogues highlighting the equipments and materials shall accompany the submittals. Technical submittals shall bring out clearly the deviations to the tender specifications. The approval of the technical submittals rests with the Owners/Project Manager/Architects/Consultants.

QUALITY CHECK FORMS

32. The successful contractor shall submit to the consultants/owners on a daily basis the quality control check forms duly filled in. Erection shall be considered complete only if stage-wise quality inspection is completed in all aspects. The contractor shall take the instructions from Consultants and Owners and strictly comply with the same.

PROJECT MANAGEMENT

33. The successful contractor shall monitor the project on a daily basis using advanced project management techniques.

SITE FACILITIES/INFRASTRUCTURE

34. Successful contractor shall employ the committed accepted manpower at site all times. Non availability of the required manpower from the contractor's part justifying the lesser manpower is not acceptable and will result in serious default of the conditions of the contract. The manpower committed shall not be changed or withdrawn without the prior approval of the Owners / Consultants. The site office shall have independent telephone/cell phone/pager for the Site In charge. The site office shall have all the required documents such as contract, agreement and drawings. The contractor shall have the following personnel on full time basis at the site:

CHAPTER - 3**SCHEDULE OF REQUIREMENTS**

TO BE FILLED BY BIDDER AND ENCLOSED WITH THE TECHNO- COMMERCIAL
 BID

Brief Description of Goods and Services	Quantity
Supply, Installation, Testing and Commissioning of alternate VRF Air-Conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB Located in New NMTC Building, CMTI, Bangalore	As per Bill of quantity
Final Destination	CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru - 560022, Karnataka, India
Period of Delivery shall count from	< TO BE FILLED BY BIDDER>
Time period by which the goods shall be ready at manufacturer's site for pre-dispatch Equipment Audit	< TO BE FILLED BY BIDDER>
Delivery Period [Goods to be delivered in one lot at final destination CMTI - Central Manufacturing Technology Institute, Tumkur Road, Bengaluru, Karnataka,India-560022]	< TO BE FILLED BY BIDDER>
Time frame required for conducting installation, commissioning of the Goods etc. after arrival of the Goods at Final destination	< TO BE FILLED BY BIDDER>

NOTE: The party has to offer their product /equipment strictly based on the specifications asked in the Bidding Documents.

CHAPTER- 4**PART-A****SPECIFICATIONS AND ALLIED TECHNICAL
DETAILS**

Supply, Installation, Testing and Commissioning of alternate VRF Air-conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB located in New NMTC Building at CMTI, Bangalore.

Note: 1. These specifications are not meant to be exhaustive and prescribe the minimum acceptable standards. Where these do not cover certain items and aspects, the best engineering practice/CMTI engineer's instructions shall be followed.

Note: 2. All codes and standards mean the latest. Necessary I.S.O Codes are mentioned along with these specifications and all relevant codes with divisions published on date shall be applicable.

1. GENERAL

1.1 All the supply & work shall be in accordance with the ISO specifications, recognized standards, and modern approved practice and shall meet the requirements of the latest issue of applicable codes, factory rules and regulations, supply codes.

1. Equipment schedule (Internal)**FLOOR MOUNTED AIRHANDLING UNIT: AHU-05 (DBS LAB)**

Description	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify	Remarks
Area served		
No. of units		
Type of unit		
Type of fan		
Type of discharge		
Type of casing		
Material of casing		
Type of construction		
Air quantity (CFM)		
Air quantity (FA CFM)		
Capacity (TR)		
No. of rows		
Fan static pressure		
Coil & filter face velocity		
Fan motor KW		
Type of fan motor		
No of Fans		
Variable frequency drive unit		
Type of protection		
Type of insulation		
Type of Pre filters		
Type of Fine filters		
Commissioning filters		

FLOOR MOUNTED AIRHANDLING UNIT: AHU-12 (DM LAB)

Description	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify	Remarks
Area served		
No. of units		
Type of unit		
Type of fan		
Type of discharge		
Type of casing		
Material of casing		
Type of construction		
Air quantity (CFM)		
Air quantity (FA CFM)		
Capacity (TR)		
No. of rows		
Fan static pressure		
Coil & filter face velocity		
Fan motor KW		
Type of fan motor		
No of Fans		
Variable frequency drive unit		
Type of protection		
Type of insulation		
Type of Pre filters		
Type of Fine filters		
Commissioning filters		

2. TECHNICAL DATA SHEET CUM SUBMITTAL

FLOOR MOUNTED AIR HANDLING UNITS AHU-05 (DBS LAB)

<p>FOLLOWING TECHNICAL DATA SHALL BE DULY FILLED AND SUBMITTED ALONG WITH THE TENDER. TENDERS WITH INCOMPLETE DATA ARE LIABLE FOR REJECTION. FURNISH DATA STRICTLY AS PER THE UNITS CALLED FOR.</p>		
Description	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify	Remarks
AIR QUANTITY IN CFM		
Make and Origin		
Model		
Overall Dimensions - W x D x H - mm		
Overall weight - Kg		
Material and thickness of casing in mm:		
Inner casing		
Outer casing		
Material of insulation		
Thickness of insulation (mm)		
Make of blower		
Orign of blower		

Type of fan (forward/backward)		
No. of fans		
Air flow - CMH		
Total Static pressure - mm wg		
Operating speed - RPM		
Critical speed - RPM		
Type of drive (Direct/belt)		
BKW		
Fan outlet velocity - MPS		
Type of bearings		
Whether statically and dynamically balanced ?	Yes/No	
Noise level at 1m from fan (dBA)		
Noise level at 1m from the filter side (dBA)		
Whether inbuilt sound attenuator for AHU included	Yes/No	
Depth of sound attenuator - mm		
Vibration level		
Capacity of cooling coil - TR		
Coil face area - sq.mt		
Total surface area - sq.mt		
No. of rows		
Material of tube and fins		
Diameter of tube - mm		
No. of fins/cm		
Type of fins		
ADP - deg. C		
Entering air temperature DB & WB		
Leaving air temperature DB & WB		
Type of pre filters		
Size and number of pre filters		
Media used		
Face velocity across filter (MPS)		
Arrestance & efficiency		
Resistance when clean - mm		
Method of cleaning		
Make of motor		
KW of motor		
Type of motor		
Speed of motor		
Degree of motor protection		
Starting current of motor - Amps		
Full load current of motor - Amps		
Class of insulation		
Whether single/three phase		
Whether provision for cable entry provided	Yes/No	
Whether commissioning filter included	Yes/No	
Whether marine lights included	Yes/No	
Whether door switch included	Yes/No	

Whether mesh for the fan section included	Yes/No	
COMMERCIAL DATA		
ITEMS FOR WHICH CUSTOMS DUTY EXEMPTION IS CONSIDERED		
ITEMS FOR WHICH EXCISE DUTY EXEMPTION IS CONSIDERED		
COMPLETION PERIOD (MONTHS)		
VAT INCLUDED%+		
SERVICE TAX INCLUDED (%)		
APPROXIMATE ENTRY TAX LIABILITY	INDICATED/NOT INDICATED	
WHETHER THE CONTRACTOR WILL		
CLEAR THE CONSIGNMENT BEING IMPORTED	Yes/No	
CURRENCY AND EXCHANGE RATE FOR IMPORTED ITEMS		
SERVICE RESPONSE TIME IN HOURS		
MAJOR DOWN TIME IN DAYS		
MINOR DOWN TIME IN HOURS		
GUARANTEE PERIOD IN MONTHS		
WHETHER MARINE CUM ERECTION INSURANCE INCLUDED	Yes/No	
PRICE FOR AMC SUBMITTED	Yes/No	
NAME OF PROJECT MANAGER:		
NAME OF ENGINEER 1		
NAME OF ENGINEER 2		
NAME OF SUPERVISOR 1		
NAME OF SUPERVISOR 2		
SPECIAL NOTE:		
TENDERERS SHALL ENCLOSE WITH THEIR OFFER THE FOLLOWING:		
COMPANY PROFILE / LOCAL BRANCH ORGANISATION CHART		
SITE ORGANISATION CHART/SITE FACILITIES		
INFRASTRUCTURE OF THE LOCAL OFFICE FOR EXECUTION OF THE JOB & SERVICE SET UP INDICATING THE MANPOWER		

NAMEWISE.		
ARRANGEMENT FOR DUCTING, PIPING & INSULATION WORKS		
LIST OF SIMILAR JOBS EXECUTED FOR THE PAST TWO YEARS & JOBS UNDER EXECUTION		
BIO-DATA & EXPERIENCE OF THE SITE TEAM PROPOSED.		

Date:

SIGNATURE OF TENDERER WITH SEAL

FLOOR MOUNTED AIR HANDLING UNITS AHU-12 (DM LAB)

FOLLOWING TECHNICAL DATA SHALL BE DULY FILLED AND SUBMITTED ALONG WITH THE TENDER. TENDERS WITH INCOMPLETE DATA ARE LIABLE FOR REJECTION. FURNISH DATA STRICTLY AS PER THE UNITS CALLED FOR.		
Description	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify	Remarks
AIR QUANTITY IN CFM		
Make and Origin		
Model		
Overall Dimensions - W x D x H - mm		
Overall weight - Kg		
Material and thickness of casing in mm:		
Inner casing		
Outer casing		
Material of insulation		
Thickness of insulation (mm)		
Make of blower		
Origin of blower		
Type of fan (forward/backward)		
No. of fans		
Air flow - CMH		
Total Static pressure - mm wg		
Operating speed - RPM		
Critical speed - RPM		
Type of drive (Direct/belt)		
BKW		
Fan outlet velocity - MPS		
Type of bearings		
Whether statically and dynamically balanced ?	Yes/No	
Noise level at 1m from fan (dBA)		
Noise level at 1m from the filter side (dBA)		
Whether inbuilt sound attenuator for AHU included	Yes/No	
Depth of sound attenuator - mm		
Vibration level		

Capacity of cooling coil - TR		
Coil face area - sq.mt		
Total surface area - sq.mt		
No. of rows		
Material of tube and fins		
Diameter of tube - mm		
No. of fins/cm		
Type of fins		
ADP - deg. C		
Entering air temperature DB & WB		
Leaving air temperature DB & WB		
Type of pre filters		
Size and number of pre filters		
Media used		
Face velocity across filter (MPS)		
Arrestance & efficiency		
Resistance when clean - mm		
Method of cleaning		
Make of motor		
KW of motor		
Type of motor		
Speed of motor		
Degree of motor protection		
Starting current of motor - Amps		
Full load current of motor - Amps		
Class of insulation		
Whether single/three phase		
Whether provision for cable entry provided	Yes/No	
Whether commissioning filter included	Yes/No	
Whether marine lights included	Yes/No	
Whether door switch included	Yes/No	
Whether mesh for the fan section included	Yes/No	
COMMERCIAL DATA		
ITEMS FOR WHICH CUSTOMS DUTY EXEMPTION IS CONSIDERED		
ITEMS FOR WHICH EXCISE DUTY EXEMPTION IS CONSIDERED		
COMPLETION PERIOD (MONTHS)		
VAT INCLUDED%+		
SERVICE TAX INCLUDED (%)		
APPROXIMATE ENTRY TAX LIABILITY	INDICATED/NOT INDICATED	
WHETHER THE CONTRACTOR WILL		

CLEAR THE CONSIGNMENT BEING IMPORTED	Yes/No	
CURRENCY AND EXCHANGE RATE FOR IMPORTED ITEMS		
SERVICE RESPONSE TIME IN HOURS		
MAJOR DOWN TIME IN DAYS		
MINOR DOWN TIME IN HOURS		
GUARANTEE PERIOD IN MONTHS		
WHETHER MARINE CUM ERECTION INSURANCE INCLUDED	Yes/No	
PRICE FOR AMC SUBMITTED	Yes/No	
NAME OF PROJECT MANAGER:		
NAME OF ENGINEER 1		
NAME OF ENGINEER 2		
NAME OF SUPERVISOR 1		
NAME OF SUPERVISOR 2		
SPECIAL NOTE:		
TENDERERS SHALL ENCLOSE WITH THEIR OFFER THE FOLLOWING:		
COMPANY PROFILE / LOCAL BRANCH ORGANISATION CHART		
SITE ORGANISATION CHART/SITE FACILITIES		
INFRASTRUCTURE OF THE LOCAL OFFICE FOR EXECUTION OF THE JOB & SERVICE SET UP INDICATING THE MANPOWER NAMEWISE.		
ARRANGEMENT FOR DUCTING, PIPING & INSULATION WORKS		
LIST OF SIMILAR JOBS EXECUTED FOR THE PAST TWO YEARS & JOBS UNDER EXECUTION		
BIO-DATA & EXPERIENCE OF THE SITE TEAM PROPOSED.		

DATE:

SIGNATURE OF TENDERER WITH SEAL

3. TESTS:

THE FOLLOWING READINGS SHALL BE TAKEN DURING THE TESTING OF THE AIR-CONDITIONING PLANT. FUNCTION OF EACH CONTROL, ELECTRICAL INTERLOCK SHALL BE TESTED. ALL THESE READINGS SHALL BE TAKEN JOINTLY WITH THE OWNERS/ CONSULTANTS OR THEIR REPRESENTATIVES AND SHALL BE JOINTLY SIGNED. A COPY OF THE TEST REPORT WITH CAPACITY COMPUTATION SHALL BE SUBMITTED TO THE CONSULTANTS.

AHU 05 DBS LAB

SL. NO.	DESCRIPTION	UNITS	Readings	REMARKS
1	AMBIENT CONDITIONS			
	Dry bulb temperature	deg. C		
	Wet bulb temperature	deg. C		
	Relative humidity	%		
2	INSIDE CONDITIONS (These readings shall be indicated in the as-built drawings)			
	Dry bulb temperature	deg. C		
	Wet bulb temperature	deg. C		
	Relative humidity	deg. C		
3	FLOOR MOUNTED AIR HANDLING UNITS			
	Entering air dry bulb temperature	deg. C		
	Entering air wet bulb temperature	deg. C		
	Leaving air dry bulb temperature	deg. C		
	Leaving air wet bulb temperature	deg. C		
	Coil face area	Sq.mt		
	Face velocity	FPM		
	Air flow rate	CMH		
	Static pressure	MM wg		
	Fan speed	RPM		
	Voltage- Volts	Volts		
	Current- Amps	Amps		
	Noise level at 1m	dBA		
	Vibration level	Microns		
	Water flow rate	1 LPM		
4	VARIABLE FREQUENCY DRIVE UNITS			

	Check for protection, bypass (manual mode)			
	Analyse operation at various test conditions			
5	NOISE LEVEL			
	Noise level inside the conditioned area	dBa		
6	IAQ LEVEL			
	Carbon-di-oxide measure in ppm for various areas including basement			

AHU 12 DM LAB

SL. NO.	DESCRIPTION	UNITS	Readings	REMARKS
1	AMBIENT CONDITIONS			
	Dry bulb temperature	deg. C		
	Wet bulb temperature	deg. C		
	Relative humidity	%		
2	INSIDE CONDITIONS (These readings shall be indicated in the as-built drawings)			
	Dry bulb temperature	deg. C		
	Wet bulb temperature	deg. C		
	Relative humidity	deg. C		
3	FLOOR MOUNTED AIR HANDLING UNITS			
	Entering air dry bulb temperature	deg. C		
	Entering air wet bulb temperature	deg. C		
	Leaving air dry bulb temperature	deg. C		
	Leaving air wet bulb temperature	deg. C		
	Coil face area	Sq.mt		
	Face velocity	FPM		
	Air flow rate	CMH		
	Static pressure	MM wg		
	Fan speed	RPM		
	Voltage- Volts	Volts		
	Current- Amps	Amps		
	Noise level at 1m	dBa		

	Vibration level	Microns		
	Water flow rate	1 LPM		
4	VARIABLE FREQUENCY DRIVE UNITS			
	Check for protection, bypass (manual mode)			
	Analyse operation at various test conditions			
5	NOISE LEVEL			
	Noise level inside the conditioned area	dBa		
6	IAQ LEVEL			
	Carbon-di-oxide measure in ppm for various areas including basement			

NOTE:

ALL INSTRUMENTS SHALL BE PROVIDED BY THE AIR-CONDITIONING CONTRACTOR. PROVIDE CALIBRATION CERTIFICATE FOR ALL INSTRUMENTS.

TAKE TEMPERATURE AND NOISE IN A GRID OF 3 X 3 M.

