HLL LIFECARE LIMITED

(A Government of India Enterprise)

AKKULAM PLANT, SREEKARIYAMP.O,

# THIRUVANANTHAPURAM-695017

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### TENDER NO: HLL/AFT/CLEAN ROOM /2016-17 dated 18/02/2017

### INVITATION FOR BID

# FOR

SUPPLY, ERECTION, VALIDATION & COMMISSIONING

OFCLASS 10000 CLEAN ROOM

AT

AKKULAM FACTORY

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**PART 1**

**SECTION I**

**INVITATION FOR BIDS (IFB)**

1. Sealed and super scribed tenders under two bid systems are invited from vendors for Supply, erection, validation & commissioning of New Class 10000 clean room at HLL Lifecare Limited, Akkulam Plant.

|  |  |  |  |
| --- | --- | --- | --- |
| Name of work | Tender No | EMD | Date & Time of Opening of Technical bids |
| Supply, erection, validation & commissioning of NEW CLASS 10000 CLEAN ROOM | **HLL/AFT/CLEANROOM / HVAC** | **Rs.2,00,000/- in the form of a DD drawn in favor of M/s.HLL LIFECARE LIMITED, and payable at Thiruvananthapuram from a nationalized bank** | 13/03/2017at  15.30 Hrs |

1. A complete set of bid documents can be had from the office of the JGM (Materials), HLL Lifecare Ltd, Engineering Division, Akkulam, Thiruvananthapuram – 695 017, Kerala, India during office hours on any working day on submission of written application.application and remitting a non-refundable fee of Rs. 520/- (including taxes) by cash at HLL Lifecare Limited, Akkulam, Thiruvananthapuram or in the form of Demand Draft drawn in favor of “HLL LIFECARE LIMITED” payable at Thiruvananthapuram, Kerala, India.
2. The bid documents will be available up to 15.00 Hrs. on the previous day of the Opening of the bids.
3. Date of issue of bid document: 20/02/2017
4. Pre bid meeting: 06/03/2017 at 11.00 Hrs
5. Last date and time for receipt of bids: 13/03/2017 at 15.00 Hrs
6. Date and time of opening of bids: 13/03/2017 at 15.30 Hrs
7. Address for communication, receipt, Pre bid Venue and Place of opening of bids:

**Joint General Manager (Materials),**

HLL LIFECARE LTD,

(A Government of India undertaking)

AKKULAM, SREEKARIYAM.P.O

THIRUVANANTHAPURAM – 695 017

KERALA, INDIA

Ph. 2445930, Fax: (0471) 2445935

1. The completed bid documents and all schedules should be submitted to JGM (Materials), in the above address along with sealed bids and the EMD. Bids received after due date and time will be rejected. Any bid not accompanied by EMD will be rejected.
2. Technical Bid and Price Bid shall be submitted in sealed covers separately. Tender Number shall be super-scribed on Technical Bid and Price Bids both covers in order to clearly identify between the 2 Bids. The two separately marked Bids enclosed in a single cover with the respective Tender Number written thereon, complete in all respect and sealed, addressed to The Joint General Manager (Materials), HLL Lifecare Limited, Akkulam Factory, Trivandrum – 695017, Kerala, India should reach us on or before the due date and time mentioned in the Tender Notification. Tender brought to the office after prescribed time will not be accepted. HLL will not be responsible for any delay in transit of tenders sent by post.
3. Bids will be opened in the presence of Bidders representative(s) who wishes to attend on the specified date and time, at the office of HLL at the address given in Clause ‘3’ above.
4. In the event of the date specified for bid receipt and opening being declared as a closed holiday for HLL’s office, the due date for submission of bids and opening of bids will be the following working day at the appointed times.
5. The HLL may, at its discretion, extend this deadline for submission of bids by amending the Bid Documents or any other reasons, in which case all rights and obligations of the HLL and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended. HLL will not be held responsible for the postal delay, if any, in the delivery of the bidding document or the non-receipt of the same. Bids sent by Telex/Fax/Telegraph will not be accepted. The company reserves the right to club or split the items of works, change the qualifying criteria at their discretion and to reject / cancel the tender without assigning any reason thereof.
6. Amendments:

Any amendments related to the tender shall be published only in HLL web site *www.lifecare hll.com*

**Joint General Manager (Materials)**

### SECTION II

**INSTRUCTION TO BIDDERS**

1. **INTRODUCTION**
2. **Eligible Bidders**

The Eligibility criteria for the bidders is as per Qualification Criteria Section VI.

1. **Cost of Bidding**

The Bidder shall bear all costs associated with the preparation and submission of its bid and HLL Lifecare Limited, Akkulam Factory, Thiruvananthapuram hereinafter referred to as “the HLL”, will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

1. **BIDDING DOCUMENTS**
2. **Contents of Bidding Documents**

3.1 The goods required, bidding procedures and contract terms are prescribed in the Bidding documents. In addition to the Invitation for Bids, the Bidding documents include:

* 1. Instruction to Bidders (ITB);
  2. General Conditions of Contract (GCC);
  3. Special Conditions of Contract (SCC);
  4. Technical Specifications & BOQ
  5. Qualification criteria
  6. Bid Form

3.2 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. **Clarification of Bidding Documents**

4.1 A prospective Bidder requiring any clarification of the Bidding Documents may notify the HLL in writing at the HLL’s mailing address indicated in the Invitation for Bids. The HLL will respond to any request for clarification of the Bidding Documents which it receives not later than 5 days prior to the deadline for submission of bids prescribed by the HLL. HLL’s response (including an explanation of the query but without identifying the source of inquiry) will be communicated through our web site / email to all prospective Bidders who have received the bidding documents.

1. **Amendment of Bidding Documents**

5.1 At any time prior to the deadline for submission of bids, the HLLmay, 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.

5.2 Any subsequent amendments in the bid shall be notified only on HLL website.

5.3 In order to allow prospective bidders reasonable time in which to take the amendment into account in preparing their bid, the HLL may, at its discretion, extend the deadline for the submission of bids

1. **PREPARATION OF BIDS**
2. **Language of Bid**

The Bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the Bidder and the HLL, shall be   
written in the English language. Supporting documents and printed   
literature furnished by the Bidder may be written in another language   
provided, they are accompanied by an accurate translation of the   
relevant passages in the English language in which case, for purposes   
of interpretation of the Bid, the English translation shall govern

1. **Documents Comprising the Bid**

Following documents and forms are to be included in the technical bid and commercial bid respectively.

1. **BID**
   1. **TECHNICAL**

The technical bid shall consist of the following documents.

* 1. EMD / Bid Security amountin the form of DD, drawn in favor of HLL Lifecare Limited, payable a Thiruvananthapuram. The EMD / Bid Security shall be refunded to the non-responsive bidders within 60 days from the date of opening of Bid.
  2. The tender document cost in the form of DD
  3. The technical specifications enclosed along with the bid document shall be confirmed by signature of the bidder/authorized signatory of the bidding firm, in all pages and authorized by official seal. The information shall be filled in the technical specifications wherever necessary as per the instructions given.
  4. Duly attested copies of factory license/ Industrial license, sales tax registration, and documents to prove the legal status, place of registration and principal place of business of the undertaking.
  5. Duly attested copies of quality certificates for the products, quality system certifications and quality accreditation certificate as specified in technical specification.
  6. Copy of Balance sheet for the past three financial years, duly certified by a chartered accountant
  7. Documentary evidence established in accordance with ITB Clause 11 that the Bidder is eligible to bid and is qualified to perform the contract if the bid is accepted;
  8. Documentary evidence established in accordance with ITB Clause 12 that the equipment and ancillary services to be supplied by the Bidder shall conform to the Bidding Documents
  9. **PRICE BID**

a.) Duly filled Bid Form and BOQ.

b.) All commercial aspects related to items that are mentioned in IFB

1. **Bid Prices**

9.1 The prices shall be quoted for all items and shall be firm. The amount shall include all plant, layout, materials, all temporary works, supervision, taxes, duties, levies, insurance and every incidental and contingent cost and charges whatsoever required to complete the item of work in all respects conforming to related specifications, drawings etc.

* 1. The price quoted by the bidder shall remain fixed during the entire period of contract and shall not be subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.

9.3 The prices quoted by the bidder shall be in sufficient detail to enable the HLL to arrive at the price of equipment/system offered.

1. **Bid Currencies**

10.1 Indian Bidders should quote only in INR.

1. **Documents establishing bidder’s eligibility and qualifications**

10.1 Pursuant to ITB Clause 8.1, the bidder shall furnish, as part of its bid, documents establishing the bidder’s eligibility to bid and its qualifications, to perform the Contract if its bid is accepted.

10.2 The documentary evidence of the Bidder’s qualifications to perform the contract if the bid is accepted, shall establish to the HLL’s satisfactions.

10.3 bidder has the financial, technical and production capability necessary to perform the Contract and meets the criteria outlined in the qualification requirements. To this end, all bids submitted shall include the following information:

(i) The legal status, place of registration and principle place of business of the company or firm or partnership, etc;

(ii) Details of experience and past performance of the bidder on items offered and on those of similar nature of work as per Clause (1) & (2) of Section VI – QualifcationCriteriaanddetails of current contracts in hand and other commitments.

1. **Period of Validity of Bids**
2. Technical Bid & Price Bid shall be valid for minimum one year
3. In exceptional circumstances, the HLL may solicit the bidders consent to an extension of the period of validity. The request and the responses thereto shall be made in writing.
4. **Format and Signing of Bid**
5. The bidder shall prepare the bid clearly marking theBid as appropriate.
6. The bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract. The letter of authorization shall be indicated by written power-of-attorney accompanying the bid. All pages of the bid, except for un amended printed literature, shall be initialed by the person or persons signing the bid.
7. Any interlineations, erasures or overwriting shall be valid only if they are initialed by the person or persons signing the bid.
8. **Sealing and Marking of bids**

Separate bids shall be submitted for Price Bid and Technical Bids.

13.1 The bidders shall seal Technical bid and Price bid in separate inner envelopes, duly marking the envelopes as “TECHNICAL BID” and ‘PRICE BID. The Bidders shall then place both the envelopes of Technical and Price bid in an outer envelope. The name of the product for which the bid is made must be written on both the inner envelops and the outer envelope.

13.2 The inner and outer envelopes shall be addressed to the HLL at the following address:

**Joint General Manager (Materials),**

**HLL Lifecare Ltd, Akkulam Factory,**

**Sreekariyam.PO,Thiruvananthapuram –17**

(a) The outer envelope shall bear the Invitation for bids (IFB) number,   
and a statement: “DO NOT OPEN BEFORE” 15.00 Hrs. ON 09/01/2017”

(b) The outer and inner envelope shall also indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared “late”.

(c) If the inner and outer envelopes are not sealed and marked as required, the HLL will assume no responsibility for the bid’s misplacement or premature opening.

(d) Bids must be received by the HLL at the address specified not later than the date and time specified in the Invitation For Bid. In the event of the specified date for the submission of bids, being declared a holiday for the HLL, the bids will be received up to the appointed time on the next working day.

(e) The HLL may, at its discretion, extend this deadline for the submission of bids by amending the bidding documents in which case all   
rights and obligations of the HLL and bidders previously subject to   
the deadline will thereafter be subject to the deadline as extended.

1. **LATE BIDS**

Any bid received by the HLL after the deadline for submission of bids prescribed by the HLL, will be rejected and returned unopened to the bidder.

1. **MODIFICATION AND WITHDRAWAL OF BIDS**

1 The bidder may modify or withdraw its bid after the bid submission, provided that written notice of the modification or withdrawal is received by the HLL prior to the deadline prescribed for submission of bids.

2 The bidder’s modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of ITB Clause 15. A withdrawal notice may also be sent by fax or email but followed by a signed confirmation copy, post-marked not later than the deadline for submission of bids.

3 No bid may be modified subsequent to the deadline for submission of bids.

4 No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the bidder in the Bid Document.

**E. BID OPENING AND EVALUATION**

**16. Opening of Bids by HLL**

1 The HLL will open all bids, in the presence of bidder's representatives who choose to attend, at 15.30 Hrs on 09/01/2017 at thefollowing location:

**HLL Lifecare Limited,**

**Akkulam Factory,**

**Sreekariyam PO Akkulam Factory, Sreekaryam P.O. ,**

**Thiruvananthapuram -695 017.**

2 The bidder’s representatives who are present shall sign a register evidencing their attendance. In the event of the specified date of bid opening being declared a holiday for the HLL, the bids shall be opened at the appointed time and location on the next working day.

3 The bidder’s names, modifications, bid withdrawals and the presence or absence of the requisite documents and such other details as the HLL, at its discretion, may consider appropriate will be announced at the opening. No bid shall be rejected at bid opening, except for late bids, which shall be returned unopened to the bidder pursuant to ITB Clause 16.

4 The HLL will record the bid opening.

5 The “Price Bid” (Cover B) will be opened after evaluation of “Technical bids” (Cover A) and the date and time of opening of Price Bid will be intimated to bidders whose bids are responsive and selected by the HLL.