4. **GUIDELINES OF PARAMETERS: AHU 05**

- Noise level inside the conditioned area - 45 dBA
- Noise level of air handling units at 1 m distance - not exceeding 65 dBA
- Vibration level of air handling units - not exceeding 75 microns peak to peak
- Coil face velocity across air handling units shall not exceed 1.78 mps
- Face velocity across filters having a thickness of 50 mm shall not exceed 1.02 mps
- The performance of all equipments shall be as per the equipment schedule/technical submittal approved and shall be within a tolerance of +/- 5%
- Air quantity shall be measured using digital anemometer
- Dry bulb temperature shall be measured using electronic thermometers
- Wet bulb temperature shall be measured using sling psychomotor with mercury thermometers in deg. F scale
- Noise level shall be measured using dB meter using octave band scale Flow shall be measured using balancing valve using electronic gadgets
- Water Pressure drop shall be measured using bourden type pressure gauge
- Air side pressure drop shall be measured using manometer
- Electrical parameters shall be measured using voltmeters, ammeters, power factor meters and watt Meter
- Speed shall be measured using electronic stroboscope
- For differential readings use the same instrument
- For IAQ measurement use Infrared Carbon-di-oxide sensor

GUIDELINES OF PARAMETERS: AHU 12

- Noise level inside the conditioned area - 45 dBA
- Noise level of air handling units at 1 m distance - not exceeding 65 dBA

- Vibration level of air handling units - not exceeding 75 microns peak to peak
- Coil face velocity across air handling units shall not exceed 1.78 mps
- Face velocity across filters having a thickness of 50 mm shall not exceed 1.02 mps
- The performance of all equipments shall be as per the equipment schedule/technical submittal approved and shall be within a tolerance of +/- 5%
- Air quantity shall be measured using digital anemometer
- Dry bulb temperature shall be measured using electronic thermometers
- Wet bulb temperature shall be measured using sling psychomotor with mercury thermometers in deg. F scale
- Noise level shall be measured using dB meter using octave band scale Flow shall be measured using balancing valve using electronic gadgets
- Water Pressure drop shall be measured using bourden type pressure gauge
- Air side pressure drop shall be measured using manometer
- Electrical parameters shall be measured using voltmeters, ammeters, power factor meters and watt Meter
- Speed shall be measured using electronic stroboscope
- For differential readings use the same instrument
- For IAQ measurement use Infrared Carbon-di-oxide sensor

5. QUALITY CHECK LIST (to be submitted during inspection stage) AHU 05

Area :
 Drawing No:
 Date :
 Checked by :
DUCTING

DESCRIPTION	CHECK LIST	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify
ANGLE IRON FLANGES:		
THICKNESS OF ANGLE	AS PER REQUIREMENT - YES/NO	
UNIFORMLY CUT	YES/NO	
WELDING	PROPER / IMPROPER	
PRIMER AND BLACK	APPLIED / NOT APPLIED	
CORNERS/EDGES	SHARP / BEVELED / GROUND	
BOLT HOLES	UNIFORMLY SPACED OR NOT	
FASTENERS:		
QUALITY	ACCEPTABLE / NOT	
MATERIAL OF FASTENER	GALVANISED / MS	
SUPPORTS:		
THICKNESS	AS PER REQUIREMENT - YES/NO	
QUALITY	ACCEPTABLE / NOT	
ERECTION WORKS:		
DRAIN PIPING		
SLOPE OF DRAIN PIPES	PROPER/IMPROPER	

THERMAL INSULATION:		
MATERIAL OF	FIBRE GLASS / EPS/SYN. FOAM	
THICKNESS	AS PER REQUIREMENT - YES /	
WHETHER TF GRADE	YES/NO	
ALUMINIUM FOIL	PROPER / IMPROPER	
ALUMINIUM TAPE	MISSING / FOUND	
SAGGING INSULATION	YES / NO	
EXPOSED FIBERGLASS	YES / NO	

Owners representative Consultant representative Contractors representative

QUALITY CHECK LIST (to be submitted during inspection stage) AHU 12

Area :
 Drawing No:
 Date :
 Checked by :
DUCTING

DESCRIPTION	CHECK LIST	DATA TO BE FILLED BY BIDDERS YES OR NO or write values. if NO please specify
ANGLE IRON FLANGES:		
THICKNESS OF ANGLE	AS PER REQUIREMENT - YES/NO	
UNIFORMLY CUT	YES/NO	
WELDING	PROPER / IMPROPER	
PRIMER AND BLACK	APPLIED / NOT APPLIED	
CORNERS/EDGES	SHARP / BEVELED / GROUND	
BOLT HOLES	UNIFORMLY SPACED OR NOT	
FASTENERS:		
QUALITY	ACCEPTABLE / NOT	
MATERIAL OF FASTENER	GALVANISED / MS	
SUPPORTS:		
THICKNESS	AS PER REQUIREMENT - YES/NO	
QUALITY	ACCEPTABLE / NOT	
ERECTION WORKS:		
DRAIN PIPING		
SLOPE OF DRAIN PIPES	PROPER/IMPROPER	
THERMAL INSULATION:		
MATERIAL OF	FIBRE GLASS / EPS/SYN. FOAM	
THICKNESS	AS PER REQUIREMENT - YES /	
WHETHER TF GRADE	YES/NO	

ALUMINIUM FOIL	PROPER / IMPROPER	
ALUMINIUM TAPE	MISSING / FOUND	
SAGGING INSULATION	YES / NO	
EXPOSED FIBERGLASS	YES / NO	

Owners representative Consultant representative Contractors representative

MAKE LIST

PREFERRED MAKE LIST OF MATERIALS- HVAC & ELECTRICAL			
SR. NO	DETAILS OF MATERIALS / EQUIPMENT	APPROVED MAKES	OFFERED BY BIDDER
1	Air handling units	VTS, Edge Tech, Systemair, Carrier, Zeco	
2	Variable Refrigerant Flow	Bluestar, Daikin, Mitshubshi, Tohisba, Voltas	
3	Copper Pipe	Totalling, Rajco	
4	Filters	AAF, CAMFILL, 3M	
5	Plug Fans	GREENHECK, KRUGER, NICOTRA	
6	Motors	ABB, CROMPTON, SIEMENS	
7	Ducting system	ASAWA, ZECO, COOL BREEZE	
8	Vibration isolators	GERB, RESISTOFLEX, DUNLOP	
9	Nitrile rubber Insulation	Uptwiga, LLORD, BEARDSSELL, KFLEX	
10	Duct Accoutic Insulation	Uptwiga, LLORD, BEARDSSELL	
11	Puff Type Insulation	OWENS CORNING, LLOYD, BEARDSSELL	
12	Volume Control Damper	Systemair, Cosmos	
13	Motorized Damper	BELIMO, Danfoss	
14	CPVC Drain	Astral, Supreme, Aasirvad	

15	Duct supports	MUPRO, HILTI, HITECH, FISHER	
16	Flexible Connections	CORI, KUNWAL	
17	Fire Sealant	HILTI, PROMSEAL	
18	Starter Panel	PRAGATI, PACE SWITCH GEAR	
19	MCCB & MCB	LEGRAND, SCHNEIDER	
20	Cables	POLYCAB, RR CABLE, KEI	
21	Cable tray	OBO, Profab, Puspak	

Note: Any deviation from the preferred makes will be subjected only to non-availability in market and the vendor has to submit all technical detailing, analysis and successful installation done elsewhere to prove the equivalence of the proposed make with the preferred list. If any physical inspection is to be made may CMTI for verification of the same all arrangements for the inspection should be made by the vendor only. Final acceptance will be decided by CMTI only. NO time of extension will be given for approval for any deviation from the preferred list.

7. GUIDELINES FOR PROJECT EXECUTION

On receipt of the order/LOI the successful contractor shall submit the following:

Price breakup for the contract value. Copies of the offer, minutes of the meeting, all correspondence for agreement Site insurance policy Site team with the profiles of the entire team with mobile numbers Bar chart for the works

TECHNICAL SUBMITTALS

On award of the contract, the successful contractor shall prepare the technical submittals and obtain the approval from the consultants.

The draft submittal has to be submitted in 2 sets. On receipt of comments, the same shall be submitted in four sets for formal approval. The commented copy shall also be returned for reference. Submittals shall be made in 1 lot for all items and no part approval will be granted.

The submittals shall be prepared with the submittal control sheet as the cover sheet. The submittal shall contain the following:

Air handling units & fans

Technical data sheet in Excel format.
GA drawing of the air-handling unit Fan curves and noise spectrum Foundation drawing of AHU Catalogue of AHU, fans

Variable speed drives:

Technical data sheet in Excel format.
GA drawing of VFD panel
Single line drawing of the panel
Catalogue of Drive and duct pressure sensor

Electrical panel:

Technical data sheet in excel format.

GA drawing

Single line drawing

ELECTRICAL LOAD SUMMARY:

On approval of the submittals an electrical load summary sheet with the electrical load of various equipment, location of the power points shall be submitted. The load summary sheet in the tender must be used with added columns for the actual load and location.

SAMPLES:

Samples shall be made as per the sample control sheet for various items. The approved samples shall remain at site.

DRAWINGS:

A control sheet for drawings shall be prepared by the contractor.

Working drawings shall be prepared based on the Architect's/Consultants' drawings followed by site measurements wherever applicable. The first cut drawing shall be submitted in 2 sets. On receipt of comments 6 or more sets as required shall be submitted along with the soft copy in CD. The commented copy shall also be returned for reference. 2 sets of A3 drawings (one in color and the other in Black and white) shall be submitted in a spiral-bound folder.

COST DEVIATION SHEET:

A job cost deviation sheet as per the BOQ bringing out the quantities in the tender and the approved shop drawings with the cost deviation shall be submitted.

SITE EXECUTION:

All relevant documents shall be kept at a site office.

The contractor shall ensure that the materials delivered are in line with the approved technical submittals and samples.

The contractors during the review of the work progress the Consultants shall substantiate the milestones in the bar chart with the delivery confirmation from the respective suppliers.

Quality check forms as per the tender conditions shall be strictly maintained. Incomplete quality check forms may result in rejection of the work done and no payments will be made in case the work is acceptable also.

Work shall be done strictly as per the specifications and drawings. Deviations if any shall be brought clearly in writing and approval has to be sought by the Consultants.

The Contractor shall submit a work schedule on a daily basis indicating the manpower deployed, activity done for the day, activity proposed for the following day, hold up if any, delay in progress due to nonavailability of material, and coordination required from other services.

Contractors shall produce the documents for pressure testing for the chilled water lines,

condenser water lines, and refrigerant lines and the same shall be certified by the consultants.

Contractors shall produce the documents for the smoke test for the ducts and the X-ray test for the pipes.

As built ducting drawings shall be submitted before the closure of the false ceiling along with measurement sheets and quality checklists.

Monthly reports with photographs, quality check forms, status of material delivery, and work progress shall be submitted in called in for.

On Completion of the installation work, the contractor shall test the system and take abstract test readings strictly as per the tender format. The readings shall be in line with the technical submittals. In case of discrepancy corrective action must be taken by the contractor. Based on this joint inspection and testing will be organized.

The snag list will be prepared by the consultants. The plant will be considered for handing over only after completion of all the pending points by the contractor.

The following shall be submitted during handing over:

As built drawings in 5 sets with 3 sets of soft copies on CD

4 sets of operation and maintenance manual – the manual shall contain the design brief, heat load summary, approved technical submittals with catalogs, operation, and maintenance literature of all equipment, Electrical load summary sheet, A3-sized as-built drawings, suggested spares, log sheet formats, operation procedures etc.,

9. SPECIFICATION OF EQUIPMENTS & MATERIALS

A) MECHANICAL SECTION OF EQUIPMENT

1.1 AIR HANDLING UNIT

The air handling unit shall be of modular type with a pentapost frame and sandwich panels. The panels and the post should be fabricated from a heavy gauge galvanized steel sheet. Panels and frames shall be secured using internally bolted fixings so that welding is avoided and the integrity of the finish is maintained. The construction shall permit the removal of panels for maximum access to fans, coils, and filters. The removal of the side panels must not affect the structural integrity of the unit. The panels and frame shall be factory painted with durable oven-cured polyester-based powder paint or powder coated. The unit shall be completely designed and fabricated as per the Eurovent standards and it should be able to maintain all the below-mentioned characteristics as required by the Eurovent standard.

EUROVENT CERTIFICATION STANDARDS

Casing strength Classification: D1

The casings to withstand the maximum fan pressure at the selected design fan speed. The maximum relative deflection should not exceed 4 mm/m. No permanent deformation of the structural parts (structures and supports) or damage of the casing may occur.

Casing Air Leakage: L1

Air leakage of the air handling unit should be tested under positive & negative pressure & should not exceed the values given below

Max. Air leak rate at	400 Pa test pressure
0.15 l/sqm	Max. Air leak rate at +700 Pa
test pressure	0.22 l/sqm
Filter Bypass Leakage	F8

The maximum allowable filter bypass leakage rate shall be 1% of the design flow rate at 400 Pa positive test pressure.

Thermal Transmittance: T3

The unit should be designed to have a heat transfer coefficient given below, Heat transfer coefficient **U: $1.0 < U < 1.4 \text{ W/sqm.K}$**

The test should be conducted in an environment chamber of a Eurovent-accredited laboratory & the readings should be taken after the steady state temperature difference of 20 K is established.

Thermal Bridging Factor: TB2

The unit should be designed to have a thermal bridging factor as given below. Thermal bridging factor **kb: $0.6 < kb < 0.75$**

The lowest difference of temperature at any point on the external surface and the mean internal temperature shall be established. The ratio between the lowest temperature difference and the mean air-to-air temperature difference defines the thermal bridging factor.

The test should be conducted in an environment chamber of a Eurovent-accredited laboratory and the readings should be taken after the steady state temperature difference of 20 K is established.

Air Handling Unit Performance as per EN 13053.

The performance of air handling units should be tested in a Eurovent accredited laboratory in accordance with EN 13053.

The tests would be carried out for Air flow – static pressure data - power consumption Heat recovery Cooling duty Heating Duty Air – side & water - side pressure drop

CASING

The casing of the AHU should be of doubled skin construction. The main framework shall be of extruded aluminum hollow structural sections.

Double skin panels shall be 50 mm thick and fabricated out of a minimum 0.63mm thick sheet with plain Pre-plasticized sheet as the outer skin and 0.8 mm perforated sheet for sound absorption or plain sheet as the inner skin. The material of insulation shall be pressure injected CFC-HFC free polyurethane foam or PIR insulation (Density 46 +2 kg/m³ with K factor not exceeding 0.02 W/m²)

The base shall have clearance from the floor to ensure air circulation and avoid entrapment of moisture below the unit. The unit shall have a sloped stainless steel drain pan with a bottom/side connection to eliminate stagnation of condensate water. Drain pan shall have a minimum 1mm thick sheet with sandwiched insulation of 25 mm thick.

The casing shall be made of extruded Aluminum sections with a polyamide thermal break profile for ensuring thermal bridging performance. The polyamide strip should be crimped to extruded aluminum sections for leakproof fitment. The structure shall be assembled using die-cast Glass filled Nylon joints to make a sturdy, strong & self-supporting framework for various sections. The

profile shall have a built-in coved aluminum profile having smooth curvature from the inside to avoid dust accumulation.

There shall be no sharp edges or corners or fasteners projecting out on the unit which might cause injury. Provide rubber caps for screws protruding inside the units. Sealing shall be by means of a non-hygroscopic gasket compressed between the frame and the panels. Access panels with hinged doors shall be provided to maintain and service the fan and filters.

All screws used for panel fixing and projecting inside the unit shall be covered with PVC caps to avoid human injury. Vendor should provide a Plenum.

The entire housing shall be mounted on a galvanized steel channel framework made out of G.I sheet of thickness not less than 2mm. For higher capacity AHUs hot dip galvanized steel channel framework made of a minimum 3 mm thick G.S sheet shall be used.

The air handling unit shall be provided with a limit switch on the door and the same shall be field wired to switch off the blower when the door is opened. The unit shall be provided with marine lights inside. The lights shall come on when the door is opened or by means of an external switch and wiring shall be done in the field accordingly. The air handling units shall be provided with an aluminum outlet damper with PVC gears suitable for connecting to an actuator. The damper shall also be suitable for manual operation. The units shall be provided with one set of commissioning filters of throw-away type apart from the regular set of filters. Permanent filters shall be installed once cleared by the Consultants/PMCs.

COOLING COIL SECTION

The Coils shall be of fin and tube type having copper tubes and aluminum fins. Coils should be AHRI Certified.

Coil selection for each Coil to be submitted for approval before manufacturing. The tubes shall have a minimum diameter of 12.7 mm 0.4 mm thick with 0.15 mm thick waffle/ripple aluminium fins firmly bonded to copper tubes assembled in zinc coated steel frame. The number of fins shall be 5 per cm. The tubes shall be mechanically expanded by means of a mandrel for optimum tube to fin bonding. The fins shall be plate or spiral and tubes shall be staggered. Coils shall be provided with copper header and MS adaptor. Water pressure drop in coil shall not exceed 3 mt. of WC. Performance of Coil in accordance as per EN 1216 standard with a maximum tolerance of 5%.

The air face velocity across the coil shall not exceed 300fpm. The coils shall have capped vent and drain connections provided on the headers. Cooling coils of water duty shall be tested for 7 KSC working pressure. The filter section shall be provided with the same casing construction as that of the unit.

The coil shall be 6 /8 rows deep for normal re-circulated air application, access door and independent drain pan. U bends shall be of copper, jointed to the tubes by brazing, soft soldering shall not be used. Each section of the coil shall be fitted with the flow and return headers to feed all the passes of coil property.