6 The HLL will scrutinize the technical bid for compliance to the specifications and documentation requirement as per the bid document. HLL will depute its competent officers to the premises of the bidder qualified on the basis of technical scrutiny, for on-site evaluation of the claims made in the technical bid, if deemed appropriate on HLL’s sole discretion. The bidders will be short-listed on the basis of responsiveness of technical bid as well as report of on-site technical evaluation. The price bid of the bidders who are disqualified at the technical scrutiny and on-site evaluation will be returned un-opened. The on-site evaluation may include the inspection of the specimen model of the equipment. The short listed bidders will be informed about the time, date and venue of the price bid opening. The successful bidder shall be identified on the basis of lowest evaluated substantially responsive bid.

**17. CLARIFICATION OF BIDS**

During evaluation of bids, the HLL 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.

**18 PRELIMINARY EXAMINATION**

1 The HLL will examine the bids to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, and whether the bids are generally in order.

2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail. If the bidder does not accept the correction of the errors, its bid will be rejected.

3 The HLL may waive any minor informality or non-conformity or irregularity in a bid, which does not constitute a material deviation, provided such a waiver does not prejudice or affect the relative ranking of any bidder.

4 Prior to the detailed evaluation pursuant to Clause ITB 21, the HLL will determine the substantial responsiveness of each bid to the bidding documents. For purposes of these clauses a substantially responsive bid is one which conforms to all the terms and conditions of the bidding documents without material deviations. Deviations from or objections or reservations to critical provisions such as those concerning Warranty, Force Majeure, Applicable law and Taxes and Duties will be deemed to be material deviation. The HLL’s determination of a bid’s responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

5 If a bid is not substantially responsive, it will be rejected by the HLLand may not subsequently be made responsive by the bidder by correction of the non-conformity.

**19. EVALUATION AND COMPARISON OF BIDS**

1 The HLL will evaluate and compare bids previously determined to be substantially responsive as follows.

2 The HLL’s evaluation of a bid will take into account, in addition to the bid price (ex-factory/ex-warehouse/off-the-shelf price of the Supply, erection, validation & commissioning of new class 10000 clean roomoffered from within India, such price to include all costs as well as duties and taxes paid or payable on components and raw material incorporated or to be incorporated in the equipment and its parts and accessories, and excise duty on the equipment, if payable) and price of incidental services, the following factors, in the manner and to the extent indicated in ITB Clause 19.3 and in the technical specifications:

3 Pursuant to ITB Clause 19.2 the following evaluation methods will be applied:

(a) Inland transportation, from factory, insurance and incidentals.

(i) Inland transportation, insurance and other incidentals, for Supply, erection, validation & commissioning of New Class 10000 Clean Room costs will also be considered in the bid price.

(b) Spare parts and after sales service facilities in India:

**20. CONTACTING THE HLL**

1 No bidder shall contact the HLL on any matter relating to its bid, from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the HLL it should do so in writing.

2 Any effort by a bidder to influence the HLL in its decisions on bid evaluation, bid comparison, or selection may result in the rejection of the bidders bid.

**F. AWARD OF CONTRACT**

**21. POST QUALIFICATION**

1 The determination will take into account the bidders financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the bidder’s qualifications submitted by the bidder, pursuant to ITB Clause 10 as well as such other information as the HLL deems necessary and appropriate.

2 An affirmative determination will be a prerequisite for award of the contract to the bidder. A negative determination will result in rejection of the bidders bid, in which event the HLL will proceed to the next lowest evaluated bid to make a similar determination of that bidder’s capabilities to perform satisfactorily.

**22. AWARD CRITERIA**

Subject to ITB Clause 28, the HLL will award the contract to the successful bidder whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid, provided further that the bidder is determined to be qualified to perform the contract satisfactorily.

**23. HLL’S RIGHT TO VARY QUANTITIES AT TIME OF AWARD**

The HLL reserves the right at the time of award of contract to increase or decrease the quantity of equipment and its parts and accessories, wherever applicable, and services originally specified in the bid document without any change in unit price or other terms and conditions

**24. HLL’S RIGHT TO ACCEPT ANY BID AND TO REJECT ALL BIDS**

The HLL 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.

**25. NOTIFICATION OF AWARD**

1 Prior to the expiration of the period of bid validity, the HLL will notify the successful bidder in writing by registered letter or by fax or email to be confirmed, that its bid had been accepted.

2 The notification of award will constitute the formation of the contract

**26 SIGNING OF CONTRACT AGREEMENT**

The successful bidder has to submit a contract agreement in their letter head as per the format specified in Section IX.

**27. Delays in supply, erection, validation & commissioning of New Class 10000 Clean room**

1 Delivery, Installation, Validation and Commissioning of the equipment and its parts and accessories shall be made by the Contractor within the stipulated delivery date as specified in the purchase order / work order / contract, from the date of placing the date of Order. If at any time during performance of the Contract, the Contractor should encounter conditions impeding timely Supply, erection, validation & commissioning of New Class 10000 Clean room, the Contractor shall promptly notify the HLL in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Contractor's notice, the HLL shall evaluate the situation and may at its discretion extend the Contractor's time for performance, with or without penalty.

2 A delay by the Contractor in the performance of its Delivery, Installation, Validation and Commissioning obligations shall render the Contractor liable to the imposition of penalty pursuant to agreement, unless an extension of time is agreed upon pursuant to agreement without the application of liquidated damages.

3 If the Contractor fails to deliver any or all of the equipment or its parts or perform the Services within the time period(s) specified in the Purchase Order, the HLL 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 the purchase order/tender document.

**28. Completion period.**

The successful bidder has to Supply, erection, validation & commissioning of New Class 10000 Clean room within**5 Months** from the date of issue of work order/Letter of Indent

**29. Payment Terms**

**29. A: Payment Terms for Supply**

1. 30% advance payment shall be released against BG (Bank Guarantee) from a scheduled bank valid for a period of One year or till completion ofDesign, Manufacture, Supply, Installation, Validation and Commissioning of the System.
2. 40% of the payment shall be released within 15 days, against receipt of goods at HLL site and certified by HLL Officials,
3. 20% of the payment shall be released after Installation, Commissioning and acceptance of the system by HLL Officials
4. Balance 10% will be retained as Retention Money which shall be released only after one year from the date of commissioning or against a Performance Bank Guarantee from a scheduled bank for an amount equivalent to 10% value of supply part, valid for a period of one year (warranty period) from the date of the issue of final machine commissioning and acceptance certificate issued by HLL.

**Payment terms for Installation**

1. 100% of against satisfactory commissioning of the project certified by HLL authorities.

###### **SECTION III**

###### **GENERAL CONDITIONS OF CONTRACT**

**1. DEFINITIONS**

1.1 In this contract the following terms shall be interpreted as indicated:

(a) “The Contract” means the agreement entered into between the HLL and the Contractor as recorded in the Contract Form signed by the parties, including all the attachments and appendices thereto and all documents incorporated by reference therein;

(b) “The Contract Price” means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations;

(c) “The Goods” means all the products, equipment, machinery, and/or other materials which the Contractor is required to supply to the HLLunder the Contract;

(d) “Services” means services ancillary to the supply of the Goods, such as transportation and insurance, and other incidental services, such as installation, commissioning, provision of technical assistance, training and other obligations of the Contractor covered under the contract;

(e) “GCC” means the General Conditions of Contract contained in this   
section.

(f) “SCC” means the Special Conditions of Contract.

(g) “The HLL” means the Organization purchasing the Goods, as named in SCC;

(h) “The Contractor” means the individual or firm supplying the Goods under this Contract;

(i) “Day” means calendar day.

(j) “Delivery period” means the period applicable upto completion of supply; installation and testing by the contractor at the required location mentioned in purchase order and accepted by the HLL.

**2. APPLICATION**

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

**3. STANDARDS**

3.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods’ country of origin and such standards shall be the latest issued by the concerned institution.

**4. USE OF CONTRACT DOCUMENTS AND INFORMATION**

4.1 The Contractor shall not, without the HLL’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 HLL in connection therewith, to any person other than a person employed by the Contractor 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.

4.2 The Contractor shall not, without the HLL’s prior written consent, make use of any document or information enumerated in GCC Clause 4.1 except for purposes of performing the Contract.

4.3 Any document, other than the Contract itself, enumerated in GCC clause 4.1 shall remain the property of the HLL and shall be returned (in all copies) to the HLL on completion of the contractor’s performance under the Contract if so required by the HLL.

**5. PATENT RIGHTS**

5.1 The Contractor shall indemnify the HLL against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods or any part thereof in India.

**6. INSPECTION AND TESTS**

6.1 The HLL or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract at no extra cost of the HLL. The Special conditions of Contract and/or the Technical Specifications shall specify what inspections and tests the HLL requires and where they are to be conducted. The HLLshall notify the Contractor in writing of the identity of any representatives retained for these purposes.

6.2 The inspections and test may be conducted on the premises of the Contractor or its subcontractor(s), at point of delivery and/or at the Goods final destination. Where conducted on the premises of the Contractor 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 HLL.

* 1. Should any inspected or tested Goods fail to conform to the specifications, the HLL may reject them and the Contractor shall either replace the rejected Goods or make all alternations necessary to meet specification requirements free of cost to the HLL.
  2. The HLLs right to inspect, test and, where necessary, reject the Goods’ arrival in at site shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the HLL or its representative prior to the Goods dispatched.

**7. PACKING**

7.1 The Contractor 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.

7.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided in the agreement / purchase order including additional requirements, if any, specified in SCC and in any subsequent instructions ordered by the HLL.

**8 DELIVERY AND DOCUMENTS**

8.1 Supply, erection, validation & commissioning of New Class 10000 Clean rooms shall be made by the Contractor in accordance with the terms specified in the purchase order by the HLL. The details of dispatching and/or other documents to be furnished by the contractor are specified in the purchase order, if any.

**9. INSURANCE**

9.1 The Goods Supplied under the Contract shall be fully insured in Indian Rupees (as specified in work order / purchase order / contract) against the loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the Special Conditions of Contract.

**10. INCIDENTAL SERVICES**

10.1 The contractor may be required to provide any or all of the following services, including additional services, if any, specified in SCC:

(a) Performance or supervision of the on-site assembly and/or start-up of the supplied goods

(b) Furnishing of tools required for assembly and/or maintenance of the supplied goods;

(c) Furnishing of detailed operations and maintenance manual

(d) performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Contractor of any warranty obligations under this Contract; and

(e) Training of the HLL’s Personnel, at the Contractor’s plant and/or on-site, in assembly, start-up, operation, maintenance and/or repair of the supplied Goods.

**11 SPARE PARTS**

1.1 As specified in the Special Conditions of Contract, the Contractor may be required to provide the information pertaining to spare parts manufactured or distributed by the Contractor and also provide the list of spares.

(a) Such spare parts as the HLL may select to purchase from the Contractor, providing that this selection shall not relieve the Contractor 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 HLL of the pending termination, in sufficient time to permit the HLL to procure needed requirements; and

(ii) Following such termination, furnishing at no cost to the HLL, the blueprints, drawings and specifications of the spare parts, if and when requested.

**12. WARRANTY**

12.1 TheContractorshall warrant that the Goods supplied under this Contract are of the most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The contractorfurthershallwarrant that the Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the HLL’s specifications) or from any act or omission of the Contractor, that may develop under normal use of the supplied Goods in conditions obtaining in the country of final destination

12.2 This warranty shall remain valid for minimum one year

12.3 The HLL shall promptly notify the contractor in writing of any claims arising under this warranty.

12.4 Upon receipt of such notice, the Contractor shall, within the period specified in SCC, and with all reasonable speed, shall indemnify the HLL.

12.5 If the Contractor, having been notified, fails to remedy the defect(s) within the period specified in SCC, within a reasonable period, the HLLmay proceed to take such remedial action as may be necessary, at the Contractor’s risk and expense and without prejudice to any other rights which the HLL may have against the Contractor under the contract.

**13. PRICES**

13.1 Prices charged by the Contractor for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Contractor in its bid, with the exception of any prices adjustmentsauthorized in the special Conditions of Contract or in the HLL’s request for bid validity extensions, as the case may be.

**14. CHANGE ORDERS**

14.1 The HLL may at any time by written order given to the Contractor, 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 HLL;

(b) services to be provided by the Contractor.

14.2 If any such changes cause an increase or decrease in the cost of, or the time required for, the Contractor’s performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price orcontract schedule, or both, and the Contract shall accordingly be amended. Any claims by the Contractor for adjustment under this clause must be asserted within thirty (30) days from the date of the Contractor’s receipt of the HLL’s change order.

**15. CONTRACT AMENDMENTS**

15.1 Subject to GCC Clause 17, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

**16. ASSIGNMENT**

16.1 The Contractor shall not assign, in whole or in part, its obligations to perform under the contract, except with the HLL’s prior written consent.

**17. SUBCONTRACTS**

17.1 The contractor shall notify the HLL in writing of all subcontracts awarded under the contract if not already specified in his bid. Such notification, in his original bid or later, shall not relieve the Contractor from any liability or obligation under the contract.

**18. LIQUIDATED DAMAGES**

18.1 If the Contractor fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the HLLshall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in SCC, up to a maximum deduction of the percentage specified in the SCC if any. Once the maximum is reached, the HLL may consider termination of the Contract.

**19. TERMINATION BY DEFAULT**

19.1 The HLL may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the contractor, terminate the Contract in whole or part;

(a)if the Contractor fails to deliver any or all of the goods within the time period(s) specified in the Contract, or within any extension thereof granted by the HLL, or

(b) if the Contractor fails to perform any other obligation(s) under the contract.

19.2 In the event the HLL terminates the Contract in whole or in part, the HLL may procure, upon such terms and in such manner as it deems appropriate, Goods or Services similar to those undelivered, and the Contractor shall be liable to the HLL for any excess costs for such similar Goods. However, the Contractor shall continue the performance of the Contract to the extent not terminated.

**20. FORCE MAJEURE**

20.1 For purposes of this Clause “Force Majeure” means an event beyond the control of the Contractor and not involving the Contractor’s fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the HLL either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

20.2 If a Force Majeure situation arises, the Contractor shall promptly notify the HLL in writing of such conditions and the cause thereof. Unless otherwise directed by the HLL in writing, the Contractor 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.

**21. TERMINATION FOR INSOLVENCY**

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

**22. RESOLUTION OF DISPUTES**

22.1 The HLL and the contractor 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.

If, after thirty (30) days from the commencement of such informal negotiations, the HLL and the Contractor have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the Special Conditions of Contract. These mechanisms may include, but or not limited to, conciliation mediated by a third Party, adjudication in an agreed national forum, and national arbitration.

22 .3 The jurisdiction of any disputes, suits and proceeding arising out of the tender shall be only in the court of Thiruvananthapuram

**23. GOVERNING LANGUAGE**

23.1 The contract shall be written in English language. English language version of the Contract shall govern its interpretation. All correspondence and documents pertaining to the Contract which are exchanged by the parties shall be written in the same language.

**24. APPLICABLE LAW**

24.1 The Contract shall be interpreted in accordance with the laws of the Union of India.

**25. NOTICES**

25.1 Any notice given by one party to the other pursuant to this Contract shall be sent to other party in writing or by fax or email and confirmed in writing to the other Party’s address specified in Special Conditions of Contract

25.2 A notice shall be effective when delivered or on the notice’s effective date, whichever is later.

**26. TAXES AND DUTIES**

26.1 Contractors shall be entirely responsible for all taxes, duties, license fees, octroi etc., incurred until Supply, erection, validation & commissioning of New Class 10000 Clean Roomto the HLL.

**SECTION IV**

**SPECIAL CONDITIONS OF CONTRACT**

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of contract. The Corresponding clause number of the General Conditions is indicated in parentheses.

**1. DEFINITIONS (GCC Clause 1)**

(a)The Purchaser is HLL Lifecare Limited, AkkulamFactory, Thiruvananthapuram

**2. INSPECTION AND TESTS (GCC Clause 6)**

2.1 The following inspection procedures and tests are required by the HLL; the contractor shall get inspected in manufacturer’s works and submit a test certificate and also guarantee/warranty certificate that the equipment conforms to laid down specifications.

2.2 The HLL or its representative shall inspect and/or test any or all the equipment to confirm their conformity to the Contract specifications, prior to dispatch from the manufacturer’s premises. Such inspection and clearance will not prejudice the right of the consignee to inspect and test the equipment on receipt at destination.

2.3 If the equipment fails to meet the laid down specifications the contractorshall take immediate steps to remedy the deficiency or replace the defective equipment/it parts to the satisfaction of the HLL.

**3. INSURANCE (GCC Clause 9)**

3.1 For delivery of Equipmentsat site, the insurance shall be obtained by the Contractor in an amount equal to 110% of the value of the equipment from “Warehouse to Warehouse” (Final destinations) on “All Risks” basis including War Risks and Strike if applicable.

**4. INCIDENTAL SERVICE (GCC Clause 10)**

4.1 The following services covered under GCC Clause 10 shall be furnished and the cost shall be included in the contract price:

(a)Transportation, safe storage and handling of consignment off site.

(b)On site assembly if any of the supplied equipment, installation, testing and commissioning of the equipment.

(c)Furnishing of detailed operations and maintenance manual for each appropriate unit of supplied equipment;

**5 .SPARE PARTS (GCC Clause 11)**

Add as Clause 11. to the GCC the following:

5.1 Contractor shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods. Other main spare parts and components shall be supplied as promptly as possible but in any case within one week of placement of order.

**6. WARRANTY (GCC Clause 12)**

Substitute GCC Clause 12.2 by the following:-

6.1 This warranty shall remain valid for minimum one year after Installation, Validation and Commissioning and handing over of the clean room any portion thereof as the case may be, have been accepted by HLL Lifecare Limited as indicated in the contract.

6.2 Any major repair pointed out by the HLL within the warranty period shall be rectified by the Contractor from the date of intimation within a period of 3 calendar days and commission the equipment to the satisfaction of the HLL. Failing which the HLL has the right to levy penalty on the Contractor per day or part thereof for the equipment until the equipment are repaired and commissioned to the satisfaction of the HLL.

6.3 The Contractor shall, in addition, comply with the performance and/ or consumption guarantees specified under the contract. If for reasons attributable to the Contractor, these guarantees are not attained in whole or in part, the Contractor shall at its discretion.

(a) make such changes, modifications, and/or additions to the equipment or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests in accordance with SCC 2:

**7. Earnest Money deposit (EMD)**

Technical Bid should accompany a DD drawn in favour of M/s.HLL LIFECARE LIMITED, and payable at Thiruvananthapuram for a sum of **Rs.2,00,000/-** towards Earnest Money Deposit. Failing which the Tender is likely to be summarily rejected.

**8. PRICES (GCC Clause 13)**

Substitute Clause 13.1 of the GCC with the following:

8.1 Prices payable to the Contractor as stated in the Contract shall not be subject to adjustment during performance of the Contract.

**9. SUB CONTRACT (GCC Clause 17)**

Add at the end of sub-clause 17.1 the following:

9.1 Sub-contract shall be only for bought-out items and sub-assemblies.

**10. LIQUIDATED DAMAGES (GCC Clause 18)**

For delays: Substitute GCC Clause 18.1 by the following:

10.1 If the Contractor fails to deliver any or all of the equipment or perform of services within the time period(s) specified in the Contract, the HLL shall without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to 0.5 percent of the value of order per week of delay subject to a maximum deduction of 7.5%. Once the maximum is reached, the HLL may consider termination of the Contract.

**11. RESOLUTION OF DISPUTES (GCC Clause 22)**

Add as GCC Clauses 22.3 and 23.4 the following:

11.1 The dispute resolution mechanism to be applied pursuant to GCC Clause 22 shall be as follows:

1. In the case of a dispute or difference arising between the HLL  
   and a Contractor relating to any matter arising out of or connected with this   
   agreement, such dispute or difference shall be settled in accordance   
   with the Arbitration and Conciliation Act 1996 the Arbitral Tribunal shall   
   consist of 3 Arbitrator, one each to be nominated by the HLL and   
   the contractor. The third Arbitrator shall be chosen by the two Arbitrators   
   so appointed by the parties and shall act as Presiding Arbitrator. In case   
   of failure of the two Arbitrator appointed by the parties to reach upon a   
   consensus within a period of 30 days from the appointment of the   
   Arbitrator appointed subsequently, the Presiding Arbitrator shall be   
   appointed by the President of Institute of Engineers (India).

11.2 The venue of arbitration shall be the place from where the Contract is issued (i.e.) Thiruvananthapuram

**12. INSTALLATION, VALIDATION & COMMISSIONING**

Supply, erection, validation & commissioning of New Class 10000 Clean room shall be completed by the contractor in accordance with the terms and technical specifications made by the HLL.

**13. Operational Acceptance:**

1. **Performance Test:** The performance test shall be conducted by the contractor during the commissioning of the facilities to ascertain whether the facilities can attain the functional guarantees.
2. **Operational Acceptance**: Operational Acceptance shall occur in respect of the facilities when the performance test has been successfully completed and the functional performances are met.

**14. TRAINING**

The bidder shall provide training for maintenance staff of the HLL free of cost where required.

The bidder shall provide all training material and documents.

Conduct of training of the HLL’s personnel shall be on-site.

**15. ENCLOSURES TO BID:**

**15.1 Technical bid (Cover A)**

Technical Bid shall include duly filled up Tender documents along with

1. Tender document fee in the form of DD, drawn in favor of HLL Lifecare Limited, payable at Thiruvananthapuram, in case the document is downloaded from website.
2. Bid Security / EMD amount in form of DD, drawn in favor of HLL Lifecare Limited, payable at Thiruvananthapuram.

c) Duly attested copy of License, approved by the concerned Licensing Authority.

d) Documentary evidence of constitution of firm such as Memorandum of Articles, Partnership Deed, etc., with details of Name, Address, Tel. No., Fax No., E-mail Address of firm and the Managing Director / Partner / Proprietor.

e) Authorization of senior responsible officer of the Company to transact business.

f) Annual turnover statement for last three years certified by the Auditor.

g) Copies of Balance Sheet and Profit & Loss Account for three years certified by the Auditors.

h) Self certified statement of the Installed manufacturing capacity of the Items quoted.

i) Qualification Criteria

j) Technical literature and other documents in support of the goods / services.

k) List of items quoted (without prices)

**15 .2 Price Bid (Cover B):**

**Price bid shall include**

a) Duly filled in Price Schedule (BOQ)

b) Bid Form

1. Price List of critical essential spares valid for 2 years

**16. VALIDATION**

It covers the installation, validation and commissioning and taking over of the equipment as per standards specified in technical specifications.

**SECTION V**

TECHNICAL SPECIFICATION

**ANNEXURE -1: DESCRIPTION OF PROPOSAL**

1. **Scope of work:**

The nature and extend of work to be carried out is generally described herein. The work to be carried out covers design, supply, erection, test, commission of new Class 10000 Clean room at HLL Lifecare Limited, Akkulam Plant,Thiruvananthapuram

1. **Description of work for Tenderers**
2. **Air conditioning system**

* Ac shall be suitable for class 10000. It is proposed to tap 28 TR of air conditioning for the proposed Class 10000 Clean room with 2 x 14 TR FM AHU with mixing box suitable for ducted return and damper in each AHU in the mezzanine area as per the drawing. The proposed capacity will be tapped from the 2 x 145 TR Bluestar plant (1 standby) from the main header or 6 inch line. HLL will coordinate with the main ac contractor for shut down and facilitate tapping of 50mm Dia. with valves at supply inlet & outlet and re patchwork of insulation as per general specification by the proposed contractor.
* Aluminum supply return ducting with terminal hepa filter in the ceiling and floor level suction return (1mt from floor level) as per dwg has been anticipated.
* Power shall be though VFD for AHU and positive pressure in the room.
* It is also proposed to shift 1 No. existing 12 TR AHU feeding to Cu T area from the proposed location of the Clean Room area to the Mezzanine area as shown in the dwg. Necessary dismantling of the AHU ducting and relocating to proposed area has to be carried out simultaneously along with shut down. And hooking up of the supply/return air ducting

1. **ELECTRICAL WORK**

* Sheet extruder and tube extruder shall have 100% UPS supply to be tapped from the existing third floor UPS room
* In the electrical panel board shown in the drawing building services three terminals for lighting, air conditioning, emergency db. In the emergency DB 30% lighting and power sockets for computer & few other power load has been anticipated.
* For the detailed lighting and power DB’s detailed layout drawings as shown in the concept drawing will have to be elaborated by the tenderes.

1. **CIVIL WORK**

As detailed in the Bill of quantities.

1. **DM WATER**

DM water line shall be given to the equipments and shall be extended from the existing line available in the other floor as per the site. The extension to be done with SS pipe up to terminal point inside the room.

1. **PNEUMATIC SYSTEM**

Compressed air shall be given to the equipments and shall be extended from the existing line available in the other floor as per the site. The extension to be done with SS pipe up to terminal point inside the room.

1. **CHILLER & CHILLED WATER LINE FOR EQUIPMENTS**

Line extension to the cooling tower to be done by the contractor

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Annexure -2 - BASIS OF DESIGN** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **No** | **Room Name** | **Clean Room Type - As per design Sheet** | **Clean Classification at rest** | **ROOM DETAILS** | | | | | | | | |  | **Air change** | | | |  | **CFM** | | | |  |  |  |  |  |
| **Room Length** | **Room Width** | **Room Height** | **Area** | **Temperature (DBT)** | **Relative Humidity** | **Lighting load** | **Equipment Load (for HVAC) - Appr.** | **Occupancy** |  | **1 Air change** | **Air Exchanges Per Hour** | **Air Exchanges Per Hour Considered** | **Fresh Air CFM as per Heatload** |  | **Dehumidified CFM** | **Minimum Room Air Changes to be considered for clean room** | **Room air change CFM** | **Room Supply Air flow rate** |  | **Exhaust air flow** | **Tonnage** | **Pressure in (Pa)** | **AHU Capacity selected** |
| Mt | Mt | Mt | Sq.mt | Deg C | % | Watts | KW |  |  |  |  | A/C | CFM |  | cfm | A/C | cfm | cfm |  | cfm | TR |  |  |
| **FIRST FLOOR** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Clean room | Clean room class C | Grade C / ISO 7 / CLASS 10000 | 17.9 | 8.11 | 3.5 | 144.8 | 22±1 | 40% - 60% | 1 | 26.6 | 3 |  | 298.1 | 10-12 | 7 | 2087 |  | 9140 | 45 | 13414 | 13414 |  | Fume Hood 2 Nos- 5297 cfm + 1059 cfm = 6356 cfm | 28.00 TR | 15 | **2 X 14 TR Double skin floor Mounted Thermal Break, Mixing Box AHU, Supply fan - 6700 CFM Each** |
|  | **TOTAL** | | | | | | **145 Sq.Mt** | |  | | | |  |  | | | |  |  | | | |  | **TOTAL** | **28.00 TR** | | |

**ANNEXURE 2: TECHNICAL SPECIFICATION**

**CIVIL WORKS**

1. **STORAGE**

Material shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work. Materials stored at site, depending upon the individual characteristics, shall be protected from atmospheric actions, such as rain, sun, winds and moisture to avoid deterioration.