FILTERS

The Pre-filters shall be of panel type with synthetic non-woven washable type media with GI framework. The filter shall have an arrestance of 90% down to 10 microns. Alternatively, pocket/bag filters shall be offered MERV-13. The filters shall be easily removed for cleaning. Proper gaskets are to be provided to prevent air leakage through the filter section. Filters shall be provided as per the LEED requirement.

FAN

The fan shall be a direct-driven backward curved EC Type fan with, and base frame and vibration isolators. The fan chambers to be insulated with 13mm nitrile rubber open-cell insulation. If required, Consultants/ Owners may visualize the factory testing. The noise level shall not exceed 65 dBA at 1.5 m from the unit.

The complete EC fan unit shall be rugged bolt construction made of SS, statically and dynamically balanced. The fan section shall be equipped with a Single Inlet Centrifugal Impeller with High-Efficiency Backward curved blades and external rotor EC (Electronically Commutated) motor, energy optimized for operation without spiral housing for high efficiency and favorable acoustic behavior. The high-efficiency backward curved impeller with rotating diffuser, made of high-performance composite material / welded aluminum sheet material, with an external rotor motor balanced together statically and dynamically according to DIN ISO 1940 Part 1.

The EC fan should be capable of being fitted in a horizontal or vertical position in the AHU, depending on the application and as per OEM requirements. The inlet cone shall be provided with a nozzle for volume flow measurement of the fan.

The motor shall be permanent magnet external rotor motor with integrated electronics and suitable for continuous operation. The speed of the motor shall be variable depending on an external control signal. The fans shall be Modbus RTU compatible for communication with BMS (Building Management System). The fan in totality shall be of most efficient type so that the power consumption and noise level is minimal. The EC motor shall have a wide voltage input range: 3~380...480V, 50/60 Hz. The motor shall be minimum IP54 protection class, with Thermal class 155 (Insulation class F). The EC motor shall be provided with suitable protection from moisture & hot climate. The ball bearing shall be provided with long time lubrication for maintenance free operation.

The device electronics shall be protected from overload by the Active Temperature Management, so that if the ambient operating temperature exceeds the design limit then the fan is not switched off immediately. In such a condition the fan should be operational at lower speeds, till the time the operating ambient temperature drops down. The EC motor shall meet all necessary EMC (Electromagnetic Compatibility) directives. The EC motor should comply with applicable EMC standards: Interference Emission Standard EN 61000-6-3 / 2. EC Motor shall be integrated with VSD (Variable Speed Drive) for speed modulation of fans. Fan characteristic curves shall be related to measurements on a fan test rig with inlet silencing chamber in accordance with DIN 24163 Part 2 OR ISO 5801. The performance data of the fan shall correspond to precision class 2 as defined by DIN 24166.

The EC motor shall have the following protective features integrated in the controller:

- Overvoltage protection
- Short Circuit protection
- Under voltage/ Over voltage detection
- Locked rotor protection
- Line fault detection
- Active Temperature Management for thermal protection of motor and electronics
- Alarm relay 250V/2A
- Over temperature protection of electronic and motor
- External LED display shall be provided for indication of the status of the fan

1.2 MISCELLANEOUS

1.2.1 Tenderer shall produce test certificates for the fans. The consultant/Owners may depute their representatives to visualize the tests. In case the air handling units are to be

knocked down for easy shifting into the air handling unit rooms, the reassembling of the units shall be done by the authorized representative from the Manufacturers using proper tools and tackles.

- 1.2.2 The unit shall be provided with factory made filter & supply air plenum. The noise level of unit shall not exceed 65 dBA at 1m from the filter side.
- 1.2.3 After assembly the entire air handling unit shall be smoke tested for leaks. Conduct leakage tests as per SMACNA.
- 1.2.4 Necessary external terminal box for cable termination shall be a part of the motor.

2 VARIABLE SPEED DRIVES

- 2.1 The variable frequency drive shall be suitable for a main voltage of 1 phase 230 V +/-10% or 3 phase 415 V +/- 10% and a frequency of 50% +/- 3%.
- 2.2 The drive shall be complete with an IP 55 protection enclosure suitable for locking, incoming isolator, indication lamps, auto manual switch and a bypass starter duly wired at factory.
- 2.3 The drive shall be provided with RFI/harmonic filters with less than 5 % (THD). The starting torque shall be 110% for 1 minute. The frequency range shall be 0 – 120 HZ/ 0 – 1000 HZ programmable. The drive shall withstand an ambient temperature of 45deg. C.
- 2.4 The VFD shall be capable of receiving the current/voltage signal from variable air-volume units, pressure transducer or temperature transducers and control the motor speed.
- 2.5 The unit shall be factory-assembled and complete with programmable analog and digital inputs and outputs, over current, overvoltage, under voltage, over temperature, earth fault protection, output short circuit protection, input phase loss, overload protection, and stall protection. Data information shall be displayed on a 4-line alphanumeric display and shall be able to show continuously four operating data items such as frequency, speed, current, KW, etc., and three operating modes. During programming, all the information required for quickly and efficiently setting up the drive shall be shown. Indication lamps for voltage and alarm shall be provided apart from the display. The control unit shall be detachable and wherever required can be mounted at a distance not exceeding 3m from the drive.
- 2.6 The VFD shall be assembled inside an IP55 panel with a bypass starter. The bypass starter shall be of star delta type above 5.5 KW. Provide visual glass for monitoring the VFD control panel. The Panel shall be complete with incoming MCCB/ACB.
- 2.7 The panel shall be provided with ventilation fans to prevent overheating of the components. The VFD and components shall be assembled properly with adequate space of maintenance. Provide connector strips for connecting the BAS cables. The drive shall be suitable for wall mounting or floor mounting. In case of floor mounting suitable MS powder-coated stand shall be included. Provide rubber mats in front of the drives. Safeguard facility against single phasing.
- 2.8 The drive shall have the ASHRAE Bacnet / Modbus and required hardware and software for hooking up the same with the building automation system.

COMPRESSOR

Two-stage, variable speed, centrifugal compressor with aluminum impellers, should be designed requiring no oil for lubrication. The compressor should be constructed with cast aluminum casing and high-strength thermoplastic electronics enclosures. Compressors should be provided with radial and axial magnetic bearings to levitate the shaft thereby eliminating metal-to-metal contact, and thus eliminating friction and the need for oil. Each bearing position should be sensed by position sensors to provide real-time repositioning of the rotor shaft, controlled by the on-board digital electronics. Compressor speed should be reduced as condensing temperature and/or heat load reduces, optimizing energy performance through the entire range. Signals from the compressor controller should determine the inverter output frequency, voltage, and phase, thereby regulating the motor speed. In case of power failure, the compressor should be capable of allowing for a normal de-levitation and shutdown. Inlet Guide Vanes should be built in to further trim the compressor capacity in conjunction with the variable-speed control, to optimize compressor performance at low loads. The compressor should be provided with a direct drive, high efficiency, and permanent-magnet synchronous motor powered by pulse-width modulating (PWM) voltage supply. Motor cooling should be by liquid refrigerant injection. A non-return valve on the discharge port of the compressor should be installed to protect against backflow of refrigerant during coast down; a thermal protection protects against over-currents while a soft-charge device reduces in-rush starting current under 2 amps. Chiller harmonics to be as per IEEE 519 Std.

FACTORY INSULATION

Factory-applied, anti-sweat insulation shall be attached to the cooler shell, flow chamber, tube sheets, suction connection, and (as necessary) to the auxiliary tubing. The insulation shall be a flexible, closed-cell Nitrile Rubber type, 19mm thick, applied with vapor-proof cement & 24G Al. Cladding. The insulation will normally prevent sweating in environments with relative humidity up to 75% and dry bulb temperatures ranging from 50 to 90 °F.

REFRIGERANT CIRCUIT

Unit designed with a single refrigerant circuit in order to optimize the heat exchange's process, especially in part load mode. Standard components of the refrigerant circuits should be:

- electronic expansion valve
- dedicated sensor level on condenser side
- high and low pressure safety valve with visualization of the pressure's level and the rotational speed directly from the controller's interface
- compressor's discharge and suction shutoff valve
- liquid line shut-off valve
- drier filter with replaceable cartridge
- refrigerant line sight glass with humidity indicator
- high pressure transducer.

ELECTRICAL AND CONTROL PANEL

The screen shall indicate chiller operating hours, entering and leaving condenser and chilled water temperatures, evaporating and condensing temperature of the refrigerant, oil pressure and temperature, operating voltage, % load and motor

current. The chiller shall be suitable for digital programming of various set points such as leaving chilled water temperature, percent current limit, pull down demand limiting, seven day time clock for starting and stopping. All safeties shall be annunciated through alphanumeric display.

The chiller shall have provision to hook up with building automation system and shall be compatible with Bacnet or Modbus protocols. Necessary hardware shall be included as a part of the plant manager in this regard. The chiller shall be provided with a single incoming MCCB, ACB interconnecting the entire sub MCCB/ACB for various circuits. The electrical panel shall have IP 52 protection (indoor location).

electronic controller

- control circuit transformer
- general door lock isolator
- power circuit with bar distribution system
- EMC filter and reactor on the compressor's power circuit
- fuses for compressors
- terminals for cumulative alarm block
- remote on/off terminals
- spring-type control circuit terminal board
- remote signal 4-20 mA

Control pumps relays both on plant side and heat source side.

Power supply 400/3/50 with direct start with a soft charge device.

QUALITY ASSURANCE

Chiller performance should be rated in accordance with ARI standard 550 (latest addition)

(ADDITIONAL TO THIS THE CHILLER TO BE TESTED WITH CONDITIONS AS MENTIONED IN THE BOQ) Equipment and installation shall be in compliance with ANSI/ASHRAE 15 (latest addition).

Cooler & condenser shall include ASME U Stamp & name plate certifying compliance with ASME section VIII Design I code for unfired pressure vessels.

Chiller shall be manufactured in a facility that has been registered by UL to the ISO 9000 standards for quality.

Chiller shall be designed and constructed to meet UL & CSA requirement and shall have labels appropriately affixed.

Each compressor assembly shall undergo a mechanical run in test to check proper operation of components and to verify that vibration level, oil pressure/temperature and efficiencies within acceptable limits at the manufacturing unit. Each compressor shall be pneumatically pressure tested at 405 Psig or (2792 KPa) and leak tested with a tracer gas at 225 Psig or (1551 KPa).

Both cooler and condenser shall be pressure tested at 375 Psig (2586 KPa) on the refrigerant side and leak tested with Refrigerant tracer gas at 300 Psig (2068 KPa).

The water side of each heat exchanger shall be hydrostatically tested at 1.5 time's rated working pressure.

The entire chiller assembly shall be leak tested with a refrigerant tracer gas at 300 Psig (2068 KPa).

Prior to shipment the chiller packages shall be tested for proper operation of controls.

Unit shall be supplied charged with the specified refrigerant or nitrogen holding charge and oil and refrigerant gas in separate cylinders for charging in the field.

Unit shall be supplied with all refrigerant piping and control wiring factory installed.

The chiller shall be provided with cable entry and earth terminal bolts. If so desired the consultants/owners may depute their representatives to the manufacturer's unit to visualize the tests. Before inspection the manufacturers shall send a format of the test report on which readings will be taken. In the absence of factory inspection the manufacturer shall perform the test and send the test report to the consultants/owners

and obtain clearance before dispatch of the chillers.

Part load performance charts indicating the capacity and power consumed (with and without condenser fans) for constant ambient temperature and for various ambient temperatures as per ARI relief shall be submitted along with the chiller technical specifications. Computer selection of the chiller with various parameters pertaining to compressor, condenser, and evaporator shall also be submitted.

Necessary terminal box for termination of cables to the chiller shall be a part of the chiller panel.

B) DUCTS AND AIR TERMINALS

1. DUCTS & SUPPORT'S

- 1.1. All ducts shall be fabricated from either galvanized sheet steel conforming to IS: 277/92 having lock forming grade or Aluminium conforming to IS: 737. The coating of zinc shall conform to Class VIII. Only new, clean and bright sheets without watermarks shall be used. The Consultants/Owners reserve the right to reject the sheets not meeting therequirements. Fabrication of ducts to be as per IS : 655.
- 1.2. The ducting shall be totally CNC machine made with duct mate type flanges or shall befabricated using lock forming machines with angle iron flanges as specified.
- 1.3. The design of supports for all types of ducts to be duly approved by the support vendors as specified by the tender.

2. CNC MACHINE MADE DUCTS WITH DUCTMATE TYPE FLANGES

- 2.1. The ducting should be fabricated from coils. The thickness of the sheet for rectangularducts should be as follows:
- 2.2. The maximum length of each duct piece should not exceed 1200 mm. Cut sheets should not be used other than elbows or for ducts having a size bigger than the factory's available sheet size. All ducting should be with duct mate-type flanges and no C & SS joints will be acceptable.

MAXIMUM SIZE OF THE MINIMUM SHEET	THICKNESS IN MM	
	GSS	ALUMINIUM
DUCT IN MM		
750 mm and below	0.63	0.80
751 mm to 1500 mm	0.80	1.00
1501 mm to 2250 mm	1.00	1.50
2251 mm and above	1.25	1.80

- 2.3. The slip on flanges should be with roll formed GI sections. The corner pieces should be

suitable for inserting into the hollow web of the slip on flange. The slip on flange should be fixed by clinching or by pop riveting so as to have a rigid joint. The spacing should not exceed 150mm. Self tapping screws are not acceptable. Recessed groove should be provided in the slip on flanges and corner plates for the proper seating of gaskets.

- 2.4. The corner piece should be secured by electro galvanized carriage bolts with flange nuts. The gaskets should be of self adhesive, microcellular, cross linked polyethylene foam type. The gaskets should be non-toxic, permanently semi-soft. Wherever specified provide PVC or Neoprene gaskets.)
- 2.5. The ducts should be of medium pressure type having a pressure of 2000 Pascal's (Class II ducts) and the leakage should be as per SMACNA/DW 143 standards) The ducts should be provided with cross bracing having a span not exceeding 400 mm. The slip on flange should have thickness of 0.6 mm or ducts up to a maximum size of 500 mm; 0.8 mm for ducts having a size between 501 mm and 750 mm; 1.0 mm for ducts having a size of 751 mm to 900 mm; 1.25 mm for ducts having a size of 901 mm to 1200 mm and 1.5 mm for ducts having sizes higher than 1201 mm. The width of the flange should be 29 mm for ducts having a maximum size of 750 mm and 39 mm for higher sizes.
- 2.6. The duct section should reach right up to the end of the slip on flange. After installation of the slip on flange and corner plates, sealant should be applied only at the interface of the duct corner edge. Care should be taken to ensure that corners completely clear the duct edges and the corner piece should not sit on the duct corner edge.
- 2.7. The gaskets should have width of 10 mm and 4.5 mm thick for ducts having a pressure class up to 500 Pascal. For a pressure class above 501 Pascal, gaskets having a width of 15 mm and a thickness of 6 mm should be used. Care should be taken to ensure that gasket is properly seated in the groove of the slip on flange and corner plates in such a way that the gasket commences midway between the corners.
- 2.8. The gasket should be applied in one piece and joined at the starting point with a butt joint. The gasket has to cut over the corners in an arc, protruding slightly into the air stream at the corners. The carriage bolt should be tightened using a ratchet or a spanner. Longer duct lengths should be aligned by passing a wire through the small round holes on the corner plates. Cleats should be inserted over the slip on flanges on all the sides using a special crimping tool.
- 2.9. The spacing between the cleats should not exceed 150 mm. The ducts should be bolted directly on the top corner pieces with threaded rods anchored to the ceiling using a bracket having a slot for minor lateral adjustments. Wherever specified provide slotted channel/angle iron supports.
- 2.10. The support rod should be galvanized and fully threaded having a minimum diameter of 10 mm for duct size up to 750 mm and 12 mm for sizes above 751 mm. The anchor fasteners should also be the same size of the rods. Wherever support rods require joints the smallest rod length should not be less than 300 mm.
- 2.11. The galvanized steel slotted rail should have a thickness of 1.6 mm for ducts of size up to 750 mm and 2.4 mm for sizes above 751 mm but below 1500 mm. For sizes above 1501 mm use 40 x 40 x 5mm angles should be used. The spacing between supports should not exceed 2000mm for ducts having a maximum size of 1500 mm and 1200mm for higher sizes. Provide additional supports for bends, elbow, and collars as required.
- 2.12. All civil work including drilling, chipping, grip bolting and other related works

should be within the scope of the air-conditioning contractor. Before drilling supports, alignment lines are to be marked on the ceiling to ensure that all the supports are in one line preferably using metal detectors trace the reinforcement bars on the slab. Care should be taken not to drill on the tendons in the case of post tensioned structures.

- 2.13. The ducts should be erected to the required levels after ascertaining the finished floor level markings using water tubes.
- 2.14. No ducts should be raised or lowered in levels as a whole system. The ducts are to be dismantled incase the levels are to be changed. In such a case the gaskets are to be replaced. Supports to be installed prior to the installation of the ducts.
- 2.15. No temporary supports or ducts supported to other services are acceptable. The entire duct including the insulation above the false ceiling should be painted with Matt finish black paint as a part of the duct works.
- 2.16. Ducts without proper quality check forms will be rejected. All ducts are to be smoke tested after assembly in sections. Pressure testing should be done for all duct lengths as required by Consultants/owners duly verified by the certified PMC's at site. Insulation or painting of ducts should be done only after such tests and after rectification of leaks. Test reports should be submitted for such tests. Consultants/owners reserve the right to witness such tests.