Cement bags brought to site shall be stored in a dry waterproof location at site. Bags shall be stacked and covered all round. Height of the stack shall not be more than 10 bags. All constructions shall be with 53 grade Portland cement of approved make

Bricks shall be stacked in regular tiers as and when they are unloaded to minimize breakage and defacement. These shall not be dumped at site. Bricks stacks shall be placed close to the site of work so that least effort is required to unload and transport the bricks again. Unloading of building bricks or handling in any other way likely to damage the corners or edges or other parts of bricks shall not be permitted.

Aggregates shall be stored at site on a hard dry and level patch of ground. If such a surface is not available, a platform of planks or old corrugated iron sheets, or a floor of bricks, or a thin layer of lean concrete shall be made so as to prevent contamination with clay, dust, vegetable and other foreign matter. Stacks of fine and coarse aggregates shall be kept in separate stock piles sufficiently removed from each other to prevent the material at the edges of the piles from getting intermixed. Fine aggregate shall pass through a test sieve # 480 of IS and leaving a residue of not more than 5%.

1. **CEMENT MORTAR**

This shall be prepared by mixing cement and sand in specified proportions. Proportioning on weight basis shall be preferred taking into account specific gravity of sand and moisture content. Boxes of suitable size shall be prepared to facilitate proportioning on weight basis. Cement bag weighting 50 kg shall be taken as 0.035 cubic meter. Other ingredients in specified proportion shall be measured using boxes of size 40 x 35 x 25 cm. Sand shall be measured on the basis of its dry volume in the case of volumetric proportioning.

The mixing of mortar shall be done in mechanical mixers or by manual hand mixing

*Mechanical Mixing-:* Cement and sand in the specified proportions shall be mixed dry thoroughly in a mixer. Water shall then be added gradually and wet mixing continued for at least three minutes. only the required quantity of water shall be added which will produce mortar of workable consistency but not stiff paste. Only the quantity of mortar, which can be used within 30 minutes of its mixing, shall be prepared at a time. Mixer shall be cleaned with water each time before suspending the work.

*Hand Mixing-:* The measured quantity of sand shall be leveled on a clean masonry platform and cement bags emptied on top. The cement and sand shall be thoroughly mixed dry by being turned over and over, backwards and forwards, several times till the mixture is of a uniform color. The quantity of dry mix which can be used within 30 minutes shall then be mixed in a masonry trough with just sufficient quantity of water to bring the mortar to a stiff paste of necessary working consistency. mortar shall be used as soon as possible after mixing and before it begins to set, and in any case within half hour, after the water is added to the dry mixture

1. **BRICK WORK**

The bricks shall be made of suitable clay and shall be thoroughly burnt at thematuring temperature of clay. They shall be free from cracks, flaws and nodules of free lime. They shall have rectangular face with sharp straight edge at right angle. They shall be of uniform color and texture. These bricks generally should conform to IS 2222. The bricks when tested in accordance with the procedure laid down inIS 3495 (Parts 1 to 4) shall have a minimum average compressive strength of 7 N/ mm2 on net area. The compressive strength of any individual brick tested shall not fall below the minimum compressive strength specified for the corresponding class of bricks. The lot shall then be checked for next lower class of brick.

Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours.

Bricks shall be laid in English Bond unless otherwise specified. For brick workin half brick wall, bricks shall be laid in stretcher bond. Half or cut bricks shall not be used except as closer where necessary to complete the bond. Closers in such cases, shall be cut to the required size and used near the ends of the wall. Bricks shall be laid on a full bed of mortar, when laying, each brick shall, be properly bedded and set in position by gently pressing with the handle of a trowel. Its inside face shall be buttered with mortar before the next brick is laid and pressed against it. Joints shall be fully filled and packed with mortar such that no hollow space is left inside the joints.

The walls shall be taken up truly in plumb or true to the required batter where specified. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in the alternate course shall come directly one over the other.

All quoins shall be accurately constructed and the height of brick courses shall be kept uniform. This will be checked using graduated wooden straight edge or storey rod indicating height of each course including thickness of joints. The position of damp proof course, window sills, bottom of lintels, top of the wall etc. along the height of the wall shall be marked on the graduated straight edge or storey rod.

The brick work shall be built in uniform layers. No part of the wall during its construction shall rise more than one meter above the general construction level. Parts of wall left at different levels shall be raked back at an angle of 45 degrees or less with the horizontal.For half brick partition to be keyed into main walls, indents shall be left in the main walls.

All pipe fittings and specials, spouts, hold fasts and other fixtures which are required to be built into the walls shall be embedded, as specified, in their correct position.

1. **EPOXY WALL PAINTING**

0.5mm thick epoxy self leveling with BASF Construction Chemicals make Mastertop 1230 Plus or equivalent as approved, over after removing the existing emulsion paint & cleaning the surface free from all loose particles, laitance, patching of small patches, nicks etc., with Epoxy putty, applying primer, Mastertop 1200 PLUS and spreading 4 component self leveling epoxy compound, tooling and finishing to gloss finish.

**CLEAN ROOM INTERIOR**

# SCOPE

This part covers Requirements and Specifications for the clean room components associated with proposed class 10000 clean room facilities and associated rooms.Contractor shall deploy a full time supervisor with sufficient experience in the similar kind of project. The installation shall be carried out in accordance with good engineering practices available, latest Indian and International standards and specific requirements covered as below:-

**CEILING PANELS**

This shall be walkable sandwiched false ceiling of minimum 100 mm Thickness. Both side Epoxy Powder coated (60-80 microns) 0.8mm thick G.I sheets (hot dipped with zinc coating of 120 gsm) with PUF as infill of density not less than 40+/-2 Kg/m3 .The load bearing capacity to be not less than 150kg/m2. The clean room panel should meet the Euro classes minimum reaction to fire B-s3,d0.

Necessary stiffeners to be provided as per manufacturer's standard and complete in all respects including, supports, hangers (T bar suspension type frame work), sealants, etc.. Ceilings shall include cutouts for HEPA filter box housings, Diffusers, Light fittings, Pendants & Utilities as indicated in the drawings (In case the vendors specification are different - vendor to provide details).

All ceiling joints and gaps between panel to panel, ceiling elements (such as HEPA module, diffusers, pipe & electrical drops etc.) etc. to be sealed using FDA approved food grade silicon sealant.

Colour of the ceiling panel: Bright White (RAL 9010) - Semi-mat or as decided by client

Joint width between panels shall not exceed 3mm.

**WALL PANELS**

This shall made with 45/50 MM thick modular ceiling with PCGI 0.5 mm thick inside/outside with sand witched puf as infil, 38±2 kg density with peripheral al profile. Other details shall be as per bill of quantities and drawing

Wall panels shall have a male edge one side and female edge on other side. This when two panels joined forms a sturdy interlock. Further the joints shall be finished with silicon sealant.

**CLEAN ROOM DOOR**

Doors are fabricated from galvanized iron sheets duly powder coated. Maximum tolerance shall be 1 mm.

Thickness of the sheet shall be min 1.2 mm. The frame may be supplied in knock down form with joints. This shall be able to assemble at site easily using nut and bolts.

Hinge plates shall be recessed and manufactured with 5mm thick sheet and this shall be suitable for flush mounting for the hinges.

Reinforcement pads shall be used for fixing the automatic door closer.

Clean room doors comprising of door frame 1.2 mm thick in GI powder coated finish, double wall 0.8 mm thick leaf/shutter with honeycomb infill, double glazed view glass of 300 mm x 600 mm SS hinges, SS handle, SS push plate, automatic door closure with speed adjuster and door lock

**LUMINARIES**

1. Type of luminary shall be as specified in the bill of quantities. This shall be complete with suitable type of lamps and control gear.
2. All ballasts for the fluorescent lamps shall be Electronic (HF) type.
3. Surface mounting Luminaires shall be directly installed to the ceiling / wall using GI anchor fasteners
4. Recess mounting luminaire shall be installed using suitable arrangements like suspension chains from ceiling slab and weight of the luminaire shall not be transferred to the false ceiling grid.
5. For installation where false ceiling is employed, it is preferred to have a common supporting system for conduits and luminaires.
6. Threaded type of suspension system is preferred over steel bracket
7. Earthing of the Luminaire body using respective earth conductor of point wiring shall be ensured.
8. Steel reinforced Flexible conduits with glands shall be used for wiring (between ceiling junction box and luminaire) for recess mounting type.

**AIR CONDITIONING SYSTEM**

1. **AIR-HANDLING UNITS (DOUBLE SKIN) WITH PLUG FANS, VFD & NECESSARY CONTROLS**
2. **TYPE**

The air handling units shall be double skin, (thermal break, wherever mixing box is specified) construction, draw - thru type comprising of various sections such as mixing box (wherever the Return Air & Fresh Air. are ducted) filter section, chilled water coil and hot water coil section, humidification section, fan section, fine filter plenum fabricated (wherever required) as per details given in Drawings and Schedule of Quantity.

1. **HOUSING/CASING**

The housing/casing of the air handling unit shall be of double skin, (thermal break, wherever mixing box is specified) construction made of sandwich type panels 45+/-5 mm thick Double Skin Panels shall be made of Pre-painted GSS on outside and Galvanized sheet inside with minimum 180 gsm/sqmt zinc coating with CFC – FREE P.U. insulation of minimum 40 kg/Cu M injected in between with an internal gasket between the skins to interrupt the thermal bridge of the panel. The thermal conductivity shall not exceed 0.022 W/mK. These panels shall be assembled to provide perfectly airtight system. The inner wall of the casing shall be absolutely smooth and without visible screws to minimize dust / powder deposit and human injuries. AHU casing shall be in compliance with Eurovent/ARI

Drain Pan shall be constructed of minimum18 G stainless steel with necessary slope to facilitate fast removal of condensate. Necessary arrangement will be provided to slide the coil in the drain pan.

1. **MOTOR AND DRIVE**

Fan motors shall be suitable 415 for 10% volts, 50 cycles, 3 phase, squirrel- cage, totally enclosed fan cooled with IP - 55 protection. Motor shall be especially designed for quiet operation. The motor shall be suitable for variable speed operations. Frequency convertor (VFD) shall be supplied by the AHU manufacturer or bought and kept satisfying all standards of VFD mentioned in the tender and in compliance with IEEE 519.

1. **FAN (plug fans)**

The fan shall be belt driven centrifugal backward curved with aerofoil section, or direct driven, backward curved plenum/plug fan. The fan and motor unit shall be placed on a common frame isolated from the AHU structure by rubber vibration isolators. In case of Plug type fans, the fan impellor shall be directly coupled with motor shaft, and balanced as a complete Fan-Motor assembly, where as suitable Belt drive will be provided for Centrifugal fans. In case of Plug fan, the entire fan with casing will be certified by a reputed 3rd party internationally acclaimed certifying body like Eurovent, or ARI or AMCA. The fan shall be statically and dynamically balanced. The unit outlet velocity shall not be exceeding 8 M/SEC. The fan shall be isolated from the AHU casing with the help of fire retardant fabric acting as a flexible connection for anti-vibration.

1. **COOLING/HEATING COILS**

Face & surface areas shall be such as to ensure rated capacity from each unit & such that air velocity across each coil shall not exceed 2.50 meters per second. The coil shall be pitched in the unit casing for proper drainage. Each coil shall be factory tested at 21 Kg per Sq. air pressure under water. Tube shall be mechanically expanded for minimum thermal contact resistance with fins. Fin spacing shall be 12 +/- 5% fins per inch (fin pitch of 0.2 cm). Coils shall be provided with suitable header. Computerized coil selection shall be furnished. Coil shall be ARI410/Eurovent certified or ASMI certified.

1. **FILTERS**

Each unit shall be provided with a factory assembled filter section containing washable air filters having Bonded Expanded Aluminium media with GSS/PVC frame. Filters should be of MERV 8 standard or above. Filter media and frame shall be rust proof and corrosion resistant. Filter shall fit so as to prevent by pass. Holding frames shall be provided for installing a number of filter cells in banks. These cells shall be held within the frames by sliding the cells between guiding channels. Face velocity shall not exceed 2.5 M/SEC.

1. **ACCESSORIES**

Each air handling unit shall be provided with manual air vent at high point in the cooling/heating coil and drain plug in the bottom of the coil. Motorised two way mixing valves located in chilled/hot water lines connecting to the coil. This valve shall be operated by the cooling/heating thermostat & shall control the flow of chilled/hot water. Cooling/heating thermostats shall be located in return air stream. Insulated butterfly valves/balancing valves, `Y’ strainer, union & condensate drain piping up to sump or floor drain in air handling unit room, as described in section “Piping”. Thermometers in the thermometer wells & pressure gauge (with cocks) within gauge ports in chilled/hot water supply and return lines

1. **VFD Specifications**

Built-in dual 5% impedance dc link reactor (harmonic filters) on the positive and negative rails of the dc bus of the vfd. Current distortion should be 35% to 45% on full load and less than 5 % on voltage in accordance with ieee519.

Built-in emc filters (electromagnetic compatibility filters) for restriction of conducted emissions to comply with iec61800: 3 (unrestricted distribution):2004 category c 1 for 50 meters of cable length between motor &vfd

1. **WATER BASED HEAT PIPES FOR ENHANCED DEHUMIDIFICATION – STANDARD SPECIFICATION**

## General- Fins, Tubes & Casing

Heat pipes for enhanced dehumidification shall be of the ‘wrap-around’ type included in the AHU around the main cooling coil. The heat pipes shall consist of a precool and a reheat fin block. Heat pipes will be delivered to the AHU manufacturer fully factory charged and sealed. A minimum of 100mm gap should be allowed between the leaving face of the cooling coil and the entering face of the heat pipe reheat section. This gap will permit the installation of sensors or other instrumentation to monitor the condition of the air after the cooling coil.

The external fins shall be of aluminium with a minimum thickness of 0.14mm. Fins shall be of the continuous plate type to maximize the external surface area rather than individually finned tube pattern. The fins shall be of the rippled or louvered type to suit the application and spaced at such a distance as required by the conditions specified. If necessary, fin spacing may differ between the two sections of the heat pipe. In corrosive atmospheres copper fins, vinyl precoatedaluminium, or Thermoguard/Heresite post coated aluminium may be used.

Tubesshall be of refrigeration standard seamless copper C106 for heat exchanger use. Tube diameter shall be a minimum of 12mm with a grooved inner surface to enhance the internal surface area and prevent pooling of liquid. The minimum root thickness of the tube shall be 0.35mm. Casings shall be from galvanized sheet steel with a minimum thickness of 1.2 mm. The casing shall incorporate tube plates, sideplates and intermediate stiffening plates as required.

## Working Fluid

The working fluid shall be **Water**. The heat pipe circuits shall be factory charged with the calculated weight of water and hermetically sealed. Individual heat pipes shall be manufactured in such a way as to ensure that all non-condensable gases are removed from the tubes.

## Circuitry

Wrap-around heat pipes shall be formed from an array of complete loops such that the working fluid flows around the loop in only one direction i.e. liquid and vapour flow in the same direction to ensure that returning liquid is not entrained by the vapour. There will be a multitude of loops in the height of the heat pipe and each loop shall be individually charged. Heat pipes with header assemblies containing a single circuit are not suitable as a single leak will render the entire heat pipe inoperative. Heat pipe loops shall be arranged to slope down to the precool side to allow gravity assisted liquid return to maximize the internal heat transfer.

## Performance and Certification

Heat pipes shall be designed to comply with the specified conditions when subject to the air volumes given in the specification.The Water heat pipe shall be sized using the validated software generated from testing done inline with AHRI 1060. The supplier shall have AHRI certification for water based heat pipes.Manufacturer must be ISO 9001:2000 certified for engineering and manufacturing of heat pipes.

1. **HEPA FILTER**

Air distribution within CLEAN ROOM shall be designed for laminar flow by supplying dehumidified air from terminal mounted HEPA filters plenum at 90-110 feet per minute velocity. Laminar air flow pattern shall be created by collecting the return air at 300 mm above finished floor level.

HEPA filters shall have an efficiency of 99.99% with 0.3 micron particles as per Institute of Environmental Science and technology(IES-RP-CC-001.3) or its equivalent. The filter resistance shall not exceed 0.52 water gauge at 100 FPM. Filter shall be scan tested for leaks at 2 m/s and certified by the specialist. HEPA filters shall be factory tested to meet Type C specifications suitable for Laminar flow.

The HEPA filters will be fixed to the plenum using M6 SS rode, 304 Q type SS bolts and nuts. SS perforated sheets Mat finish, hole size 23mm x 7mm oblong shape with 70% perforation.

1. **ELECTRIC HEATER-(Air Duct Heaters)**

Electric heater elements shall be factory-bent type so arranged that all connections are on the same side. They shall operate at a minimum air velocity **of 5 m/s in ducts and 2 m/s in AHU's**.

The electric heating coils shall comprise a series of stainless steel sheathed heating resistances. They shall be pre-wired and connected to a terminal block located behind an access door. The coils shall be mounted on sliding rails. The equipment shall be protected by a manual reset safety thermostat

The power supply to the electric heating coil must be interlocked with fan operation

Manual reset, wired in series or via contactor with heating elements. Heater batteries shall be protected against overheating with fire safety thermostats of the manual reset rigid tailstock type sensing temperature in ductwork on the leaving side of the battery. Thermostat locations shall be such that their operation is unaffected by radiation from the heater elements and their temperature set point shall be 55 °C. Thermostats shall have single pole double throw contact arrangement to enable trip condition to be indicated by means of pilot lamps on the relevant electrical switch panels. Silicon heat resistant wiring to the terminal box).

Arrangement for heater elements within the heater batteries shall be such that they are uniformly spaced across the width of the duct to present equal air flow over each element. When necessary arrange in staggered rows to ensure best distribution of air flow over individual elements.

1. **WATER PIPING**
2. **Scope**

The extent and scope of this section covers supply and erection of entire piping for chilled water circulation, and drain. The scheme of piping for each of the above system is shown on the drawings. The successful Tenderer on award of work shall prepare detailed working drawings and obtain the approval of the Engineer-in-charge, before executing the piping work.

1. **Chilled water piping:**

All pipes & fittings shall be brand new and shall be of approved make. The material and type of piping shall be as given here under: -

|  |  |  |
| --- | --- | --- |
| **Pipe size (mm)** | **Class of Material** | **Joints & Fittings** |
| Up to 65 | GI pipes as Per IS : 1239 | Screwed fittings, unions & screwed flanges. |
| Up to 150 | -do- | Welded fittings, slip on flanges |
| 200 & above | Pipes as per IS: 3589 | Welded fittings, slip on flanges, etc. |

All fittings for piping with welded joints shall be welded quality. Fittings for screwed piping shall be of malleable iron. The fittings shall have the same pressure rating as that of piping. Valves of 75mm dia. and above shall be as per IS: 780, with cast iron body with flanged connection and nonrisingspindles. Spindle, valve seat, wedge nut, etc shall be of gun metal or bronze. For piping of 50 mm dia. and below GM valves with screwed connection may be used. The valves shall be suitable for a test pressure as per equipment schedule. Globe/balancing valves shall be installed for controlling flow of water on discharge side condensers, chillers and water coil outlets. Globe valves shall conform to relevant ISS in all respects.

1. **Flanges:**

Flanges wherever used shall conform to the requirements of latest edition of ISS. The flanges shall be of forged steel. Generally slip-on flanges shall be used for pipe sizes 75mm and above. or smaller pipes, screwed flanges shall be incorporated. Supply of flanges shall include bolts, nuts, washers and sealing materials.

1. **Check valves (Non-return valves)**

Check valves shall be provided at locations shown on drawings of and wherever required. Check valves up to 65mm size shall be of gun metal with screwed female ends. Valves of 65mm and above shall be of CI with flanged ends. Check valves shall be supplied, if specially called for & agreed to.

1. **Butter fly valve**

Butter fly valve shall perform the function of isolating valves. Butterfly valve shall cast iron body with black nitrile seat. All butterfly valves shall be provided with locking devices. Valve above 300 mm dia shall be gear driven.

1. **Strainers:**

Pot strainers or Y strainers with cast iron or MS body shall be designed for test pressure specified for valves. Each strainer shall be provided with removable cover and brass screen. The screen shall be of brass sheet, having perforations, to provide a minimum net free area of 4 times the cross section area of piping connected to the strainer. Strainers shall be provided with threaded sockets or flanges depending up on the pipe size. Strainers shall be provided on suction of each pump. Strainers shall be provided with drain plug.

1. **Installation**

Piping shall be installed only after thoroughly cleaning and painting with one primer coat of red oxide paint. Pipes shall be cut square and free suspended from stands, clamps, hangers as specified and required. The pipe supports or hangers as specified and required. The pipe supports or hangers shall be designed to withstand combined weight of pipe, pipe fittings, fluid in pipe and insulation. Pipe supports shall be of steel and coated with rust preventing paint and finished with two coats black enamel paint. "Vibration Isolation” hangers shall be installed close to the source of vibration. The supports designed to minimize vibrations shall be heavy enough to damp out vibrations and shall have relatively wide bearing surface to avoid swivel action. The following spacing are recommended for pipe supports.

|  |  |
| --- | --- |
| **Pipe (MM)** | **Spacing (MTR)** |
| Up to 25 | 2.0 to 2.2 meter |
| 32 to 65 | 2.4 to 2.7 meter |
| 75 to 125 | 2.7 to 3.0 meter |
| 150 & above | 3.0 to 3.6 meter |

Pipe supports shall be spaced at a maximum interval of 1.5 mtrs at heavy fittings and valves. Wherever piping passes through walls, pipe sleeves of diameter 50mm larger than that of piping shall be provided. Pipe sleeves shall be of steel or cast iron pipe. Sleeves shall not be installed in structural members except where indicated, or approved. Where pipes pass through fire walls/fire partition, a seal of asbestos rope, mineral wool or any other non-combustible material shall be used for packing the sleeve. Where off-sets have to be laid 45 degree elbows shall be preferably used. Wherever "Tees" are installed, they should be installed such the "Bull heading" is prevented. Vertical pipe risers shall be installed straight and true to the plumb. All connections to and from the water headers shall be through shoe connections in the direction of flow of water. The risers shall be fixed parallel to walls and columns. The risers shall be provided with two support at each floor when passing from floor to floor. Supports for insulated pipes shall not be in direct contact with the pipe. Further, supports shall be arranged and fixed in such a way that undue pressure is not exerted on the insulation. The outlets required for passage of various pipes are shown in the drawings. The contractor should carefully examine the same and point out any discrepancies or deviations. Tee off connection shall be through reducing tees. Wherever tees cannot be installed, a direct connection may be provided with shoe connection in the direction of flow. No restriction shall be imposed to water flow in the header. Reducers wherever used in horizontal runs of piping shall be eccentric type, to provide for free drainage wherever required. In other locations, concentric reducers may be used.

1. **Flanges & Union**

Flanges and unions shall be provided in each line preceding the connection to each equipment, which require maintenance. Union shall be installed in between the equipment and each valve for piping with screwed or welded joints. Flanges/unions will not measured& shall be treated as part of piping.

1. **Air Venting**

Air valve shall be provided at the summit of piping system for air venting. Globe valve of same size as air valves shall be incorporated. The sizes of air valves shall be as specified hereunder. All such valves will be measured & paid.

|  |  |
| --- | --- |
| **MAINS** | **AIR VALVES** |
| Up to 100 mm | 25 mm |
| 101 to 300 mm | 40 mm |

1. **Drains**

Drains shall be provided at all low points in the system. 25mm dia. gate valve with the same size GI piping up to the nearest drain or floor trap shall be provided for each drain point. The piping shall be pitched towards the drain points. Air venting valves shall also be connected to the nearest floor trap/drain through equal sized GI pipe. All such pipe & valves will be measured and paid.

1. **Sockets for pressure gauges**

Pressure gauges shall be provided at the following locations.

a. Supply and return of chillers and condensers.

b. All pumps-suction and discharge.

c. Heat exchangers-inlet and outlets.

1. **Sockets for Thermometer**

Direct reading 225mm long industrial thermometers having reading mercy shall be provided at the inlet and outlet of all heat exchangers to read water entering and leaving temperature. The thermometers shall be installed in separate wells. Thermometer shall be of appropriate range and shall be calibrated before installation. Thermometers for insulated piping shall be installed in extended neck to avoid damage or deformation of the insulation. The thermometers will not be measured and paid and shall be treated as part of equipment.

1. **Insulation**

Chilled water piping, condensate drain piping, etc. shall be insulated as per the specification enumerated under the specification "Insulation".

1. **Testing**

Piping shall be cleaned thoroughly.

Piping shall be tested to hydrostatic test pressure at least 2.5 times the maximum working pressure for a period of 24 hours. However, minimum test pressure shall be 10 Kg/sq. cm. The defects in joints and leaks observed during the test shall be rectified to the entire satisfaction of the Engineer-in-charge and piping shall again be subjected to pressure test. The testing of piping system shall conducted in presence of employer's representative. No insulation shall be carried out till the satisfactory completion of pressure testing. The contractor shall furnish all the necessary equipment, tools, instruments and labor to perform the test, to re water and clean space.