3. **FLAT OVAL DUCTS**

- 3.1. Duct construction should follow IS: 655. Thickness of sheets for Oval duct should be as follows:

MAXIMUM SIZE OF THE DUCT IN MM	MINIMUM SHEET THICKNESS IN MM	
	GSS	ALUMINIUM
750 mm and below	0.63	0.80
751 mm to 1500 mm	0.80	1.00
1501 mm to 2250 mm	1.00	1.50
2251 mm and above	1.25	1.80

- 3.2. The fabrication of the ducting including details of transverse joint connections, bracing, seams etc., for longitudinal joints etc., will be generally as per IS: 655. Ducting lengths to be of not less than 2.5m wherever possible (for ducts upto 800mm) & 1.5m (for ducts above 801mm).
- 3.3. The ducts should be rigid and should have very minimum leakage. Use silicone sealant at suspected leak points. The ducts should be of medium pressure type having a pressure of 2000 Pascal's (Class II ducts) and the leakage should be as per SMACNA/DW 143 standards). Only angle iron flanges should be used for all transverse joints and GS sheet flanges are not acceptable. Stiffening angles should be fixed to the sides of the duct by riveting. Flanges should be welded at corners first and then riveted to duct.
- 3.4. The ducts should be rigid and should have very minimum leakage. Use silicone sealant at suspected leak points. The ducts should be of medium pressure type having a pressure of 2000 Pascal's (Class II ducts) and the leakage should be as per

SMACNA/DW 143 standards). Only angle iron flanges should be used for all transverse joints and GS sheet flanges are not acceptable. Stiffening angles should be fixed to the sides of the duct by riveting. Flanges should be welded at corners first and then riveted to duct.

- 3.5. All angles, rods and other MS members, materials, components etc., used for supports should be provided with a coat of zinc chromate primer and black paint during supply followed by a final coat of black paint after erection along with the ducting. Silicone sealant should be applied at angle iron flange/sheet corners or at places where there is a leakage.
- 3.6. No metal putty/paste should be used. Provide slotted channel/angle iron supports with threaded rods. The support rod should be galvanized and fully threaded having a minimum diameter of 10 mm for duct size up to 750 mm and 12 mm for sizes above 751 mm. The anchor fasteners should also be the same size of the rods. Wherever support rods require joints the smallest rod length should not be less than 300 mm. The galvanized steel slotted rail should have a thickness of 1.6 mm for ducts of size up to 750 mm and 2.4 mm for sizes above 751 mm but below 1500 mm.
- 3.7. For sizes above 1501 mm use 40 x 40 x 5mm angles should be used. The spacing between supports should not exceed 2000mm for ducts having a maximum size of 1500 mm and 1200mm for higher sizes. Provide additional supports for bends, elbow, and collars as required. All civil work including drilling, chipping, grip bolting and other related works should be within the scope of the air-conditioning contractor.
- 3.8. Before drilling supports, alignment lines are to be marked on the ceiling to ensure that all the supports are in one line preferably using metal detectors trace the reinforcement bars on the slab. Care should be taken not to drill on the tendons in the case of post tensioned structures. Elbows are to be provided with vanes. 3mm thick rubber gasket are to be used.
- 3.9. The gaskets should be butt joined and should not sit over the other or there should be a gap between two gaskets. The ducts should be erected to the required levels after ascertaining the finished floor level markings using water tubes.
- 3.10. No ducts should be raised or lowered in levels as a whole system. The ducts are to be dismantled in case the levels are to be changed. In such a case the gaskets are to be replaced. Supports to be installed prior to the installation of the ducts. No temporary supports or a duct supported to other services is acceptable.
- 3.11. The entire duct including the insulation above the false ceiling should be painted with Matt finish black paint as a part of the duct works. Exposed ducts should be painted with two coats of approved shade paint with zinc chromate primer. Quality check forms are to be prepared during various stages of installation works.
- 3.12. Ducts without proper quality check forms will be rejected. All ducts are to be smoke tested after assembly in sections. Pressure testing should be done for select duct lengths as required by Consultants/owners. Insulation or painting of ducts should be done only after such tests and after rectification of leaks. Test reports should be submitted for such tests. Consultants/owners reserve the right to witness such tests.

4. PREINSULATED DUCTING – Supply Air Ducts

- 4.1. Rigid POLYISOCYANURATE foam thermal insulating panels, laminated with flexible

Al. foil. Thickness of panels shall be either 20mm for internal use and 30mm for external use. The insulation of the material to be CFC/HCFC free and fire resistance BS 476 part 5,6 (class 1) and Part 7 of class O.

- 4.2. The panels shall have Al. foil thickness of 80/80 microns for 20mm panel and 80/200 microns for 30mm panel. The min. density of the panels to be not less than 48kg/cu.m for 20mm & 30mm panels. The tolerance ranges shall be in accordance with SASO GS 1156/200. The thermal conductivity of the material to be not less than 0.022 W/mk.
- 4.3. The embossed Al. foil to be lacquered with 3gm/cu.m of corrosive resistant polyester paint for both 20 mm and 30 mm panels.
- 4.4. The joining system for panel's upto 500mm shall be through male –female connections system which is designed for low pressure applications upto 500 Pascal. These connectors are of Al. plate with punches in prone points to join two duct segments together. Whereas the joining system for ducts more than 500mm shall be using polymer flanges for internal ducting or Al. invisible flanges for external duct and slide in channel. The flanges to be connected shall be through special cover corners having a holding pin, which goes inside the flange and the insulation. In addition to this, Profile glue to be strictly used for adhesion to panels.
- 4.5. No metal putty/paste should be used. Provide slotted channel/angle iron supports with threaded rods. The support rod should be galvanized and fully threaded having a minimum diameter of 10 mm for duct size up to 750 mm and 12 mm for sizes above 751 mm. The anchor fasteners should also be the same size of the rods. Wherever support rods require joints the smallest rod length should not be less than 300 mm. The galvanized steel slotted rail should have a thickness of 1.6 mm for ducts of size up to 750 mm and 2.4 mm for sizes above 751 mm but below 1500 mm.
- 4.6. For sizes below 1200 mm, the spacing between supports should not exceed 3000mm and for sizes exceeding 1200mm supports shall be 4000mm.
- 4.7. If necessary, access doors to be built within the panel itself, using frame profile, chair section profile and double sealing gasket. The access door is supplied with full assembly. Also, appropriate number of internal stiffening Al. or PVC rods, self-threading screws & load distribution discs for large ducts to be provided. Load distribution Al. discs shall be placed externally and internally for higher strength.
- 4.8. Connection mechanism of Grills/ dampers/ Attenuators/ butterfly dampers/ unit connections shall be as per OEM standards.
- 4.9. Supporting elements comprises of GI threaded rods, nuts, washers and 20G GI. Base channels with edges crimped. No metal putty/paste should be used. Provide slotted channel/angle iron supports with threaded rods. The support rod should be galvanized and fully threaded having a minimum diameter of 10 mm for duct size up to 750 mm and 12 mm for sizes above 751 mm. The anchor fasteners should also be the same size of the rods. Wherever support rods require joints the smallest rod length should not be less than 300 mm. The galvanized steel slotted rail should have a thickness of 1.6 mm for ducts of size up to 750 mm and 2.4 mm for sizes above 751 mm but below 1500 mm.
- 4.10. Ducts without proper quality check forms will be rejected. All ducts are to be smoke tested after assembly in sections. Pressure testing should be done for select duct lengths as required by Consultants/owners. Insulation or painting of ducts should be done only

after such tests and after rectification of leaks. Test reports should be submitted for such tests. Consultants/owners reserve the right to witness such tests.

5. AIR PLENUMS

- 5.1. Air plenums should be modular in construction and **factory fabricated** with powder coated aluminum frame work and double skin panels of 25 mm thick with Nitrile Rubber insulation similar to the air handling unit casing.
- 5.2. The panels should be powder coated and finished to the shade as that of the air handling unit.
- 5.3. The panels should be fabricated out of 0.8 mm thick outer sheet duly powder coated and the inner sheet should be perforated having a thickness of 0.8 mm thick having minimum 30% perforations should be used to perform the acoustic functions. Wherever specified, provide plain sheet having a thickness of 0.8 mm on the inside. For filter plenums provide plain sheet on the inside.
 - 5.3.1. The plenum should be provided with factory cutouts for connection to the ducts and to the air handling unit. No site cutting is allowed. Necessary access door should be provided. The plenum should be hung from the ceiling using factory made supports using threaded rods having a thickness of 15 mm/12 mm rods depending on the size of the plenum. Wherever specified, provide plenums fabricated out of 1.5 mm thick stainless steel of SS316 grade. Inspection doors should be provided to permit access to heater boxes filters etc., on the plenums as required.

6. FLEXIBLE DUCTS

- 6.1. Flexible ducts should be used for connecting the supply diffuser plenum to the ducting. A double lamination of tough polyester should encapsulate a steel helix to form an airtight inner core. The double layer core should be wrapped in a thick blanket of fiberglass insulation and sheathed in a rugged and durable tri-directionally reinforced metalized polyester jacket. The insulation should have a thickness of 15/25 mm as specified. The ducts should be complete with accessories such as saddle straps for supports and worm drive clips for termination to the rigid metallic duct collars.
- 6.2. Longer flexible lengths exceeding 800 mm connecting the plenums and ducts are not acceptable. Single skin aluminum flexible ducts should be made of a triple lamination of aluminum foil, polyester and metalized polyester film permanently bonded to a coated spring steel wire helix. The PVC flexible ducts should be of fire retardant type. PVC flexible ducts should be used for connecting the toilet exhaust plenums to the ducts or connecting the exhaust ducts in the case of laboratories. The ducts should have pressure rating of 1500 Pascal's.

7. MANUAL & CONTROL DAMPERS

Rectangular Damper with Aerofoil Blades,

- 7.1. **Performance,**
 - o Leakage to be Class 1A. (Leakage shall not exceed 3 cfm/sq. ft. against 1-in. wg differential static pressure.
 - o Pressure Rating: Damper close-off pressure equal to fan shutoff pressure with a maximum blade deflection of 1/200 of blade length.

- Damper shall have AMCA seal for both air leakage and air performance.

7.2. Construction,

7.2.1. Frame,

Material to be extruded-aluminum profiles of 1.8 mm thick. Hat-shaped channel with integral flange(s). Mating face shall be a minimum of 25 mm. Width not less than 125 mm.

7.2.2. Blade,

Hollow, airfoil, extruded aluminum, opposed blade configuration. Material to be Al. of 1.8 mm thick with width not to exceed 150 mm & Length as required by close-off pressure, not to exceed 1200 mm.

7.2.3. Seals,

Blades to be Replaceable, mechanically attached extruded silicone or plastic composite. Jams to be Stainless steel, compression type.

7.2.4. Axles,

Axles to be 0.5mm diameter of SS type and mechanically attached to blades.

7.2.5. Bearings

Bearings to be SS sleeve mounted on frame where blade axles are installed in vertical position, provide thrust bearings.

7.2.6. Linkage

shall be concealed in frame and made of Al. and SS.

7.2.7. Transition,

Factory mount damper in a sleeve with a close transition to mate to field connection. Damper size and sleeve shall be connection size plus 50 mm. Sleeve length shall be not less than 300 mm for dampers without jackshafts and shall be not less than 450 mm for dampers with jackshafts.

7.2.8. Additional corrosive protection for Corrosive environment,

Provide anodized finish for aluminum surfaces in contact with airstream. Anodized finish shall be a minimum of 0.018 mm thick. Axles, damper linkage, and hardware shall be constructed of Type 316L stainless steel.

7.3. Airflow Control:

- Wherever indicated damper assembly to be provided with integral airflow measurement and control. A Factory-furnished and calibrated controller shall be programmed, in nonvolatile EPROM, with application-specific airflow set point and range. The controller and actuator shall communicate to control the desired airflow. The controller shall receive a zero- to 10-V dc input signal and report a zero- to 20-mA output signal that is proportional to the airflow.
- Airflow measurement and control range shall be suitable for operation between 150 to 2000 fpm. Ambient Operating Temperature Range to be from Minus 40 to plus 60 deg C. Ambient Operating Humidity Range: 5 to 95 percent relative humidity, non-condensing.
- Provide unit with control transformer rated for not less than 85 VA. Provide transformer with primary and secondary protection and primary disconnecting means. Coordinate requirements with field power connection. Factory mount electronics within a NEMA 250, Type 1 painted steel enclosure.

8. FIRE DAMPERS

- 8.1. To be fabricated out of 1.6 mm thick formed sections with plated solid steel stubs with permanently sealed bronze bearings. The dampers should be suitable for 90 minutes fire rating and should comply with UL rating. Certified fire damper should be of motorized spring return type with complete with temperature sensor and control panel. Provisions should be made for fixing a limit switch to monitor the position of the damper wherever specified. The fire damper should be able to receive an external signal from the fire detection system for closure apart from the temperature sensor. Fire & Smoke damper complete with outer shell with 1.6mm thick galvanized steel frame and the blade/Leaf with 1.6mm thick GSS, control panel, temperature Sensors, Duct type smoke detectors, transformer to convert 240 V AC to DC Voltage, motorized electric actuator, spring return type extended sleeve 400mm / 600mm with complete boxing. (Torque selection for all fire damper actuator shall be approved by consultants/clients)
- 8.2. CURTAIN TYPE Fire damper UL 555 certified of 90 mins rating, constructed with outer shell with 1.6mm thick galvanized steel frame and the blade/Leaf with 1.6mm thick GSS. And with necessary flanges for connection with Fusible Link & spring mechanism, the damper shall be held open by a replaceable fusible link rated at 74degC as per specifications and drawings. 96 degC, 145 deg C, 183 deg C rated links available. Fire damper and sleeve assemblies expand during periods of intense heat. Therefore it is essential that openings in walls or floors be larger than the fire damper and sleeve assembly to allow for this expansion. Minimum clearances required between the outside of fire damper sleeve assemblies and wall/floor openings are Galvanized steel fire dampers and sleeves: 1/8 in. (3mm) per foot of damper width and 1/8 in. (3mm) per foot height with a minimum clearance of 1/4in. (6mm).
- 8.3. The fire dampers should have 0 leakages. The motor should be off ON/OFF type 12V/24V supply with 400/600 mm sleeve of 18G & Smoke sensor. Size not to exceed 1500 x 1000. Duct connections to the air handling unit at expansion joints should be with Metal to Fabric to metal flexible duct connectors.
- 8.4. The fabric should be of fiberglass weave with silicon rubber coating or PVC The duct connection should be of fire retardant type and should be provided with a zip. Cross talk silencers should be fabricated out of 0.8 mm thick duct having an L profile with acoustic insulation.
- 8.5. The cross talk silencer will be supported by threaded rods. The cross talk silencer will be measured as a part of ducting.
- 8.6. Rat proofing, consisting of 1.5 mm thick GSS mesh should be provided for all open ducts, dampers, fan outlets and return air slits as a part of ducting/dampers/louvers. Mosquito proof net fabricated out of stainless steel mesh construction should be provided at the outdoor air intake louvers/grilles wherever specified. Where sheet metal ducts or sleeves terminate in wood work/MS frame work, masonry wall, tight joints should be made by means of closely fitting heavy angle iron flanged collars. All ducts should be totally free from vibration under all conditions of operation.
- 8.7. For special applications mount the ducts on saddles coated with rubber. Ducts erected/kept in site for erection should be sealed at the open ends using polythene sheet

after fabrication and erection.

- 8.8. All ducts should be cleaned thoroughly on the inside and outside before being erected/commissioned. All ducts should carry the duct reference nos. for inspection visible from the bottom of the duct.