1. **Balancing**

After the completion of installation and testing of piping, allthe piping system shall be adjusted and balanced to deliver the water quantities as specified/as required/as directed. The instruments/equipment required to adjusting the balancing ofwater system shall be accurately calibrated before taking any measurement. Calibrated orifices and portable flow meters may be used to adjust and balance the water flow. The contractor shall furnish a certified balancing report to the Engineer-in-charge for evaluation and approval.

1. **Painting**

After successful completion of installation, testing and insulation all exposed piping shall be given two coats of approved synthetic enamel paint as per the color coding requirement.

1. **Specification for Thickness Of Pipe**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Description | Thickness | Standard |
| 1 | 600 mm dia. | 8.0 mm | IS 3589 |
| 2 | 500 mm dia. | 7.0 mm | IS 3589 |
| 3 | 450 mm dia. | 7.0 mm | IS 3589 |
| 4 | 400 mm dia. | 7.0 mm | IS 3589 |
| 5 | 350 mm dia. | 6.0 mm | IS 3589 |
| 6 | 300 mm dia. | 6.0 mm | IS 3589 |
| 7 | 250 mm dia. | 6.0 mm | IS 3589 |
| 8 | 200 mm dia. | 6.0 mm | IS 3589 |
| 9 | 150 mm dia. | 4.8 mm | IS1239 |
| 10 | 125 mm dia. | 4.8 mm | IS1239 |
| 11 | 100 mm dia. | 4.5 mm | IS1239 |
| 12 | 80 mm dia. | 4.0 mm | IS1239 |
| 13 | 65mm dia. | 3.6 mm | IS1239 |
| 14 | 50mm dia. | 3.6 mm | IS1239 |
| 15 | 40mm dia. | 3.2 mm | IS1239 |
| 16 | 32mm dia. | 3.2 mm | IS1239 |
| 17 | 25mm dia. | 3.2 mm | IS1239 |
| 18 | 20mm dia. | 2.6 mm | IS1239 |

1. **INSULATION**

**Scope:**

Supply and fix thermal insulation for piping, ducting and equipment as per the specification described in the section.

**Materials of Insulation:**

The following insulating materials shall be used:

**a) For Piping**

**GENERAL**

All underground and aboveground chilled water lines shall be insulated with pre-insulated PUF.

**INSULATION**

The service pipe insulation shall be polyurethane foam with 36 kg/cu m minimum density, 90% minimum closed cell content, minimum compressive strength of 40 psi and thermal conductivity of 0.14 Btu-in/hr/ft2/OF. The insulation shall completely fill the annular space between the service pipe and jacket and-shall be bonded to both, the service pipe & jacket.

The insulation shall be provided to the minimum thickness specified below:

|  |  |
| --- | --- |
| Chilled water Pipe Size (mm) | Minimum insulation thickness mm |
| < 150 | 30 |
| 150 to 300 | 50 |
| >300 | 50 |

However the exact thickness could vary marginally for underground piping based on the exact sizes of HDPE pipes available.

**INSULATION JACKET**

**Over ground Piping:**

For over ground piping the jacket shall be out of Spirally wound GI/Al tubes as per following specs

**GI /AL**

|  |  |
| --- | --- |
| Jacket OD (mm) | Minimum Jacket Thickness Gauge |
| OD < 250 | 26 |
| 250 to 500 | 24 |
| >500 | 24 |

**Buried piping:**

The outer protective insulation jacket shall be seamless, extruded, black, uv resistant, high-density polyethylene (HDPE). The minimum thickness of the HDPE jacket shall be as follows:

|  |  |
| --- | --- |
| Jacket OD (mm) | Minimum Jacket Thickness (mm.) |
| OD < 300 | 3.5 |
| 300 to 600 | 5 |
| > 600 | 7 |

**FITTINGS**

**Over ground pipe insulation fittings:**

Use factory fabricated fittings & pour chemicals supplied at site to make composite insulation.

**Buried pipe insulation fittings:**

Take off fittings wherever underground should be factory insulated pipe with mitred HDPE outer covering to suit Carrier pipe fitting.

**FIELD JOINTS INSULATION:**

Field joints insulation shall consist of PUF poured manually in a prefabricated GI sheet metal mold fixed around the joint. Then a neat shrinkable sleeve with a closure patch is applied & heat shrunk over the insulation to finish the joint.

**UNDER GROUND PIPING & INSULATION EXECUTION:**

Underground systems shall be buried in a trench of not less than 600 mm deeper than the top of the pipe & not less than 450mm wider than the combined OD of all piping systems. A minimum thickness of 600mm of compacted backfill over the top of the pipe is desirable.

Trench bottom shall have a minimum of 150 mm of sand, pea gravel or specified backfill material, consolidated to suit operating weight & to act as a cushion for the piping

**b) For Ducting**

For Thermal insulation: 9 mm thick class o nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3

For non ac area: - 19 mm thick insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3

**Note: particular size mentioned above is not available in the production line next available higher size may be considered.**

**Duct Insulation:**

Sheet metal/Aluminium ducts shall be insulated as described below:

a) Thickness of insulation: Material : 9/10 mm Nitrile Rubber

Conditional Space Unconditional Space

i) Supply air duct (as shown in the dwgs) 9mm insulation 19mm insulation

ii) Return Air ducts -Nil- 19mm insulation

iii) Plenums /acoustic Internal lining with 10mm thick insulation as specified on the drawing

**Valves & Fittings :**

All valves, fittings, flanges, strainers etc. in the piping, operating below normal temperature , shall be insulated in the manner described above. Care should be taken to ensure that no damage would be caused to the insulation when valve or strainer is used or serviced.

**Pumps & Accessories** :

Chilled water pumps and accessories shall be provided with insulation of same thickness as that of pipes to which they are connected. The application of insulation shall generally conform to the method described above. Proper care shall be taken while insulating the pumps such that dismantling of pumps will not cause damage to the insulation.

**Equipment**

**Air Handling Units :**

1. Drain Pan :25 mm thick expanded polystyrene fire-retardant quality with 2 layers of bitumen.

**Water Chillers/equipment :**

Water chillers or equipment operating below the ambient temperatures shall be insulated with 75mm thick thermoses/equal expanded polystyrene insulation. The equipment surface shall be given a coat of zinc chromate’s primer and two coats of Koldfas compound. Insulation shall then be applied butting all the joints tightly. The joints shall be properly sealed with adhesive. The insulation shall be wrapped with 24swgx19mm GI wire netting and two coats of smooth sand-cement plaster shall be applied to a total thickness of 12mm. the surface thus prepared shall give two coats of synthetic enamel paint of approved shade.

1. **SHEET METAL WORK**
2. **Scope**

Supply and erect highest standard fully machine fabricated duct as per SMACNA 2005 eliminating air Leak and simple connections at site of approved make as per the specifications described below.Details of duct manufacturing and machines used for the same may be submitted along with the tender. Any longitudinal joints and flange fixing to be carried out at site, electric hand held joining machine and rivet gun to be used with the prior approval of consultant as per SMACNA 1995.

1. **Material for Ducting:**

All duct work shall be constructed out of best quality cold annealed, flat galvanized sheet steel /AL (galvanized to specifications of IS : 277 (latest edition) ).

The joints shall be finished straight and neat. The duct workshall be supported/secured from roof slab or any other building member using angles, rods as may be required. (Only Hi-tech supports)

The fabrication of duct shall be done as per IS : 655 (latest edition). Transverse joints, connections, bracing, seam etc. shall be generally as per IS : 655. All the ducts over 300mm in either dimension shall be cross broken except those on which rigid board insulation is applied. Stiffening angles shall be black structural steel and riveted to the cut work. The longitudinal seam on all ducts may be Pittsburgh seam hooked and hammered. Ducts of size 600 mm and above shall be reinforced between the joints. Where drive-slips are used, angles shall be riveted to the ducts 50mm from slips.

1. **Duct Construction :**

The intent of the above specification, is to obtain duct pieces that are robust and rigid enough to preclude flutter & to achieve minimum amount of air leakage. The contractor may fabricate ducts conforming to any other approved standard to achieve the desired result. However, detailed specifications shall be submitted for approval before adopting the same. Suitable rubber gaskets shall be provided between the duct flanges. Ducting shall be supported from independent hangers fixed to the building structure. In any case the duct shall not be supported from false ceiling, ceiling hangers, light fixtures, support for light fixtures or piping work etc. In case the structure is under construction, inserts and anchors required for duct support shall be set in the building structure at the time of pouring concrete. The Contractor shall prepare, detailed drawings of hangers and supports and submit for the approval of consultants.

Dimensions of duct sections shown are inside dimension of bare ducts. Where ducts are required to be lined or insulated on inner surface, their dimensions have to be enlarged so that the cross section area is not reduced as compared to those shown on the drawings.

1. **Elbows, Vanes Etc.**

Simple elbows, transformation sections, shall be formed with Pittsburgh corner seams. Complicated fittings shall be constructed with double corners. Elbows, bends and offset pieces shall have a center line radius of not less than 1.5 times the radial of width of the duct. Turning vanes should be provided at required spacing such that the aspect ratio of each individual elbow formed by the vanes shall not be more .

1. **Transformation**

Duct transformation shall be made with a side slope of 10mm to 70mm. However, if the duct cross section area need to be reduced, a maximum reduction of 20% of the original area shall be allowable.

1. **Obstructions**

Where ducting has to avoid building structural members, piping, electrical pipes and cables, ducts shall be transformed, divided or curved to one side. The reduction in area shall not exceed 20% of the original area.

1. **Take offs**

The branch take-offs and collars shall be provided with turning vanes. Straightening vanes shall be provided in the collars wherever practicable.

1. **Dampers & Splitters**

Dampers shall be provided in the duct work for proper control and balancing of air distribution. Dampers shall have easily accessible operating mechanism. The operating mechanism shall consist of links, levers and quadrants as required for proper control and setting in a desired position. The position of the handle of Damper operating mechanism shall be clearly visible and it shall indicate the position of the damper in duct. Dampers, splitters and their operating mechanism shall be fabricated of GS sheets of two gauges heavier than duct piece having theses fittings and shall be easily accessible through suitable access doors in the ducts. Dampers shall be installed in duct at all required locations such as chutes, branches etc.

1. **Fire Dampers**

Fire dampers shall be provided in the ducting as shown on the drawings and wherever required as per the local codes. However, fire dampers shall be provided in the ducts passing through fire walls and where the ducts serves more than two floors Fire Dampers shall have same fire resistance as that of fire walls, ceiling, etc. The fire damper shall be installed in the duct in such a manner that vibration and rattling does not occur due to the passage of air. Fire damper with solenoids (solenoids shall be supplied & installed by AC Contractor).

1. **Apparatus and Equipment connections**

Equipment’s such as air handling units shall be connected to the duct by means of double canvas sleeve of 15 ounce, woven asbestos cloth connection of at least 150mm long.

Duct sleeves made of 20 gauge thick galvanized sheet steel shall be used for ducts passing through load bearing walls or partitions. sleeves shall provide 25mm clearance all around as per duct or insulated duct. The space between sleeve and duct shall be packed with twisted asbestos.

All the sheet metal plenums required to confine the flow of air through filters and fans, shall be fabricated out of 18 gauge galvanized sheet steel, suitably braced as required. Suitable access doors shall provided for plenums.

1. **Access Doors**

Hinged or bolted access doors shall be provided in ducting for fire dampers, coils, plenums and any apparatus requiring frequent servicing for inspection. Access doors shall be rigid and shall be provided with air tight rubber gaskets. Insulated ducts shall be provided with insulated doors

1. **Diffusers, Registers & Grilles**

All side wall supply grilles shall be double deflection type with both horizontal and vertical vanes being adjustable. Grilles shall be provided with multi-louver damper for volume control with adjustable handle from the from of the grille. Side wall grille shall be similar to Tuttle & Bailey. All return air and exhaust grilles shall have only horizontal louvers and similar to Tuttle and Bailey Aerovane T-70 D or equivalent. Ceiling diffuser shall be provided with volume control dampers, which can be operated from below. Ceiling diffusers shall be similar to Tuttle & Bailey type 5-aerofuse.

All the diffusers and grilles shall be of mild steel/powder coated aluminium. Diffusers and grilles shall be provided with sponge rubber gasket between flanges and wall or ceiling. Samples of grilles/diffusers shall be approved by consultant before installation.

1. **Installation**

The installation of ducting shall conform to standard practice of the trade. The contractor shall provide and neatly erect all the sheet metal work as shown on the approved drawings.

The Contractor shall upon the award of work prepare detailed shop drawings of ducting for approval by Engineer-in-charge. The drawings shall indicate the exact route of ducting, ducting dimensions, details of splitters, vanes, dampers, fire dampers, heaters, filters etc. as specified and required. The drawings shall also incorporate cross section indicating beams, obstruction, piping, cables etc. The ducting shall be suitably designed to avoid all obstructions and at the same time utilizing a minimum number of bends/transformations/divisions etc. Every duct layout drawing shall clearly indicate the location & spacing of supports & hangers.