9. AIR TERMINALS

- 9.1. All air outlets and intakes and accessories should be constructed from extruded aluminum powder coated sections as indicated in the tender schedules. The air terminals should be finished with the approved shade powder coating.
- 9.2. The supply and return air Plate type diffusers should be fabricated using extruded aluminum frame having a thickness of 1.2 mm with removable core. The core should be preferably with single pressed sheet held together with aluminum pipes and aluminum tubes to hold the removable core to the outer frame. Provide perforated diffuser plates. The perforated sheet should have a thickness of 1.2 mm with minimum 70% perforations. The diffuser should be provided with opposed blade type collar dampers. Te opposed collar blade damper should be fabricated out of all aluminum extrusions with black powder coating.
- 9.3. The damper should be suitable for adjustment through the perforated sheet in case of perforated dampers. All diffusers to be mounted on grid false ceiling should be with regular flanges. The continuous grilles should be with extruded aluminum profiles with 20x 16 x 1.2 mm thick frame. The louvers should have a profile thickness of 5 mm at the front and 2 mm at the rear.
- 9.4. The louvers should be spaced having a center-to-center distance of 12 mm with black aluminum space bushes. The grilles should be having a cleat for fixing on to the false ceiling. No screws should be fixed on the frame. The louvers should be provided with required angle of deflection as specified in the tender schedules.
- 9.5. The grilles should be preferable a single piece for lengths upto 3500 mm with end flanges. Wherever cut sections are used end flanges, end flanges should be provided having a length not lesser than 600 mm. Provide curved profiled grilles by ascertaining the site measurements. For grilles on round/spiral ducts provide curved frames to have a flush seating on the ducts. Framed supply and exhaust grilles should be with extruded aluminum profiles having a size of 20 x 16 x 1.2 mm thick.
- 9.6. The louvers should have a profile thickness of 5 mm at the front and 2 mm at the rear having a spacing of 12 mm with black aluminum bushes. Provide collar dampers as specified. Provide non-vision type fresh air grilles of powder coated aluminum for drawing fresh air louvers wherever specified suitable for fixing on to the windows/ventilators. The louvers should be with mosquito net.
- 9.7. Linear slot diffusers should be fabricated out of 20 x 60 x 1.2 mm extruded aluminum frame with internal T frame with black powder coated diffuser blade which should slide into the frames and is adjustable to achieve the desired flow. These should be held together by means of 8mm dia aluminum pipes and 20 x 20 x 1.2 mm thick square tubes and should be riveted using aluminum rivets.
- 9.8. Floor grilles should be fabricated out of adequate thickness aluminum extruded sections suitable for taking the load of the equipment's and people. The grilles should be complete with damper for throttling.
- 9.9. Jet diffusers should be fabricated of aluminum sheet having a thickness of 1.2 mm

complete with aluminum spinning's supported on the flange assembly which can be fixed to the duct collar. The nozzle should be of rotatable type. The diffuser should be powder coated. Diffuser spigots should be suitable for installing below the ducts with flexible duct connection. The spigot should be complete with diffuser and should have a height not exceeding 150 mm.

- 9.10. The spigot should be fabricated out of GSS/Aluminum having a thickness of 1 mm and 1.2 mm respectively. Contractor should submit samples of all the approved makes mentioned in the tender.
- 9.11. Cross talk duct to be fabricated out of GSS/Aluminum having a thickness of 1 mm. The height of the duct is subjected to variation as per the site false ceiling requirements. The duct size to be of very low velocity of not more than 500 FPM.
- 9.12. Under flow air terminals to be linear type 1mm thick galvanized steel construction with pre painted flat black. The length of the grill to be not less than 1.2m and if necessary it should be provided upto 3m. The Linear terminal shall be of variable air volume type. All the required cables and plugs to be included for each valve. The grill shall be extruded Al.
- 9.13. The make approved by the Owners/Consultants/Architects should only be used. In case of a change in make during the execution as compared to the one proposed to the tender stage, no extra price should be paid for the makes approved during execution stage. A sample of each type of air outlet or intake that will be used during the job should be kept at the site.
- 9.14. Location of air outlets should be as shown in the drawings and frames should be used for/ fixing the grilles. Necessary frames for fixing of air terminals should be co-ordinate with interior agencies. During erection, ducts should be covered with polythene sheet or waste sheets at open ends to prevent ingress of dust/debris inside. After installation of the entire ducts, the ducts should be tested for leaks. The entire distribution system should be then balanced using a velometer. Measured air quantities should be within 5% of the specified air quantities.
- 9.15. Dampers should be permanently marked after air balancing is completed so that these can be restored to their correct position if disturbed at any point of time. Smoke test for testing the leakage should also be performed for all ducts. Consultants from time to time during erection may call for leak tests. Contractors should maintain quality check forms as per the tender formats. Ducts should be identified by areas and duct numbers in the quality check forms. Ducts not finding place in the quality check form may be summarily rejected.

Measurement of Works:

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

All materials / equipments issued by the owner shall be stored properly.

Any damage to free issue material shall be recovered from the contractor.

Refrigerant piping:

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

Warranty

The period of validity of Warranty shall be effective from the date of acceptance of the Goods to the entire satisfaction of the Purchaser. The Warranty shall be Comprehensive in nature. The warranty period shall be 12 months.

Payment

The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:

Payment for Goods and Services supplied shall be made in Indian Rupees, as follows:

40% of payment PO value will be made after successful supply of outdoor units, AHU unit and control panel at CMTI.

60% will be made after completion of installation of all items commissioning, testing, validation and certification from statutory bodies.

DOCUMENTS AND DRAWINGS:

1. Following documents and drawing to be submitted by the vender in well advance to take the approval from CMTI

- a) General arrangement drawing.
- b) submit the electrical drawings (both power and control circuit).
- c) Drawing for IDU(AHU modification) & ODU mounting work.
- d) Leaflet and literatures.
- e) Test certificates of equipments.

2. On Award of Work and During Execution:

- I. Reconfirmation of the above Technical Parameters
- II. Detailed Bar Chart for Execution of Work.
- III. Make of each item which the contractor is going to use (it must be from tender approved makes list only)
- IV. Technical Data Sheet of all equipment shall be submitted for approval of engineer in charge.
- V. Working Drawings
- VI. Drawings & details of all ancillary items like power supply, wall openings, etc. which are not covered under HVAC scope but are necessary for HVAC System. It will be the responsibility of HVAC contractor to make necessary markings and coordinate & supervise these items at Site as per HVAC requirements.
- VII. Test Certificates for cooling coil, panel boards, etc., as required by Engineer In-Charge/Client.

3. On Commissioning:

- a. Test Results as per Schedule of Testing.
- b. Operating Procedure & Maintenance Schedule
- c. As-Built Drawings
- d. Submit Troubleshooting manual for overall systems.

PART-B
QUALIFYING CRITERIA

Tender for Supply, Installation, Testing and Commissioning of Alternate VRF Air-conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB Located in New NMTC Building, at CMTI Bangalore.

Bidders who qualify/meet the following Technical and Financial capabilities are eligible to participate in the bid for supply of VRF AC. Bidder shall furnish all the requirements asked in these criteria with documentary proof and submit along with quotation. Bids of the parties which are not meet the following criteria will not be considered for evaluation and will be rejected without seeking any further clarifications.

I. Technical Qualification Requirements:

The bidder should meet the following technical qualifying requirements and shall submit relevant certificates to establish his credentials.

1. The Bidder should be an organization with experience in having executed contracts for the design, engineering, manufacture, Supply, Installation, Testing, and Commissioning of an Alternate VRF Air-conditioning facility.
2. The tenders are accepted only from vendors who quoted considering ISO certified materials for the whole project. **The list of ISO certified materials has to be submitted along with technical bid.**
3. The firm should have successfully completed the Design, Manufacture, Installation, Testing, and Commissioning of the VRF Air-conditioning facility during the last 5 years. Bidders have to provide details of installations with contact details.
4. The AC,s of similar/higher capacity of minimum 2 quantity should have been supplied by the vendor in past five years (As per Technical specification) of similar or better accuracy and submit work completion certificates for the same.
5. Bidder shall furnish the details of their factory like manpower, machinery, quality system, etc., to assess their capability.

II. Financial Qualification Requirements:

The bidder should also meet the following financial qualification requirements:

1. The Bidder should have annual turnover of not less than a value of Rs. 50 Lakhs per year last **three** financial years.
2. Bidder shall submit audited balance sheet and financial status for last 03years.

III. The following documents shall be submitted along with the application for prequalification of Bid:

1. Firm establishment certificate and nature of work (for Sln0.1).
2. Detail of work of similar type completed during the last 5 years.
3. Satisfactory work Completion certificates from the clients.
4. The VRF AC supplied to Make & Model of the Unit.
5. Month & Year of Commissioning, Application for which AC is used (Optional).
6. Performance Report of VRF with programmable AC.(With years of service)

from End users, with addresses and contact person with phone numbers.

IV. Bid Selection Procedure and Process of BID Qualification

- Step - 1: Short listing based on documents submitted, satisfying all eligibility criteria given above by the firm or individual along with their Bid/application. (Non-submission of any document as given in the above list within the stipulated time leads to rejection of Bid)
- Step 2: Subsequently Bidder’s competency, technical achievements, and financial status will be evaluated as suitable for his project. Feedback from Bidder’s clients will be verified.
- Step 3: If required, a Visit will be made to their factory/ firm by the technical team (CMTI or third party) for accessing the capability of the manufacturer.
- Step 4: Meanwhile Technical Bids will be opened and scrutinized for meeting all technical specifications and supply conditions.

CMTI reserves right to verify the information/data furnished by Bidder. If the same is found as fault or with any deviation the bid will be rejected. Only those Bidders who are found suitable & meeting all the above qualification Criteria / requirements will qualify for opening the Price Bids for evaluation.

IMPORTANT NOTE

	Requirements	Supplier Comments
1.	Vendor may quote considering the Tender for Supply, Installation, Testing, and Commissioning of Alternate VRF Air-conditioning facility for DUAL BEAM SYSTEM LAB and DIMENSION METROLOGY LAB. Before quote.	Agreed : Yes / No
2.	The supplier should duly submit the layout proposal drawings, technical specifications, and other relevant documents along with the bid	
3.	Delivery Schedule: 6 to 8 weeks from the date of Purchase Order for supply and installation works	
4.	Bidder shall furnish all the above details fully and explicitly.	
5.	Please note that the “BID” without above mentioned the documents/information in support of the eligibility criteria will be summarily rejected	
6.	The vendor may clarify any technical doubts or issues before the quote	
7.	The vendor should agree for ISO certified materials are used for whole project.	

BILL OF QUANTITY

DUAL BEAM SYSTEM LAB (DBS LAB AHU05)- BILL OF QUANTITIES				
Sl.No	DESCRIPTION OF WORK	QTY.	UNI TS	MAKE
	EQUIPMENTS			
1.0	AIR HANDLING UNIT (DX TYPE)			
	Supply, installation, testing & commissioning of Double skin construction type Floor Mounted Air handling Units.			
	<p>Casing: - Double Skin wall panels, 46±2mm thick sandwich CFC free PUF injected panels(Density to be not less than 40±2kg/m³). Double skin wall panels shall be fixed to 3 mm thick, hollow extruded aluminium profile joined by 3-D Extruded aluminium chamfered corners, forming the structural frame work to house all internal components. Inner sheet of the panels shall be made of 0.8 mm thick plain GSS and outer sheet shall be of 0.8 mm thick GSS with pre plasticised finish. AHU frame work shall be of extruded aluminium profile with three way corner frame sections .Panels should have complete with Glass view panel, motor guard, marine light, limit switch, cable entry, drain connection at both the ends, insulated SS drain tray, 13mm thick 2 layers of isolation pads between the AHU frame & the Pedestal. Screw less construction with zero leakage in the panel joints. Inspection door(Hinge Type) for all the sections. The entire unit shall be fitted with thermal break profile and double skin panels with thermal barrier. Casing of the unit shall comply to eurovent EN 1886 with casing strength D1 type, casing leakage L1, Filter bypass leakage F8, Thermal bridging factor TB2 and air handling performance as per EN 13053. The air leakage through ahu casing shall not exceed specified limits while tested as per class B of DW 143 standard.</p>			SYSTEMAIR / EDGETECH / CARRIER/ / VTS/ZECO
	<p>Fan: The fan section shall be with vertical arrangement as per the efficiency criteria. The fans shall be direct driven Plug type fan with variable frequency drive. The fans section shall have centrifugal backward curved blower duly supported on Al. frame through rubber-in-shear or spring vibration mountings and raised at a height to match the opening of the front discharge supply air opening. If the discharge is top than the blower shall be supported using brackets/Al. frame with rubber-in-shear or spring vibration mountings without the need for elevation. The impeller and shaft of the fan shall be both statically and dynamically balanced. The motor shall be IE3 or above type totally enclosed and fan cooled type with class F insulation and IP 55 Protection. Minimum fan efficiency should not be less than 75%, Motor efficieny not less than 92%.The motor shall be of energy efficient type with high and flat efficiency curve for 50 to 100% load. Motor shall be especially designed for quiet operation and motor speed shall not exceed 1440 RPM. Drive to fan shall be provided through direct drive arrangement based on the type of blower selected. Fan motors shall be energy efficient and shall be 415±10% volts, 50 cycles, three phases, totally enclosed fan-cooled class F, with IP-55 protection. Motors shall be especially designed</p>			

	for quiet.			
	Filters: Each unit shall be provided with a factory assembled filter section containing washable synthetic type air pre filters media and provision for EU7 (MERV-13) mounted on Aluminum Frame. Filter bank framework shall be fully sealed and constructed from GSS. The efficiency of the prefilters shall be 90%down to particle size of 10 microns as per IS 7613, and ASHRAE 52.1. The MERV filter shall be 99% down to 0.3 microns. The fresh air side of the unit shall be properly ducted by cowling to an angle of 45Deg.			
	Cooling Coil: Refrigerant Coils shall have 12.5 to 15 mm dia (O.D)tubes minimum 0.35 mm thick with sine wave aluminium fins firmly bonded to copper tubes assembled in zinc coated steel frame. Face and surface areas shall be such as to ensure rated capacity from each unit and such that the air velocity across the coil shall be around 150 meters per minute. Where, air velocity of coil is more than 170 meter per minutes, additional PVC eliminator should be provided to avoid water carryover. The coil shall be pitched in the unit casing for proper drainage. The coil shall have MS/copper header with chilled water supply & return connections protruding out of AHU casing by minimum 150 mm and fitted with MS stub for copper head for connection with MS pipe. Each coil shall be factory-tested at 21 kg per sq. m air pressure under water. Tubes shall be mechanically expanded for minimum thermal contact resistance with fins. Fin spacing shall be 4 - 5 fins per cm. Water pressure drop in coil shall not exceed 10 PSIG.All public area AHUs shall be provided with minimum 6 Row Cooling Coil.			
	Note: Fire retardant canvas connection with 18gauge GI flanges at both sides			
	Noise Level: Contractor to ensure noise level < 60 dBA @ 1.5 m from the fillter side and < 60 dBA all around the UNIT.			
	Note: Minimum efff including drive loss not less than 75% for full load and 70% for loads up to 50% part load.			
	DX Coil-6 Row Deep			
	Outside Air Temperature: 96 deg F DBT /45% RH (Summer),82 Deg F DBT/82% RH			
	Supply air Temperature: 50Deg F			
a	Unit Capacity is 11TR, 2700CFM, 35mm Static	1	No.	
	OUTDOOR UNIT			
	Supplying, installation, testing and commissioning 20HP (TERRACE FLOOR), VRF/VRV air conditioning system, out door unit(ODU) complying type-IV OEM standards working on HFC free refrigerant R410A or other required/suitable green equivalent refrigerant, for cooling capacity delivering 100% at 44 deg. celcius and non stop cooling even at 50 deg celsius and coefficient of performance (COP) 3 to 4,modular type horizontal/vertical hot air discharge suitable for total piping			

2.0	length upto 1000 meter operation in cooling mode with inverter based VRF/VRV technology microprocessor based control compressor starter/control panel complete with scroll compressor, air cooled anti corrosive copper condenser coil of suitable shape for increasing maximum heat transfer area, built in oil separator, accumulator and oil receiver, copper tube aluminium fin air cooled condenser, condenser fan with suitable for 415V±10%, 50 Hz, 3 phase power supply, internal copper refrigerant piping, internal wiring and first charge of refrigerant, etc, all housed in powder coated weather proof cabinet provided on angle iron frame or suitable foundation connected to the system in approved manner complete.	1	No.	BLUESTAR / DAIKIN / MITSHUBSHI /TOSHIBA/V OLTAS
	The intelligent microprocessor based control system shall maintain the communication between indoor and outdoor units to operate the compressors in most efficient way and to keep the equal running time for constant speed compressors. The electrical contractor shall leave the required size cable with MCB near outdoor unit. The AC contractor shall terminate it to the ODs. The quote shall also include the earthing with earth pits, earthing strips as per IS & IEC specifications. The unit shall work with only R 410A refrigerant gas and on 400V / 3Ph / 50Hz AC power supply. (All components shall be mounted on welded steel base frame, structural steel profiles/panels made out of galvanized sheet steel, protected with primary coat & finished with acrylic paint Including M.S Stand for out door unit at Terrace level) Quote shall be inclusive of supporting elements also.			
	Outdoor Unit (ODU) Capacity : 20.00 Hp- with double compressor, suitable electrical & Refrigerant interconnection, initial charge of refrigerant R 410 A and ready for use with single point Electrical supply & refrigerant suction/Liquid line tapping etc as required.			
3.0	Supply, installation, testing & commissioning of Exhaust fan, floor mounted, suitable for outdoor application installation as per specification . Each complete with SISW Backward curved Centrifugal Fan, MS Frame work with Aluminum paint, free standing spring isolator equipped with top mounted adjusting bolt and nonskid base. Fan Bearing shall be outside the fan for easy maintenance. IP 55 with proper enclosure fan Motor shall be suitable for 415±10% volts, 50 cycles/second, 3 phase AC supply. (Suitable for outdoor installation) guard for motor should be water leakage proof and size should be as per cable size.			GREENHECK / NICOTRA
	The unit shall be provided with suitable drain plug at the bottom to drain out the rain water entering inside the unit.			
	The exhaust side of the unit shall be properly ducted(22G GI duct Aluminum paint of 180GSM) by cowling to an angle of 45Deg with wire mesh.			
	Noise Level: Contractor to ensure noise level < 50 dBA @ 1m from all around the UNIT.			