Ducting over the false ceiling area shall be supported from the ceiling slab or from beams. In no event, the ducting shall be supported from false ceiling hangers, cable trays/racks, pipe supports or be permitted to rest on the false ceiling. All the ducts shall be rigid and shall be adequately supported and braced wherever required with tees, angles or adequate size to prevent buckling, Vibration or breathing. The contractor should mention the total quantity of various sizes ducting sheet along with each floor drawing of duct layout.

1. **Insulation:**

Duct work shall be insulated as per specification given under insulation.

1. **Testing:**

After completion of ducting, the entire system shall be tested for air leakages. The max. allowable air leakage shall be 10% on commissioning of the plant, the entire air distribution system shall be balanced to supply the required air quantities to various regions and rooms to maintain the specified inside conditions. The readings of air quantities, after final balancing of the system. through each register, diffuser or grille shall be recorded and submitted to the Engineer-in-Charge.

1. **Round ducting:**

Round duct shall be machine fabricated as per IS standards. Ducting covering the insulation shall also be factory fabricated including reducers, tees, elbows etc. The entire exposed ducting shall be painted with two coats of paint/primer after subsequently cleaned as explained in the painting methods else where in this tender.

1. **TESTING OF AIR-CONDITIONING SYSTEM:**

**Cooling coils of air-handling units & fan coil units**

The flow of air over the cooling coil will be measured by recording the velocity of air across each filter placed before the cooling coil. The velocity shall be measured by means of an anemometer.

Air quantity across the filters = Velocity of air across the filter in FPM x Net filter area in sq. ft.

The wet bulb temperature of air entering the coil and that leaving the coil shall be measured. The enthalpy of entering and leaving air shall be noted from the psychometric chart, corresponding to the WB temperature recorded.

Say, he = Enthalpy of entering air in Btu /lb hl = Enthalpy of leaving air in btu/lb.

**Air balancing:**

After the desired inside conditions are achieved the quantity of air through every outlet shall be measured.

Air Qty (CFM) = Air velocity at the outlet in FPM x Effective area of the outlet in Sft.

**Test Readings**

The following readings shall be recorded hourly during the tests and capacity of the plant shall be computed.

* **Air handling units & fan coil units**

1. Air velocty - M/Hr (FPM)

2. Coil face area - M2 (SFT)

3. Air quantity - M3/Hr (CFM)

4. Entering air temp DB - 0C (0F)

5. Entering air temp WB - 0C (0F)

6. Leaving air temp DB - 0C (0F

7. Leaving air temp WB - 0C (0F)

8. Entering water temp - 0C (0F)

9. Leaving water temp - 0C (0F)

10. Entering water pressure - Kg/cm2 (psi)

11. Leaving water pressure - Kg/Cm2 (psi)

* **Motor**

a. Rated Horse Power - HP

b. Rated Volts - Volts

c. Rated Current - Amps

d. Actual current - Amps

e. Actual Volts - Volts

f. Starting current - Amps

* **Supply Air Grilles**

1. Area of Grill - M2 (Sft)

2. Velocity - M/Hr (FPM)

3. Air flow rate - M3 (FPM)

4. Temperature DB - 0C (0F)

5. Temperature WB - 0C (0F)

* **Filters**

1. Total area - M2 (Sft)

2. Effective area - M2 (Sft)

3. Velocity of air - M/Hr (FPM)

4. Quantity of air - M3/Hr (CFM)

The observations of the test shall be recorded for each item separately.

**ELECTRICAL SYSTEM**

**ELECTRICAL INSTALLATION:**

**Scope**

The scope of this section comprises of the supply, erection, testing and commissioning of electrical switch gear and wiring installation.

**General**

Work shall be carried out in accordance with the specifications, local rules I.E. Act 1910 as amended up to date and rules issued thereunder, regulations of the Local Fire Insurance Association and Indian Standards code of practice No. IS : 732-1963 and CPWD General specifications for Electrical Work(Internal) -1977 and Kerala State Electrical Inspectorate standards.

**Wiring System**

Wiring shall be carried out with PVC insulated, PVC sheathed and armored cables. Wiring shall be suitable for a 3 phase, 50 cycles, 4 wire supply with 415 volts between phases and 230 volts between phase and neutral. The voltage and frequency of supply shall be subject to variations permissible under the Indian Electrical Act and Rules.

**Material**

All materials shall be of the best quality complying with the appropriate IS specification. Material used shall be subject to the approval and samples of the same shall furnished where required. Acceptable makes of materials are given in the equipment schedule.

**Cables Laying**

Cables shall be laid generally in accordance with Indian Standard Code of Practice/CPWD specification/ISS/ Inspectorate cables shall be laid in trenches or buried or carried on walls as stated in the schedule, indicated on the drawings, or approved by Where more than one cable is running proper spacing shall be provided to minimize the loss incurrent carrying capacity.

Cable racks and trays shall be provided wherever specified in bill of quantities. Cables shall be suitably supported with MS angle iron clamps mounted on M.S. supports when run on walls. This distance between supports shall not be more than 0.5 meter.

Special care shall be taken to ensure that the cables are not damaged at bends. The radius of bends of the cables when installed shall be sufficiently large to ensure that no undue stress is caused on the insulation/conductor. Where cables pass through pipes, wooden bushes shall be provided at the ends.

When these pass through floors or walls the cable holes shall be sealed in a manner approved by consultant. With each cable, 2 Nos. of earth conductors of sizes specified under sub-head "Earthing" shall be provided.

**Equipment Wiring**

Final connections to the Equipment shall be through flexible wiring particularly for equipment mounted on guide rails and which are liable to be moved.

**Earthing**

Earthing shall be as per IS : 3042 - 1963 in all respects. The earth station shall consist of GI pipe and accessories as per IS : 3043.

The connection between earth plate and main earth bar shall be by means of 3 Nos. 3/8" brass bolts and nuts. These bolts shall be fixed at least 4" apart. The earthing station shall be preferably located in a grassy lawn/near flower beds/near water traps. These shall be kept at least 2 meter away from the foundation of the building or outer face of the building. The distance between earth stations, shall be at least 5 meters. No earth electrode shall have greater ohmic resistance than 0.5 ohms. as measured with approved earth testing equipment. In case of rocky soil, it may be relaxed to 1.0 ohms.

All switches/isolators shall be connected to the earth and size of earth conductor shall be as follows depending upon the size of the cable connected with the switch/isolators.

|  |  |
| --- | --- |
| **Cross sectional area of the current Carrying conductor** | **Size of earth conductor** |
| 1. 4/6/10 | 10 SWG Cu |
| 2. 16/25/35 | 6 SWG Cu |
| 3. 50/70/95 | 4 SWG Cu |
| 4. 120/150/185/225/240 | 25mm x 3mm strip Cu |
| 5. 300/400 | 40mm x 5mm strip Cu |

**Control/Indication/Interlocking Wiring:**

The control/indication/interlocking wiring shall be done with 2.5 sq.mm PVC insulated and PVC sheathed armored copper conductor cables of multi cores as per requirement. All the machines as detailed in the drawings shall be remote controlled at the main panel board through push buttons (ON/OFF buttons). All the machines shall have red/green lamp indicators to show the working/off position of individual machines. An electrical interlocking shall be provided for safe running of refrigeration machines i.e. the refrigeration machine shall only start after C.T. fans, condenser water pumps, chiller water pumps have started working. Control wiring for individual fan coil units shall be done with 2.5 sq.mm copper conductor single core cables drawn in recessed conduit.

**Completion Drawings**

Four sets of completion drawings giving single line diagram run of cables location along with of detail panels, indication/interlocking circuits cable with sizes within the building/underground cables showing the location of straight through joint boxes, location of main earthing stations shall be furnished within one month from the date of completion of the work.

**Testing**

Before the commissioning of the plant, the entire installation shall be tested in accordance with Code of Practice IS No: 732 - 1963 and the test report furnished by the qualified and authorized person. The electrical installation shall be got passed from local electrical inspector. The first inspection fee shall be paid by the Owner. Subsequent fee, if any, shall be paid by the Contractor.

**MCBs, RCCBs, & MCB DBs**

1. Factory assembled MCB DBs as per BOQ / SLD shall be wall mounting type.
2. Suitable steel frame work if required shall be provided for installation where number of MCBDBs is more than one.
3. Suitable fabricated wire ways shall be assembled between DBs on theabove framework for easy wiring and cable dressing.
4. Body earthing (Double) to the main grid shall be strictly ensured.
5. MCBs of proper rating as per SLD/wire size shall be arranged on the DINrail.
6. All circuits shall be neatly terminated to the corresponding terminals andproper dressing inside the DB shall be carried out.
7. Circuit identification ferrules to be provided for each conductors of a circuit.
8. Separate neutral and earth bus shall be provided and respective conductors of each circuit shall be connected to the above bus.
9. Circuit identification, feeder identification and cable size shall be suitablymarked on the DB after the installation.

**SECURITY SYSTEM**

1. **FIRE DETECTION AND ALARM SYSTEM**

**Multi Criteria Detector:**

The multi-sensor or multi-tech smoke detector which will have both photoelectric as well as thermal detection elements shall have inbuilt microprocessor, and shall be capable of taking an independent alarm decision. The scattering of smoke particles shall activate the photo sensor. Each intelligent addressable smoke detectors sensitivity shall be capable of being programmed electronically from Control Panel without any extra tools as: most sensitive, more sensitive, normal, less sensitive or least sensitive. In addition to the five sensitivity levels the detector shall provide a pre-alarm sensitivity setting, which shall be settable in 5% increments of the detector's alarm sensitivity value. The detector should continue to give TRUE alarms even if the loop controller on the main panel fails. Alarm condition shall be based upon the combined input from the photoelectric and thermal detection elements. Each detector shall be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient "environmental thresholds approximately six times an hour.. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 75% and 100% of the allowable environmental compensation value

**MANUAL STATIONS**

The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering.

**PROGRAMMABLE ELECTRONIC SOUNDERS/HOOTERS:**

Electronic sounders shall operate on 24 VDC nominal. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 10 feet from the device and shall be flush or surface mounted as shown on plans. They shall produce broad band directional sound to guide occupants to safe exists even in complete darkness. Strobe lights shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria: The maximum pulse duration shall be 2/10 of one second. Equivalent alternate type will be also acceptable

**INSTALLATION**

Conduiting shall be surface type and shall be 16G black enameled MS for the FDA system. Minimum size shall be 20mm. Only threaded type of installation shall be carried out. Thread sealing compound shall be used. No elbows are permitted but long radius bends. Fire red shade shall be applied for FDA conduiting. Wiring shall be of flame retardant low smoke type, 660volts grade, PVC insulated shielded, flexible twin core with multistrand copper conductor. Cross sectional area shall be not less than 1.5 Sq.mm. – for FDA system.All passive components shall be interconnected using above conductor toform a closed loop.Power supply for the hooter shall be through a separate networkoriginating from the control panel.Photoelectric type smoke detectors are proposed below false ceiling.This shall be located in the false ceiling to merge with reflected ceilinglayout.Type ‘A’ wiring to be adopted in which return wire through a separateconduit shall be brought back to the FDA control panel.This return wiring shall be at least 30cms from loop conduiting.All testing as per relevant standard shall be carried out.

The detectors & MCPs shall be connected and synchronized to the existing control panel already installed at the building.

**FIRE EXTINGUISHER**

Supply, Installation of clean agent type fire extinguisher, should be BIS specification, handy type, user friendly, EPDM rubber hose type, controllable discharge mechanism. Capacity 4 KG.

The Clean Agent Fire Suppression system cylinder, CCOE, Nagpur approved seamless cylinders, discharge hose, and all other accessories required to provide a complete operational system meeting applicable requirements of NFPA 2001 (2012 addition) Clean Agent Fire Extinguishing Systems, NFPA 70 National Electric Code, NFPA 72 National Fire Alarm Code or ISO standards

The Clean Agent system considered for Total flooding application shall be in compliance with the provisions of Kyoto Protocol.

Care should be taken that none of the Greenhouse Gases identified in the Kyoto Protocol is used for fire suppression application

1. **CCTV SYSTEM**

The Closed Circuit Television System (CCTV system) shall provide an on-line display of video images on monitor. Cameras with suitable lenses shall be used to view specific areas of interest. The primary objective of implementing a CCTV system is to ensure effective surveillance of an area and also create a record for post event analysis.

**FIXED DOME CAMERA**

The Dome camera unit shall be 1/3” CCD type Color and shall provide a minimum of 480 TV lines resolution. It shall be possible to use lenses of 3.6 mm focal length. The complete unit shall be housed in a dome and base unit, both preferably made from injection moulded plastic. It shall be possible to adjust the camera head inside the dome in both the planes so that it can be wall or ceiling mounted. The camera shall operate on 12 volts D.C.

**WIRING**

Cabling between Power Supply Unit and Cameras shall be in the scope the Vendor. The RG 11 Co axial Video cable connecting the Digital Video Recorder to Cameras shall be armoured cables meeting the signal cabling requirement of the system manufacturer.