	Fire retardant canvas connection with 18gauge GI flanges at both sides			
	Static pressure and Motor Rating : The Indicated static pressure and motor rating is only provisional. Contractor to calculate static pressure based on final approved construction drawing and pressure drop of finalized Equipment / Items and submit for review / approval to the Client / consultants. The procurement shall be processed only after duly verification / approval of calculation and selection from the Client / consultants.			
a	460 cfm capacity at 10 mm external static pressure	1	No.	
4.0	COPPER PIPE			
a	supplying, laying/fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 28.6mm dia (OD) for liquid line/suction line supply and return piping of suitable gauge (hard copper pipe for liquid main line and soft copper pipe for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19mm thick elastomeric nitrile rubber along with application of multicoating of VRV/VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and ultra violet radiations with OEM standards of VRV/VRF air conditioning system complete.	30	Mtrs	TOTALING / RAJCO
b	supplying, laying/fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 15.9 mm dia (OD) for liquid line/suction line supply and return piping of suitable gauge (hard copper pipe for liquid main line and soft copper pipe for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19mm thick elastomeric nitrile rubber along with application of multicoating of VRV/VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and ultraviolet radiations with OEM standards of VRV/VRF air conditioning system complete.	30	Mtrs	TOTALING / RAJCO
5.0	Supplying and installation of high pressure grade required size copper connection Y or T- Joints / renet for liquid and suction line complete erected on wall/ceiling with supports/raceways, Nitrile rubber insulation, painting etc. with brazing and testing for leakages confirming the normal operation of the VRV / VRF air conditioning system.	2	No's	TOTALING / RAJCO
6.0	Supply, fabrication, installation and testing of flexible canvass connections constructed between ductable unit / dampers / ducting of required size with fire resist flexible double canvas sleeve complete.	4	No's	
	DUCT AND INSULATION			
	DUCT			

7.0	Supply, Fabrication, Installation and Testing of galvanized sheet metal ducts (SITE FABRICATED DUCTS) in accordance with the approved shop drawings complete with all accessories like vanes, flanges, suspension rods , anchor bolts, GI bolts & nuts, canvas connections & splitter dampers etc.,GI Sheets shall be as per IS 277 with zinc coating of 120 gsm and as required by the specification as per SMACNA Standards			ASAWA /ZECO/ COOLBREEZE
	Note: Selants used in duct joints have VOC less the 30			
a	24 gauge galvanized sheet steel	58	sqmt	
b	22 gauge galvanized sheet steel	R0	sqmt	
8.0	INSULATION			
a	Supply, Installation, Testing and commissioning of Duct Acoustic Insulation applied inside of duct work with 15 mm thk Nitrile Rubber open cell Insulation as per specifications(Insulation to be of Density 32kg/m ³ , Class O fire rated, thermal conductivity of 0.036 w/mK).	9	sqmt	UPTWIGA/ LLORD/ BEARDELL
b	Duct thermal insulation closed type with 13 mm thick Class 'O' synthetic foam insulation factory laminated aluminium foil and aluminium tape as per specs. The Aluminium 9 micron Reinforced aluminium, thermal conductivity of 0.032W/mk, compiled Class 'O' fire rating standard (Density to be not less than 25kg/m ³).	58	sqmt	UPTWIGA/ LLORD/ BEARDELL
	Note: All the insulation qty to be provided with adhesive sheets for easy installation			
9.0	Supply, installation, testing and balancing of AI Volume Control Dampers with operating handle aero foil blade with rubber bedding for Supply/Return/Exhaust air duct branches in accordance with the approved shop drawings and specifications. The VCD for Fresh air duct in the AHU room shall be with sleeve 400mm / 600mm to fix the Modulating actuators for the VCD.	0.6	sqmt	SYSTEMAIR/ COSMOS
10.0	Supply, installation & testing of GSS Motorized dampers for required torque with electric actuators so as to interlock to control automatic on/off operation with spring return.The damper frame shall be mounted on a 12 mm shaft, which turns in sintered bronze bearings. The bearings shall be self aligning, non -binding type. The damper blades shall be of Aluminum & torque selection for all actuator shall be approved by consultants/ clients.			BELIMO/ DANFOSS
a	Rate per Sq.mt	2	sqmt	
b	No. of Actuators (Damper sizes shall be not more than 0.5sqmt)	3	No's	
11.0	Supply, installation and testing of CPVC Drain piping for the units With Insulation of Nitrile Rubber pipe section thickness of 9 mm and suitable for following pipe size (Includes necessary fittings such as adators, elbows etc. and supports)			ASTRAL/ SUPREME/AS HIRVAD
a	32 mm	35	Mtrs	
b	25 mm	R0	Mtrs	

12.0	Supply, installation, of bird screen mesh of powder coated/Anodised extruded aluminium construction for exhaust and DX unit for fresh air duct and as per approved shop drawings.	0.5	sqmt	
13.0	Installation of new duct as per schematic by duct modification of existing duct work at site	01	Lot	
14.0	Rerouting of existing chilled/refrigerant pipes and existing Drain line to accommodate the DX type AHU	01	Lot	
	HVAC RELATED ELECTRICAL ITEMS			
1	STARTER PANEL			
	<p>Design, Engineering, Manufacture, Supply, Site Storage, Testing (FAT/SAT), Commissioning, Documentation of following LT Switchgears with Form 3B, IP 54 for indoor and IP55 for outdoor, RAL 7035, suitable for 415V, 3 phase, 4 Wire 50 Hz AC supply system of suitable size fabricated in compartmentalized design from CRCA sheet steel of 1.6 mm thickness for body, 2mm thickness for frame work and covers, 3mm thickness for gland plates with stiffeners where ever required and shall be dust and vermin proof construction.</p> <p>The panel must be a vibration free structure which is chemically treated with seven tank process before painting for surface treatment and powder coated with two coats of Zinc chromate primer and two coats of paint of approved shade.</p> <p>Fire and corrosion resistant coating similar to VIPER FR-1101 applied in two coats with necessary primer. The panel must be have suitable capacity extensible type TPN copper/Aluminium bus bars, Fire retardant DMC/SMC fillings for openings around bus bar near the sectional barriers.</p>			STARTER PANEL/ PRAGATI CONTROL/ PACE SWITCH GEAR
	<p>Any panel exceeding 1.5 m shall be made in parts(sections) not exceeding 1.5 m. bottom base channel of MS section not less than 100mm x 50mm x5mm thick, common earth bar of size 50mm x 5mm at the rear with 2 Nos. earth stud, solid connections from main bus bar to switch gears with required size of bus bars and control wiring with 2.5 sq.mm PVC insulated copper conductor (FRLS) cable, cable alleys, cable gland plates in two half, i/c providing following switch gears etc conforming to technical specification and as required:</p> <p>Refer list of recommended materials for the approved makes of breakers, relays, meters, starters, TVS, indicating lamps, ELRs etc</p>			MCCB & MCB: LEGRAND / SCHNEIDER
	The breaker should have an integrated short circuit release which gives protection against short circuit in case of failure of microprocessor release.			
	Fire suppression - Automatic tube detection for electrical panels			
	Note: Panel vendor to support electrical vendor team during commissioning.			
	Single Line Diagram & Technical Specifications to be closely			

	followed for further details.			
a	STARTER PANEL: AHU FAN of 2.2kW 3phase.16A MPCB with DOL starter. 2.2kW VFD provision to be provided inside the panel. Necessary On Off Trip indication lamps, OLR, contactors, VFD mode and bypass mode selector switches with indicators to be provided. The panel to be of IP rated (location of panel: Terrace) (Panel to be of Outdoor Type)	1	No	
b	63A TPN IP55 outdoor type Isolator with enclosure for HVAC equipment (factory fabricated)	1	No	
c	6A/16A TPN IP55 outdoor type Isolator with enclosure for HVAC equipment (factory fabricated)	1	No	
2.0	Supply, unloading, storing, shifting to required location, Installation, of 1.1 kV grade, 1C/3C/3.5C/4C, XLPE insulated, and PVC inner & outer sheath, stranded aluminium / Copper conductor, flat steel strip/ wire armoured cables conforming to IS:1554 & IS-7098/ Part I (with latest amendments)and of following sizes. The cable shall bear ISI certification mark. Laying of the cable in existing hume pipe/cable tray including transportation of cable to site, and providing cable route/ joint markers and cable tie, including supply and fixing of cable tags for every 0.5 to 0.75 mtr, etc., complete as required. Imp Note: All Cables shall be procured by contractor based on the shop drawings, site measurement and the approved cable schedule			RR CABLE/ KEI/ POLYCAB
	END TERMINATIONS & GLAND EARTHING :			
	Supply, Installation, Testing & Commissioning of End terminations for cables with brass gland of Double / Single compression and copper lugs etc, complete as per specifications. Also Supply & Installation of Gland Earthing Consisting of Suitable ring and Brass Nuts, Bolts and washers. Gland earthing with 14 SWG copper wire to connect to nearest earth flat. Cost of Aluminum engraving cable tag for incoming and outgoing cables shall be inclusive in rate.			
	Note:			
	Gland type : Heavy duty Brass with nickel plated			
	Compression : Double compression above 35 Sq.mm			
	Sealing Ring : Natural rubber for indoor, Neoprene for Outdoor			
	PVC gland should be provided for single core & multi core flexible copper cables			
	Only long body Aluminium lugs & copper lugs should be used for aluminum and copper armoured / unarmoured cables irrespective of sizes			
a	Supply & Installation of 1R X 4C x 4 Sqmm XLPE, Cu, Ar. Cable (To the Starter Panel)	15	Mtrs	
	End Termination	8	No's	
b	Supply & Installation of 1R X 4C x 4 Sqmm XLPE, Cu, Ar. Cable (From Starter Panel)	5	Mtrs	
	End Termination	8	No's	

c	Supply & Installation of 1R X 3C x 2.5 Sqmm XLPE, Cu, Ar. Cable (Exhaust Fan)	5	Mtrs	
	End Termination	6	No's	
d	Supply & Installation of 1R X 4C x 16 Sqmm XLPE, Cu, Ar. Cable (ODU UNIT)	5	Mtr	
	End Termination	8	No's	
3.0	Cable Tray			
	<p>Supply and fixing of Pre galvanized Perforated cable trays with horizontal & vertical bends, reducers, Tee's, Cross over, supports, brackets and other accessories as required confirming to IS/IEC-61537. The cable tray shall be galvanized for corrosion protection confirming to DIN EN 10346 / ISO 1461. Cable trays are to be tested for Impact resistance test according to IEC 60068-2-75, Salt Spray test according to ISO 9227 as per IS/IEC 61537 test duration recommendation. The cable tray should not deflect more than 1/100th of the span length at SWL in Mid span for cable and the transverse deflection of all mounting accessories at SWL shall not exceed 1/20th of the length and manufacturer has to submit load chart and manufacturer declaration according to EN 61537.</p> <p>The cable trays, wall bracket system, Slotted U support system and all related accessories & fasteners should be tested according to IS 1893 to meet out the seismic Zone V requirement. The respective support system elements should be factory fabricated, selection of support system elements & installed guidelines as per the manufacturer recommendation in order comply seismic zone V (IS 1893) and vibration forces during earth quake. The cable tray shall be supplied in standard length of 3000 mm.</p>			OBO/ PROFAB/ PUSPAK
a	150 mm X 50 mm X 1.6mm Light duty Perforated type cable trays	10	Rmt	
b	100 mm X 50 mm X 1.6mm Light duty Perforated type cable trays.	10	Rmt	
	NOTE:			
a	MS channels, angle frames for installation of units. All MS Channels and angle frames to be painted with two coats of primer and two coats of black colour epoxy paint. To avoid corrosion to chanel & angles required chemical to be used. Apply suitable chemicals to avoid corrosion to chanel & angles frames.			
b	Civil works such as opening & closing of walls to take the pipes & ducts, etc. and co-ordination with main civil contractor for equipment pedestals.			
c	Submission of Operating and Maintenance Manuals in Hardbound wrappers complete with As built drawings, (Soft and hard copies), Air balance figures, water balance figures, all manufacturer's catalogue, warranty certificate, test certificates, all pre and post commissioning check list and all other relevant details necessary for the smooth operation and maintenance of the plant. test certificate to be provided.			

d	Any items and works not specifically mentioned above but as required for the works. (contractor to specify the nature of work / item)			
e	Power and water requirement shall be as per actuals site work			
	Exclusions:			
a	GST Extra as per the type of commodity			
b	Civil works related			

ANNEXURE-II

DIMENSION METROLOGY LAB (DM LAB AHU12) BILL OF QUANTITIES				
SL. No.	DESCRIPTION OF WORK	QTY	UNITS	MAKE
	EQUIPMENTS			
1.0	AIR HANDLING UNIT (DX TYPE)			
	Supply, installation, testing & commissioning of Double skin construction type Floor Mounted Air handling Units.			
	Casing: - Double Skin wall panels, 46±2mm thick sandwich CFC free PUF injected panels(Density to be not less than 40±2kg/m ³). Double skin wall panels shall be fixed to 3 mm thick, hollow extruded aluminium profile joined by 3-D Extruded aluminium chamfered corners, forming the structural frame work to house all internal components. Inner sheet of the panels shall be made of 0.8 mm thick plain GSS and outer sheet shall be of 0.8 mm thick GSS with pre plasticised finish. AHU frame work shall be of extruded aluminium profile with three way corner frame sections .Panels should have complete with Glass view panel, motor guard, marine light, limit switch, cable entry, drain connection at both the ends, insulated SS drain tray, 13mm thick 2 layers of isolation pads between the AHU frame & the Pedestal. Screw less construction with zero leakage in the panel joints. Inspection door(Hinge Type) for all the sections. The entire unit shall be fitted with thermal break profile and double skin panels with thermal barrier. Casing of the unit shall comply to eurovent EN 1886 with casing strength D1 type, casing leakage L1, Filter bypass leakage F8, Thermal bridging factor TB2 and air handling performance as per EN 13053. The air leakage through ahu casing shall not exceed specified limits while tested as per class B of DW 143 standard.			SYSTEMAIR / EDGETECH / CARRIER/ FLAKTWO ODS
	Fan: The fan section shall be with vertical arrangement as per the efficiency criteria. The fans shall be direct driven Plug type fan with variable frequency drive. The fans section shall have centrifugal backward curved blower duly supported on Al. frame through rubber-in-shear or spring vibration mountings and raised at a height to match the opening of the front discharge supply air opening. If the discharge is top than the blower shall be supported using brackets/Al. frame with rubber-in-shear or spring vibration mountings without the need for elevation. The impeller and shaft of the fan shall be both statically and			

	dynamically balanced. The motor shall be IE3 or above type totally enclosed and fan cooled type with class F insulation and IP 55 Protection. Minimum fan efficiency should not be less than 75%, Motor efficiency not less than 92%.The motor shall be of energy efficient type with high and flat efficiency curve for 50 to 100% load. Motor shall be especially designed for quiet operation and motor speed shall not exceed 1440 RPM. Drive to fan shall be provided through direct drive arrangement based on the type of blower selected. Fan motors shall be energy efficient and shall be 415±10% volts, 50 cycles, three phases, totally enclosed fan-cooled class F, with IP-55 protection. Motors shall be especially designed for quiet.			
	Filters: Each unit shall be provided with a factory assembled filter section containing washable synthetic type air pre filters media and provision for EU7 (MERV-13) mounted on Aluminum Frame. Filter bank framework shall be fully sealed and constructed from GSS. The efficiency of the prefilters shall be 90%down to particle size of 10 microns as per IS 7613, and ASHRAE 52.1. The MERV filter shall be 99% down to 0.3 microns. The fresh air side of the unit shall be properly ducted by cowling to an angle of 45Deg.			
	Cooling Coil: Refrigerant coils shall have 12.5 to 15 mm dia (O.D) tubes minimum 0.35 mm thick with sine wave aluminium fins firmly bonded to copper tubes assembled in zinc coated steel frame. Face and surface areas shall be such as to ensure rated capacity from each unit and such that the air velocity across the coil shall be around 150 meters per minute. Where, air velocity of coil is more than 170 meter per minutes, additional PVC eliminator should be provided to avoid water carryover. The coil shall be pitched in the unit casing for proper drainage. The coil shall have MS/copper header with chilled water supply & return connections protruding out of AHU casing by minimum 150 mm and fitted with MS stub for copper head for connection with MS pipe. Each coil shall be factory-tested at 21 kg per sq. m air pressure under water. Tubes shall be mechanically expanded for minimum thermal contact resistance with fins. Fin spacing shall be 4 - 5 fins per cm. Water pressure drop in coil shall not exceed 10 PSIG.All public area AHUs shall be provided with minimum 6 Row Cooling Coil.			
	Note: Fire retardant canvas connection with 18gauge GI flanges at both sides			
	Noise Level: Contractor to ensure noise level < 60 dBA @ 1.5 m from the fillter side and < 60 dBA all around the UNIT.			
	Note: Minimum efff including drive loss not less than 75% for full load and 70% for loads up to 50% part load			
	DX Coil-6 Row Deep			
	Outside Air Temperature: 96 deg F DBT /45% RH (Summer), 82 Deg F DBT/82% RH			
	Supply air Temperature: 50Deg F			
a	Unit Capacity is 22 TR,5,100 CFM, 35 mm static	1	No	

	OUTDOOR UNIT			
2.0	<p>Supplying, installation, testing and commissioning 20HP (TERRACE FLOOR), VRF/VRV air conditioning system, outdoor unit(ODU) complying type-IV OEM standards working on HFC free refrigerant R410A or other required/suitable green equivalent refrigerant, for cooling capacity delivering 100% at 44 deg. celsius and non stop cooling even at 50 deg celsius and coefficient of performance (COP) 3 to 4, modular type horizontal/vertical hot air discharge suitable for total piping length upto 1000 meter operation in cooling mode with inverter based VRF/VRV technology microprocessor based control compressor starter/control panel complete with scroll compressor, air cooled anti corrosive copper condenser coil of suitable shape for increasing maximum heat transfer area, built in oil separator, accumulator and oil receiver, copper tube aluminium fin air cooled condenser, condenser fan with suitable for 415V±10%, 50 Hz, 3 phase power supply, internal copper refrigerant piping, internal wiring and first charge of refrigerant, etc, all housed in powder coated weather proof cabinet provided on angle iron frame or suitable foundation connected to the system in approved manner complete.</p>	2	No's	BLUESTAR / DAIKIN / MITSUBISHI
	<p>The intelligent microprocessor based control system shall maintain the communication between indoor and outdoor units to operate the compressors in most efficient way and to keep the equal running time for constant speed compressors. The electrical contractor shall leave the required size cable with MCB near outdoor unit. The AC contractor shall terminate it to the ODs. The quote shall also include the earthing with earth pits, earthing strips as per IS & IEC specifications. The unit shall work with only R 410A refrigerant gas and on 400V / 3Ph / 50Hz AC power supply. (All components shall be mounted on welded steel base frame, structural steel profiles/panels made out of galvanized sheet steel, protected with primary coat & finished with acrylic paint Including M.S Stand for outdoor unit at Terrace level) Quote shall be inclusive of supporting elements also.</p>			
	<p>Outdoor Unit (ODU) Capacity : 20.00 Hp- with double compressor, suitable electrical & Refrigerant interconnection, initial charge of refrigerant R 410 A and ready for use with single point Electrical supply & refrigerant suction/Liquid line tapping etc as required.</p>			
3.0	<p>Supply, installation, testing & commissioning of Exhaust fan, floor mounted, suitable for outdoor application installation as per specification. Each complete with SISW Backward curved Centrifugal Fan, MS Frame work with Aluminum paint, free standing spring isolator equipped with top mounted adjusting bolt and nonskid base. Fan Bearing shall be outside the fan for easy maintenance. IP 55 with proper enclosure fan Motor shall be suitable for 415±10% volts, 50 cycles/second, 3 phase AC supply. (Suitable for outdoor installation) guard for motor should be water leakage proof and size should be as per cable size.</p>			GREENHECK / NICOTRA

	The unit shall be provided with suitable drain plug at the bottom to drain out the rain water entering inside the unit.			
	The exhaust side of the unit shall be properly ducted(22G GI duct Aluminum paint of 180GSM) by cowling to an angle of 45Deg with wire mesh			
	Noise Level: Contractor to ensure noise level < 50 dBA @ 1m from all around the UNIT.			
	Fire retardant canvas connection with 18gauge GI flanges at both sides			
	Static pressure and Motor Rating: The Indicated static pressure and motor rating is only provisional. Contractor to calculate static pressure based on final approved construction drawing and pressure drop of finalized Equipment / Items and submit for review / approval to the Client / consultants. The procurement shall be processed only after duly verification / approval of calculation and selection from the Client / consultants.			
a	1332 cfm capacity at 10 mm external static pressure	1	No	
4.0	COPPER PIPE			
	Supplying, laying / fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 41.3 mm dia (OD) for liquid line / suction line supply and return piping of suitable gauge (hard drawn copper pipe for liquid main line and for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19 mm thick elastomeric nitrile rubber along with application of multicoating suitable for use with VRV / VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and ultra violet radiations complete with OEM standards of VRV / VRF air conditioning system.	18	Mtrs	TOTALING / RAJCO
	supplying, laying/fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 28.6mm dia (OD) for liquid line/suction line supply and return piping of suitable gauge (hard copper pipe for liquid main line and soft copper pipe for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19mm thick elastomeric nitrile rubber along with application of multicoating of VRV/VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and ultra violet radiations with OEM standards of VRV/VRF air conditioning system complete.	12	Mtrs	TOTALING / RAJCO
	Supplying, laying / fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 19.1 mm dia (OD) for liquid line / suction line supply and return piping of suitable gauge (hard drawn copper pipe for liquid main line and for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19 mm thick elastomeric nitrile rubber along with application of multicoating suitable for use with VRV / VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and	18	Mtrs	TOTALING / RAJCO

	ultra violet radiations complete with OEM standards of VRV / VRF air conditioning system.			
	supplying, laying/fixing, testing and commissioning of appropriate nominal refrigerant copper pipe of 15.9 mm dia (OD) for liquid line/suction line supply and return piping of suitable gauge (hard copper pipe for liquid main line and soft copper pipe for refrigerant) along with necessary supports, hangers, clamps, vibration isolators and fittings such as bends, tees, valves, gauges, strainers with insulation of 19mm thick elastomeric nitrile rubber along with application of multicoating of VRV/VRF piping for protection against mechanical damages, fungal growth, flame spread, water permeance and ultraviolet radiations with OEM standards of VRV/VRF air conditioning system complete.	12	Mtrs	TOTALING / RAJCO
5.0	Supplying and installation of high pressure grade required size copper connection Y or T- Joints / refnet for liquid and suction line complete erected on wall/ceiling with supports/raceways, Nitrile rubber insulation, painting etc. with brazing and testing for leakages confirming the normal operation of the VRV / VRF air conditioning system.	4	No's	TOTALING / RAJCO
6.0	Supply, fabrication, installation and testing of flexible canvass connections constructed between ductable unit / dampers / ducting of required size with fire resist flexible double canvas sleeve complete.	4	No's	
	DUCT AND INSULATION			
7.0	DUCT			
	Supply, Fabrication, Installation and Testing of galvanized sheet metal ducts (SITE FABRICATED DUCTS) in accordance with the approved shop drawings complete with all accessories like vanes, flanges, suspension rods , anchor bolts, GI bolts & nuts, canvas connections & splitter dampers etc.,GI Sheets shall be as per IS 277 with zinc coating of 120 gsm and as required by the specification as per SMACNA Standards			ASAWA/ ZECO/ COOLBREE ZE
	Note: Selants used in duct joints have VOC less the 30			
a	24 gauge galvanized sheet steel	12	sqmt	
b	22 gauge galvanized sheet steel	12	sqmt	
8.0	INSULATION			
a	Supply, Installation, Testing and commissioning of Duct Acoustic Insulation applied inside of duct work with 15 mm thk Nitrile Rubber open cell Insulation as per specifications (Insulation to be of Denstity 32kg/m3, Class O fire rated, thermal conductivity of 0.036 w/mK).	16	sqmt	UPTWIGA/ LLORD/ BEARDSEL L
b	Duct thermal insulation closed type with 13 mm thick Class 'O' synthetic foam insulation factory laminated aluminium foil and aluminium tape as per specs. The Aluminium 9 micron Reinforced aluminium, thermal conductivity of 0.032W/mk, compiled Class 'O' fire rating standard (Density to be not less than 25kg/m3).	34	sqmt	UPTWIGA/ LLORD/ BEARDSEL L
	Note: All the insulation qty to be provided with adhesive sheets			

	for easy installation			
9.0	Supply, installation, testing and balancing of AI Volume Control Dampers with operating handle aero foil blade with rubber beeding for Supply/Return/Exhaust air duct branches in accordance with the approved shop drawings and specifications. The VCD for Fresh air duct in the AHU room shall be with sleeve 400mm / 600mm to fix the Modulating actuators for the DCV.	0.4	sqmt	SYSTEMAIR/ COSMOS
10.0	Supply, installation & testing of GSS Motorized dampers for required torque with electric actuators so as to interlock to control automatic on/off operation with spring return. The damper frame shall be mounted on a 12 mm shaft, which turns in sintered bronze bearings. The bearings shall be self aligning, non -binding type. The damper blades shall be of Aluminum & torque selection for all actuator shall be approved by consultants/ clients.			BELIMO/ DANFOSS
a	Rate per Sq.mt	1	sqmt	
b	No. of Actuators (Damper sizes shall be not more than 0.5sqmt)	3	No's	
11.0	Supply, installation and testing of CPVC Drain piping for the units With Insulation of Nitrile Rubber pipe section thickness of 9 mm and suitable for following pipe size (Includes necessary fittings such as adators, elbows etc. and supports)			ASTRAL/ SUPREME
a	32 mm	55	Mtrs	
b	25 mm	0	Mtrs	
12.0	Supply, installation, of bird screen mesh of powder coated/Anodised extruded aluminium construction for exhaust and DX unit for fresh air duct and as per approved shop drawings.	0.5	sqmt	
13.0	Installation of new duct as per schematic by duct modification of existing duct work at site (to be quoted as lumpsum based on physical verification at site) ref schematic drawing in annexure.	1	Lot	
HVAC RELATED ELECTRICAL ITEMS				
1.0	STARTER PANEL			
	Design, Engineering, Manufacture, Supply, Site Storage ,Testing (FAT/SAT), Commisioning, Documentation of following LT Switchgears with Form 3B, IP 54 for indoor and IP55 for outdoor,RAL 7035, suitable for 415V, 3 phase, 4 Wire 50 Hz AC supply system of suitable size fabricated in compartmentalized design from CRCA sheet steel of 1.6 mm thickness for body , 2mm thickness for frame work and covers, 3mm thickness for gland plates with stiffeners where ever required and shall be dust and vermin proof construction. The panel must be a vibration free structure which is chemically treated wth seven tank process before painting for surface treatment and powder coated with two coats of Zinc chromate			STARTER PANEL/ PRAGATI CONTROL/ PACE SWITCH GEAR

	<p>primer and two coats of paint of approved shade. Fire and corrosion resistant coating similar to VIPER FR-1101 applied in two coats with necessary primer. The panel must be have suitable capacity extensible type TPN copper/Aluminium bus bars, Fire retardant DMC/SMC fillings for openings around bus bar near the sectional barriers.</p>			
	<p>Any panel exceeding 1.5 m shall be made in parts(sections) not exceeding 1.5 m. bottom base channel of MS section not less than 100mm x 50mm x5mm thick, common earth bar of size 50mm x 5mm at the rear with 2 Nos. earth stud, solid connections from main bus bar to switch gears with required size of bus bars and control wiring with 2.5 sq.mm PVC insulated copper conductor (FRLS) cable, cable alleys, cable gland plates in two half, i/c providing following switch gears etc conforming to technical specification and as required: Refer list of recommended materials for the approved makes of breakers, relays, meters, starters, TVSS, indicating lamps, ELRs etc</p>			MCCB & MCB: LEGRAND/ SCHNEIDE R
	The breaker should have an integrated short circuit release which gives protection against short circuit in case of failure of microprocessor release.			
	Fire suppression - Automatic tube detection for electrical panels			
	Note: Panel vendor to support electrical vendor team during commissioning.			
	Single Line Diagram & Technical Specifications to be closely followed for further details.			
a	STARTER PANEL: AHU FAN of 4kW 3phase .25A MPCB with DOL starter. 4kW VFD provision to be provided inside the panel. Necessary On Off Trip indication lamps, OLR , contactors , VFD mode and bypass mode selector switches with indicators to be provided . The panel to be of IP rated (location of panel : Terrace) (Panel to be of Outdoor Type)	1	No.	
b	63A TPN IP55 outdoor type Isolator with enclosure for HVAC equipment (factory fabricated)	2	No's	
c	6A/16A TPN IP55 outdoor type Isolator with enclosure for HVAC equipment (factory fabricated)	1	No.	
2.0	<p>Supply, unloading, storing, shifting to required location, Installation, of 1.1 kV grade, 1C/3C/3.5C/4C, XLPE insulated, and PVC inner & outer sheath, stranded aluminium / Copper conductor, flat steel strip/ wire armoured cables conforming to IS:1554 & IS-7098/ Part I (with latest amendments)and of following sizes.The cable shall bear ISI certification mark. Laying of the cable in existing hume pipe/cable tray including transportation of cable to site, and providing cable route/ joint markers and cable tie,including supply and fixing of cable tags for every 0.5 to 0.75 mtr,etc., complete as required. Imp Note: All Cables shall be procured by contractor based on the shop drawings, site measurement and the approved cable schedule</p>			RR CABLE/ KEI/P OLYCAB
	END TERMINATIONS & GLAND EARTHING :			

	Supply, Installation, Testing & Commissioning of End terminations for cables with brass gland of Double / Single compression and copper lugs etc, complete as per specifications. Also Supply & Installation of Gland Earthing Consisting of Suitable ring and Brass Nuts, Bolts and washers. Gland earthing with 14 SWG copper wire to connect to nearest earth flat. Cost of Aluminum engraving cable tag for incoming and out going cables shall be inclusive in rate.			
	NOTE:			
	Gland type : Heavy duty Brass with nickel plated			
	Compression : Double compression above 35 Sq.mm			
	Sealing Ring : Natural rubber for indoor, Neoprene for Outdoor			
	PVC gland should be provided for single core & multi core flexible copper cables			
	Only long body Aluminium lugs & copper lugs should be used for aluminum and copper armoured / unarmoured cables irrespective of sizes			
a	Supply & Installation of 1R X 4C x 6 Sqmm XLPE, Cu, Ar. Cable (To the Starter Panel)	15	Mtrs	
	End Termination	8	No's	
b	Supply & Installation of 1R X 4C x 4 Sqmm XLPE, Cu, Ar. Cable (From Starter Panel)	5	Mtrs	
	End Termination	8	No's	
c	Supply & Installation of 1R X 3C x 2.5 Sqmm XLPE, Cu, Ar. Cable (Exhaust Fan)	5	Mtrs	
	End Termination	6	No's	
d	Supply & Installation of 1R X 4C x 16 Sqmm XLPE, Cu, Ar. Cable (ODU UNIT)	10	Mtrs	
	End Termination	8	No,s	
3.0	Cable Tray			
	<p>Supply and fixing of Pre galvanized Perforated cable trays with horizontal & vertical bends, reducers, Tee's, Cross over, supports, brackets and other accessories as required confirming to IS/IEC-61537.The cable tray shall be galvanized for corrosion protection confirming to DIN EN 10346 / ISO 1461 .Cable trays are to be tested for Impact resistance test according to IEC 60068-2-75, Salt Spray test according to ISO 9227 as per IS/IEC 61537 test duration recommendation. The cable tray should not deflect more than 1/100th of the span length at SWL in Mid span for cable and the transverse deflection of all mounting accessories at SWL shall not exceed 1/20th of the length and manufacturer has to submit load chart and manufacturer declaration according to EN 61537.</p> <p>The cable trays, wall bracket system, Slotted U support system and all related accessories & fasteners should be tested according to IS 1893 to meet out the seismic Zone V requirement .The respective support system elements should be</p>		Rmt	OBO/ PROFAB/ PUSPAK

	factory fabricated, selection of support system elements & installed guidelines as per the manufacturer recommendation in order comply seismic zone V (IS 1893) and vibration forces during earth quake. The cable tray shall be supplied in standard length of 3000 mm.			
a	150 mm X 50 mm X 1.6mm Light duty Perforated type cable trays	10	Rmt	
b	100 mm X 50 mm X 1.6mm Light duty Perforated type cable trays.	10	Rmt	
	NOTE:			
a	MS channels, angle frames for installation of units. All MS Channels and angle frames to be painted with two coats of primer and two coats of black colour epoxy paint. To avoid corrosion to chanel & angles required chemical to be used. Apply suitable chemicals to avoid corrosion to chanel & angles frames.			
b	Civil works such as opening & closing of walls to take the pipes & ducts, etc. and co-ordination with main civil contractor for equipment pedestals.			
c	Submission of Operating and Maintenance Manuals in Hardbound wrappers complete with As built drawings, (Soft and hard copies), Air balance figures, water balance figures, all manufacturer's catalogue, warranty certificate, test certificates, all pre and post commissioning check list and all other relevant details necessary for the smooth operation and maintenace of the plant. test certificate to be provided.			
d	Any items and works not specifically mentioned above but as required for the works. (contractor to specify the nature of work / item)			
e	Power and water requirement shall be as per actuals site work			
	Exclusions:			
a	GST Extra as per the type of commodity			
b	Civil works related			

CHAPTER - 5
CONTRACT FORM

Contract No. _____ Date: _____

THIS CONTRACT AGREEMENT is made
the [] day of [] month of, [] year

BETWEEN

The Central Manufacturing Technology Institute (CMTI), a registered Government of India Society under the administrative control of the Ministry of Heavy Industry and Public Enterprises, Government of India having its registered office at Tumkur Road, Bengaluru - 560022, Karnataka, India represented by [Insert complete name and address of Purchaser (hereinafter called “the Purchaser”), and

[Insert name of Supplier], a corporation incorporated under the laws of [insert: country of Supplier] and having its principal place of business at [insert: address of Supplier] (herein after called “the Supplier”).

WHEREAS the Purchaser invited Bids for certain Goods and ancillary Services, viz., [insert brief description of Goods and Services] and has accepted a Bid by the Supplier for the supply of those Goods and Services in the sum of [insert Contract Price in words and figures, expressed in the Contract currency(ies)] (herein after called “the Contract Price”).

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:
 - (a) This Contract Agreement
 - (b) Special Conditions of Contract
 - (c) General Conditions of Contract
 - (d) Technical Requirements (including Schedule of Requirements and Technical specifications)
 - (e) The Supplier’s Bid and original Price Schedules
 - (f) The Purchaser’s Notification of Award
 - (g) [Add here any other document(s)]
- 3 This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.
- 4 In consideration of the payments to be made by the Purchaser to the Supplier as here in after mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein inconformity in all respects with the provisions of the Contract.
- 5 The Purchaser here by covenants to pay the Supplier in consideration of the provision

of the Goods and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS where of the parties here to have caused this Agreement to be executed in accordance with the laws of Union of India on the day, month and year indicated above.

For and on behalf of the Central Manufacturing Technology
Institute

Signed: [insert signature]

In the capacity of [insert title or other appropriate
designation] in the presence of [insert identification of
official witness]

Signed: [insert signature]

in the capacity of [insert title or other appropriate
designation]
in the presence of [insert identification of official
witness]

For and on behalf of the Supplier

Signed: [insert signature of authorized representative(s) of the Supplier] in the capacity of
[insert title or other appropriate designation] in the presence of [insert identification of
official witness]

CHAPTER - 6

OTHER STANDARD FORM

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1.	Integrity Pact
2.	Bidder Information form
3.	Bid Security Form
4.	Performance Statement Form
5.	Deviation Statement form
6.	Bid form
7.	Performance Security Form
8.	Acceptance certificate form
9.	Eligibility certificate form
10.	Non Black-listed Self certificate form

INTEGRITY PACT

Tender Ref. No.& Date:.....

1. This Integrity pact Agreement is made at..... on this.....day of..... 20..... BETWEEN **Central Manufacturing Technology Institute(CMTI)** represented by its **Purchase Officer/ Executive Engineer/ Chief Administrative Officer**, Hereinafter referred as the **Buyer/ Owner**, which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns) AND **M/s** hereinafter referred to as the (Details of duly authorized signatory) “**Bidder/Contractor**” and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

2. Preamble

WHEREAS the Owner/ Buyer has floated the Tender under organizational procedures (hereinafter referred to as “Tender/Bid”) and intends to procure/ award contract for..... hereinafter referred to as the Goods/ Services/ works/ Contract. AND WHEREAS the Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s). AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as “Integrity Pact” or “Pact”), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties. NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

3. Commitment of the Buyer/ Owner

- 3.1 The Buyer/ Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
- a. No employee of the Buyer/ Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - b. The Buyer/ Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Buyer/ Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
 - c. The Buyer/ Owner shall endeavour to exclude from the Tender process all known prejudiced persons or any person, whose conduct in the past has been of biased nature.
- 3.2 If the Buyer/ Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or if there be a substantive suspicion in this regard, the Buyer/ Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

4. Commitment of the Bidder(s)/ seller(s)/ Contractor(s)

- 4.1 It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to CMTI all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- 4.2 The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution.
- a. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Buyer/ Owner’s employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is

not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.

- b. The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
- c. The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act Indian Legislation, Prevention of Corruption Act 1988 as amended from time to time. Further the Bidder(s)/Contractor(s) will not use improperly, for the purpose of competition or personal gain, or pass on to others, any information or documents provided by the Buyer/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- d. The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign principals/agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
- e. The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- f. The Bidder(s)/Contractor(s) have not sold and will not sell the same material/equipment at prices lower than the bid price.

4.3 The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4.4 The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice (means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of CMTI's interests).

4.5 The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

4.6 The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/sub-vendors.

- a. The Buyer/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- b. The Buyer/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Buyer/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process

5. Previous Transgression

- a. The Bidder declares that no previous transgressions occurred in the last 3 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process. The date of such transgression, for the purpose of disclosure by bidders in this regard, would be the date on which cognizance of the said transgression was taken by the competent authority. The Transgression(s), for which

cognizance was taken even before the said period of three years, but are pending conclusion, shall also be reported by the bidders.

- b. If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Buyer/ Owner.
- c. If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Buyer/ Owner may, at its own discretion, revoke the exclusion prematurely.

6. Consequences of Breach

Without prejudice to any rights that may be available to the Buyer/ Owner under law or the Contract or its established policies and laid down procedures, the Buyer/ Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Buyer/ Owner's absolute right:

- a. If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Clause 4 & Clause 5 above, or in any other form such as to put his reliability or credibility in question, the Buyer/ Owner after giving 14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Buyer/ Owner. Such exclusion may be forever or for a limited period as decided by the Buyer/ Owner.
- b. Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Buyer/ Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.
- c. Criminal Liability: If the Buyer/ Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Buyer/ Owner has substantive suspicion in this regard, the Buyer/ Owner will inform the same to law enforcing agencies for further investigation.

7. Compensation for Damages

- a. If the Buyer/ Owner has disqualified the Bidder(s) / Seller(s) from the tender process prior to the award according to Clause 8, the Buyer/ Owner is entitled to demand and recover the damages equivalent to Earnest Money Deposit in case of open tendering.
- b. If the Buyer/ Owner has terminated the contract according to Clause 6, or if the Buyer/ Owner is entitled to terminate the contract according to Clause 6, the Buyer/ Owner shall be entitled to en cash the advance bank guarantee and performance bond/ warranty bond, if furnished by the Bidder(s)/Seller(s), in order to recover the payments, already made by the Buyer/ Owner for undelivered Goods and / or Services and / or Works.
- c. The Bidder(s)/Seller(s) shall also be liable to refund to the Buyer/ Owner, the Agency Commission / payments made by the Seller(s) / Bidder(s) along with interest at the rate of 2% per annum above LIBOR (London Inter Bank Offer Rate) (for foreign vendors) and Base Rate of SBI (State Bank of India) plus 2% (for Indian vendors).

8. Independent External Monitor(s)

- a. The Buyer/ Owner has appointed Independent External Monitor(s) for this Integrity Pact after approval by the Central Vigilance Commission. The task of the Monitor is to review

independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

- b. For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- c. The IEM is not subject to instructions by the representatives of the parties and performs his/her functions neutrally and independently. The IEM would be provided access to all documents/ records pertaining to the contract for which a complaint or issue is raised before them, as and when warranted. However, the documents/ records/ information having national Security Implications and those documents which have been classified as Secret/ Top Secret are not to be disclosed. He/ she reports to the Director, CMTI.
- d. If any complaint with regard to violation of the IP is received by the Buyer/ Owner in a procurement case, the Buyer/ Owner shall refer the complaint to the Independent External Monitor(s) for their report. Contact details of IEMs are given in the bid/ tender documents as well as in the website of CMTI <https://cmti.res.in>
- e. The Bidder(s)/Contractor(s) accepts that the IEM has the right to access without restriction to all Project documentation of the Buyer/ Owner including that provided by the Contractor. The Contractor will also grant the IEM, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to Sub-contractors.
- f. The IEM is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s)/ Sub-contractor(s) with confidentiality. The IEM has also signed declarations on 'Non-Disclosure of Confidential Information' and of 'Absence of Conflict of Interest'. In case of any conflict of interest arising at a later date, the IEM shall inform Director, CMTI and recuse himself / herself from that case.
- g. The Buyer/ Owner will provide to the IEM sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Buyer/ Owner and the Contractor. The parties offer to the IEM the option to participate in such meetings.
- h. As soon as the IEM notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Buyer/ Owner and request the Management to discontinue or take corrective action, or to take other relevant action. The IEM can in this regard submit non-binding recommendations. Beyond this, the IEM has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- i. The IEM will submit a written report to the Director, CMTI, within 4 weeks from the date of reference or intimation to him by the Buyer/ Owner and, should the occasion arise, submit proposals for correcting problematic situations
- j. If the IEM has reported to the Director, CMTI, a substantiated suspicion of an offence under relevant IPC/ PC Act, and the Director, CMTI has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the IEM may also transmit this information directly to the Central Vigilance Commissioner.
- k. The word 'Monitor' would include both singular and plural.

9. Duration of the Pact

- a. This Pact will be effective from the date of issue of tender (NIT).It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other unsuccessful bidders, within 6 months from date of placement of order / finalization of contract against this tender till the Contract has been awarded.
- b. If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Director, CMTI.
- c. Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10. Other Provisions

- a. Changes and supplements need to be made in writing. Side agreements have not been made.
- b. After award of work, the IEMs shall look into any issues relating to execution of contract, if specifically raised before them.
- c. The Bidder(s)/Seller(s) signing this IP shall not initiate any Legal action or approach any court of law during the examination of any allegations/complaint by IEM and until the IEM delivers the report.
- d. In the event of any dispute between the management and the Bidder(s)/Seller(s), relating to those contracts where Integrity Pact is applicable, the same will be settled through mediation before the panel of IEMs within 4 weeks. In case the dispute remains unsolved even after mediation by the panel of IEMs, CMTI will take further action as per the terms and conditions of the contract in respect of dispute resolution/ arbitration.
- e. Nothing contained in this Integrity Pact shall be deemed to assure the Bidder(s)/ Seller(s) of any success or otherwise in the tendering process.
- f. If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- g. Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- h. This Integrity pact is subject to Indian Laws, and exclusive Jurisdiction of Courts at Bangalore, India.
- i. The Parties hereby sign this Integrity Pact at _____ on _____ (Bidder(s)/contractor) and at _____ on _____ (Buyer/ Owner)

11. LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following

Witnesses:

(For and on behalf of Buyer/ Owner) (For and on behalf of Bidder/Contractor)

WITNESSES: 1.....
(signature, name and address)

2.....
(signature, name and address)

Place:

Date

BIDDER'S INFORMATION FORM

- a) [The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done of the letter head of the firm]

Date: [insert date (as day, month and year) of Bid Submission] Tender No.: [insert number from Invitation for Bids]

Page 1 of _____ pages

1. Bidder's Legal Name [insert Bidder's legal name]
2. In case of JV, legal name of each party: [insert legal name of each party in JV]
3. Bidder's actual or intended Country of Registration: [insert actual or intended Country of Registration]
4. Bidder's Year of Registration: [insert Bidder's year of registration]
5. Bidder's Legal Address in Country of Registration: [insert Bidder's legal address in country of registration]
6. Bidder's Authorized Representative Information Name: [insert Authorized Representative's name] Address: [insert Authorized Representative's Address] Telephone/Fax numbers: [insert Authorized Representative's telephone/fax numbers] Email Address: [insert Authorized Representative's email address]
7. Attached are copies of original documents of: [check the box(es) of the attached original documents] Articles of Incorporation or Registration of firm named in 1, above.

Signature of Bidder Name

Business Address

BID SECURITY FORM

Whereas (hereinafter called the tenderer") has submitted their offer dated for the supply of (Hereinafter called the tender")

Against the Purchaser's tender enquiry no. Know all men by these Presents that we _____ of _____ having our registered office at _____ are bound unto _____ (hereinafter called the "Purchaser")

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

THE CONDITIONS OF THIS OBLIGATION ARE:

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

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

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

(Signature of the authorized officer of the Bank)

Name and designation of the officer Seal, name & address of the Bank and address of the Branch

PERFORMANCE STATEMENT FORM (For a Period of last 3 years)

Name of the Firm:

Order placed by (full address of purchaser)	Order No and date	Description and quantity of ordered equipment	Value of order	Date of completion of delivery as per contract	Date of actual completion of delivery	Remarks indicating reasons for late delivery, if any	Has the equipment been installed Satisfactory? (Attach a certificate from the purchaser/consignee)	Contact person along with telephone No: Fax No: And e-mail address

Signature and Seal of the Manufacturer/Bidder _____

Place:

Date:

DEVIATION STATEMENT FORM

The following are the particulars of deviations from the requirements of the tender specifications:

CLAUSE DEVIATION REMARKS (INCLUDING JUSTIFICATION)

Place:

Date:

Signature and seal of the
Manufacturer/Bidder

NOTE:

1. Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations".

BID FORM

[The Bidder shall fill in this Form in accordance with the instructions indicated No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date: [insert date (as day, month and year) of Bid Submission]

Tender No.: [insert number from Invitation for Bids]

Invitation for Bid No.: [insert No of IFB]

To: [insert complete name of Purchaser]

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda No.: [insert the number and issuing date of each Addenda];
- (b) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules Specified in the Schedule of requirements the following Goods and Related Services [insert a brief description of the Goods and Related Services];
- (c) The total price of our Bid, excluding any discounts offered in item (d) below, is: [insert the total bid price in words and figures, indicating the various amounts and the respective currencies];
- (d) The discounts offered and the methodologies for their application are:
Discounts. If our bid is accepted, the following discounts shall apply. [Specify in detail each discount offered and the specific item of the Schedule of Requirements to which it applies.]
- (e) Our bid shall be valid for the period of time specified in ITB Sub-Clause 1.16.1, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our bid is accepted, we commit to obtain a Performance Security in accordance with ITB Clause 1.38 and GCC Clause 2.13 for the due performance of the Contract;
- (g) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract: [insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]

Name of Recipient	Address	Reason	Amount
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(If none has been paid or is to be paid, indicate "none.")

- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Signed: [insert signature of person whose name and capacity are shown]

In the capacity of [insert legal capacity of person signing the Bid Submission Form]

Name: [insert complete name of person signing the Bid Submission Form]

Duly authorized to sign the bid for and on behalf of: [insert complete name of Bidder]

Dated on _____ day of _____

_____ [Insert date of signing]

PERFORMANCE SECURITY FORM

To:___(Name of Purchaser)

WHEREAS.....(Name of Supplier) hereinafter called "the Supplier" has undertaken, in
pursuance of ContractNo..... dated, 20.....to supply (Description of
Goods and Services) hereinafter called "the
order".

AND WHEREAS it has been stipulated by you in the said order that the Supplier shall furnish you with a
Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the
Supplier's performance obligations in accordance with the order

AND WHEREAS we have agreed to give the Supplier a Guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier,
up to a total of(Amount of the Guarantee in Words and Figures and we undertake to pay you, upon your
first written demand declaring the Supplier to be in default under the order and without cavil or argument,
any sum or sums within the limit of(Amount of Guarantee) as aforesaid, without your needing to prove or
to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until theday of.....20.

Signature and Seal of Guarantors

Date 20

Address:

All correspondence with reference to this guarantee shall be made at the following address:

(Name & address of the Purchaser)

ACCEPTANCE CERTIFICATE FORM

No.

Dated:

M/s

Sub: Certificate of commissioning of equipment

1. This is to certify that the equipment as detailed below has/have been received in good condition along with all the Standard and special accessories (subject to remarks in Para 2). The same has been installed and commissioned.

(a) Contract No. _____ Date _____

(b) Description of the equipment _____

(c) Name of the consignee _____

(d) Scheduled date of delivery of the consignment to the Institute _____

(e) Actual date of receipt of consignment by the Institute _____

(f) _____ Scheduled date for completion of installation/commissioning _____

(g) Actual date of completion of installation/commissioning _____

(h) Penalty for late delivery Rs. _____

(i) Penalty for late installation at Institute Rs. _____

2. Details of accessories/items not yet supplied and recoveries to be made on that account: SI. No. Description Amount to be recovered

3. The acceptance test has been done to our entire satisfaction. The Supplier has fulfilled his contractual obligations satisfactorily or The Supplier has failed to fulfill his contractual obligations with regard to the following:

(a) _____

(b) _____

(c) _____

(d) _____

The amount of recovery on account of failure of the Supplier to meet his contractual obligations is as indicated above.

For supplier signature _____ Name _____ Designation _____ Name of Firm _____ Date _____

For purchase signature _____ Name _____ Designation _____ Name of the Institute _____ Date _____

ELIGIBILITY CERTIFICATE FORM

[To be provided on the letter head of the Bidder and should be signed by a person with the proper authority to sign documents that are binding on the Bidder]

This is to certify that we are not associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting Services for the preparation of the design, specifications, and other documents to be used for the procurement of the Goods to be purchased under this Invitation of Bids/Tender No. _____ Dated _____

Authorized Signatory

Name: _____

Designation: _____

NON-BLACK LISTED SELF CERTIFICATION FORM

[To be provided on the letter head of the Bidder and should be signed by a person with the proper authority to sign documents that are binding on the Bidder]

This is to certify that M/s. _____ [Name of Bidder] has not been blacklisted by any Indian Central/ State Government Department / any other Purchasing authority /organization in last 3 years.

Authorized Signatory

Name: _____

Designation: _____