The 4 core .75 Sq. mm. Power cable for powering the Cameras shall be PVC insulated copper, multi strand, Shielded armoured cables shall be 650V grades and shall generally confirm to IS –1554 – 1988 and meet the signal cabling requirement of the system manufacturer.

**INSTRUCTION**

Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.The contractor and/or the systems manufacturer's representatives shall provide “Operation and Maintenance Manual” as detailed in the General Conditions of Contract.

The cameras shall be connected and synchronized to the existing DVR already installed at the ground floor.

1. **PUBLIC ADDRESS SYSTEM**

**SCOPE**

The scope of work under this head shall include design, supply, and installation of Public Address System. The work under this system shall consist of design, supply, installation, testing, training & handing over of all materials, equipment and appliances and labour necessary to commission the said system, complete with Speakers, Amplifiers, relays etc. It shall also include laying of cabling necessary for installation of the system as indicated in the specification and Bill of Quantities. Any openings/chasing in the wall/ceiling required to be made for the installation shall be made good in appropriate manner.

**CEILING MOUNTED SPEAKERS**

The speaker shall be flush mounted in the False Ceiling cavity and shall be suitable for a general purpose applications such as Public Address, Music Reproduction etc.,

The Speaker shall consists of a single piece 6 W dual cone loudspeaker, frame, a 100 V line matching transformer and a circular metal grille. The speaker shall come with a screw terminal block for line matching transformer connection. The speaker shall be screw mounted to the ceiling and it shall have a protective steel fire cover to prevent entry of fire into the false ceiling void area through the speakers. The speakers shall also meet the following specifications

Max. Power : 9 W

Rated Power (PHC) : 6W (6-3-1.5 W)

Rated voltage : 100 V AC

Rated impedance : 1667 Ohms

Effective frequency range (-10 dB) : 80 to 18 kHz

Opening angle (1 KHz/ 4 KHz, -6dB) : 175/55

Power handling capacity : Min 6 watts with a tapping facility for

1.5,3,6 Watts

Sound pressure level at 1 KHz, 6W, 1m : Min 92dB

Sound pressure level at 1 KHz, 1W, 1m : Min 84dB

Speaker diameter : Around 200 mm

Connection : 4 - pole screw connector

Operating Temperature : -25°C to +55°C

**MIXING AMPLIFIER**

The main function of the power amplifier shall be the amplification of audio signals for the speakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing outputs The Booster mono amplifiers shall be capable of operating for speech and music applications. They shall be mounted on a suitable 19” Euro Racks.

The power amplifiers shall have adequate continuous power output to meet the requirement of the configuration. The unit shall be capable of delivering the rated output watts with less than 0.1% harmonic distortion in the design band width. The amplifier shall have a broad band frequency response of 50 Hz to 20 KHz. The output voltage and impedance shall meet with the system requirements.

Amplifiers shall be protected against over loads and output shorts and a special thermal overload on the heat sink. Additionally, all booster amplifiers have an overheat protection circuit that switches off the power stage if the internal temperature reaches a critical limit due to poor ventilation or overload. A temperature-controlled fan shall be provided to ensure high reliability at high output power and low acoustic noise at lower power output.

**Annexure – 3 I.S. STANDARDS AND SAFETY STANDARDS**

The installation and components thereon shall conform to the requirements of following specifications:-

ISO 14644 2004/Schedule M -Clean rooms & associated controlled environments.

NBC - National Building Code.

NFPA 2001 - Clean Agent Fire Extinguishing Systems

NFPA 70 - National Electric Code

NFPA 72 - National Fire Alarm Code

I.S. 277 - Galvanized steel sheets

I.S. 325 - Three phase induction motors

I.S. 655 - Metal air ducts

I.S. 732 - Code of practice for Electrical wiring and fittings

I.S. 778 - Gun metal gate, Globe and check valves for general purposes

I.S. 900 - Code of practice for installation and maintenance of induction motors

I.S. 996 - Single phase small A.C. and Universal motors

I.S. 1239 - Mild steel tubes, tubular and other wrought steel fittings

I.S. 1248 - Direct acting electrical indicating instruments.

I.S. 1554 - PVC insulated (Heavy duty) electric cables for working voltages up to andincluding 1100 volts.

I.S. 1520 - Horizontal centrifugal pumps and for clear cold, fresh water.

I.S. 1822 - Motor starters of voltage not exceeding 1000 volts.

I.S. 2208 - HRC cartridge fuse-links up to 650 volts.

I.S. 2372 - Timber for cooling tower.

I.S. 2516 - A.C. circuit breakers.

I.S. 2592 - Recommendation for methods of measurement of fluid flow by means of orifice plates and nozzles

I.S. 3589 - Electrically welded steel pipes for water gas and sea gauge

I.S. 3624 - Bourden tube pressure and vacuum gauges

I.S. 4047 - Heavy duty air break switches and fuses for voltages not exceeding 1000 volts.

I.S. 6392 - Steel pipe flanges

I.S. 7403 - Code of practice for selection of standard worm and helical gear boxes.

**Annexure -4 APPROVED MAKES:**

| **S.No.** | **Items** | **Acceptable Makes** |
| --- | --- | --- |
| 1 | Air Handling Units (Indoor & Outdoor) | Zeco/System air / VTS |
| 2 | VFD | Danfoss/Seimens /Schneider/ABB/Allen Bradlly |
| 3 | Heat Pipe | SPC |
| 4 | Fine filter | Thermadyne/AAF |
| 5 | Hepa filter | Thermadyne/AAF |
| 6 | Heater | Daspass/ Escorts |
| 7 | Thermostat for FCU/ AHU | Honey Well/ Siemens |
| 8 | Humidistat | Honey Well/ Danfoss/ Siemens |
| 9 | GI Pipes | Jindal / TATA |
| 10 | M.S / SS Pipes | Jindal / TATA |
| 11 | PVC/HDPE Pipes | George Fischer/Astral/Prime/SFMC/ Jindal / TATA |
| 12 | Butterfly Valves | Audco/Honeywell/Advance/SKS |
| 13 | Y strainer | Sant/RB/Emerald/VTM/ lehry |
| 14 | Pressure gauge/Thermometer | H.Guru/ Feibing |
| 15 | AUTO AIR VENTS | Anergy/ Sant |
| 16 | 3 Way Motorized Valve | Honey Well/ Siemens |
| 17 | Factory fabricated Ducting | Rolarstar/ zeco |
| 18 | Flexible duct | Seven star/ flaktwood |
| 19 | Grills and diffusers | Dynacraft/ Air flow/N air systems / SYSTEM AIR/ Ruskin Titus / Caryaire/COSMIC |
| 20 | Duct insulation(Thermal & acoustic) | Armaflex/ Kflex |
| 21 | Ducting support | Gripple hangers |
| 22 | Duct Dampers | Caryaire / System air/Pineair/Airflow |
| 23 | Fire Damper | Caryaire/ Ravistar/ Air master /Dynacraft/ N air systems |
| 24 | Power Cables | Universal / CCI / Polycab |
| 25 | Push button starter | Siemens / Tecknik / Schneider |
| 26 | Auxiliary Relays /Contactors | Oen / Omran / Ply |
| 27 | Line Type Fuse | Schneider / Siemens/ L & T |
| 28 | Indicating lamps | Siemens / Tecknik / Schneider |
| 29 | Selector switches | Siemens / Salzer / Kaycee |
| 30 | ACBMCCB | ABB / Schneider / L&T |
| 31 | Contactors | Siemens/ Schneider/ ABB/ L & T |
| 32 | Over Load Relays | Siemens/ Schneider/ ABB/ L & T |
| 33 | Meters | Enercon/ L&T / Automatic Electric |
| 34 | Contactor | Siemens/ Schneider/ L & T |
| 35 | DP Switches | Honeywell/Siemen/Beck |
| 36 | Communication Cable | Finolex / Skytone / Fusion Polymers / Delton |
| 37 | Control Cable | Finolex / Skytone / Fusion Polymers / Delton |
| 38 | FRLS PVC Conduit | Avon Plast / BEC / Precision / Life Guard/ IS Approved |
| 39 | Cameras | Pelco / Honeywell / Siemens / GE |
| 40 | Digital Video Recorder | Pelco / Honeywell / Siemens / GE. |
| 41 | Batteries | Hitachi / GS / Batteries / |
| 42 | Switchgear | Siemens |
| 43 | MCB/MCBDB | Legrand/ABB/SCHNEIDER/SIEMENS |
| 44 | Modular Switches | Legrand |
| 45 | Industrial Plung& Socket | Legrand |
| 46 | Luminaire&Lamps | Philips/WIPRO/CG |
| 47 | FDA Control Panel | Honeywell/schneider |
| 48 | Detectors | Honeywell/schneider |
| 49 | Return Air Motorized Dampers | Caryaire/Ravistar/Airflow |
| 50 | Fresh Air intake louvers | Caryaire/Ravistar/Airflow |
| 51 | Clean room – wall Panel/Ceiling panel/Doors etc. | GMP Technical / Plus Ventilation |

All other makes should required prior approval from the HLL.

**SECTION VI**

**QUALIFICATION CRITERIA**

1. The tenderer should have minimum 2years experience in the relevant field. ( Documentary evidence should be submitted)
2. The tenderer should have completed at least three jobs similar in nature in single contracts during the last 5 years. ( Documentary evidence like Purchase orders & completion certificates should be submitted)
3. Average annual financial turnover of the bidder during the last 2 years, ending 31st March of the previous financial year, should be furnished. (Documentary evidence should be submitted)
4. The tenderer should submit Earnest Money Deposit in the manner specified along with the tender document.
5. The duly signed acceptance form conforming that All terms & conditions, technical specifications, volume of supply are understood by the bidder .Certificate that bid is in total conformity with the specifications and terms and conditions mentioned in the bid document and certificate on period of validity (sheet enclosed)
6. Deviation if any, giving reasons for the deviation.

Note:

1. ‘*Similar work’ shall mean preferably the Supply, erection, validation & commissioning of Clean rooms. Certificate of satisfactory completion of work obtained from an officer not below the rank of an executive engineer in the case of Government departments or from an officer of equivalent position in the case of other organization shall be produced. The certificate will clearly indicate the name of item supplied, period during which completed (giving date of commencement and date of completion of cost of supply). The certificate should bear the name, signature and seal of the officer. In the absence of such a certificate the tender may not be considered.*
2. *The bidder should furnish Registration Certificate and Certificate of Incorporation.*
3. *Bidders shall invariably furnish documentary evidence (Client’s Certificate/installation report) in support of the satisfactory operation of the equipment as specified above.*
4. *The bidder should furnish the copy of Audited balance sheet in proof of financial strength.*
5. *Conditional Bid will be summarily rejected*

**SECTION VII**

### APPLICATION FOR PREQUALIFICATION

(General information of the contractor)

**SUPPLY, ERECTION, VALIDATION & COMMISSIONING OF CLASS 10000 CLEANS ROOM**

A. Name of Firm/Company :

1. Postal address :

2. Telephone No :

FAX :

E-Mail :

3. Year of commencement of Contract/

Year of establishment of firm/Company :

B. In the case of Firm

1. Whether proprietary of partnership firm:

2. Name of Managing partner :

3. Name of other partners :

Note: Attested copy of partnership deed to be enclosed

C. In the case of Company

1. Whether Private Limited or Public Limited

Company :

2. Name of Managing Director :

3. Name of other Directors :

Note: Attested copy of Company Registration need to be enclosed.

D. Are you a manufacturer, authorized Dealer or any :

other? If authorized agent,

A copy of the original letter from the

Manufacturer / Principal, duly attested,

Should be furnished conforming the agency

E. How many years have you been in the business :

Of Supply, erection, validation & commissioning

of Class 10000 clean room as per the HLL specification enclosed

F. What would be the minimum period required to :

deliver from the date of confirmed Purchase order?

G. Have you been a contractor / manufacturer, :

No. of major supplies of similar item supplied

successfully in India, specify. Enclose two

completion certificates from the client

certified that the similar item supplied

successfully. The client list shall be enclosed.

H. What is your :- :

a) CST No :

b) VAT NO /TIN NO :

c) Central Excise Registration No: :

d) PAN No

1. Name & Address of your Banker(s) :

J. Has the Contractor/Firm/Company ever been black :

listed by the Govt./or the registering authority.

1. if so, give the period and details.

K. Average annual financial turn over of the bidder during the last 2 years, ending 31st March of the previous financial year.

a. Annualized turnover of the Contractor/Firm/Company in the last 2 years ending 31.03.2016

1. 2014-2015: Rs
2. 2015-2016: Rs

(Bio data with willingness letters to be enclosed )

L. Acceptance Form

M. CERTIFICATE

I/We hereby certify that the details given in the application form is correct to the best of my/our knowledge. I /We have no objection in contacting any of our clients for reference.

Signature:

Place:

Date:Name and address of the bidder with seal:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DETAILS OF MAJOR WORK ORDER SUCCESSFULLY EXECUTED BY THE TENDERER AS PRIME CONTRACTOR DURING THE LAST 5 YEARS** | | | | |
| Sl. No. | Name of Client with full address, telephone numbers and nature of item supplied | Details of item supplied | Value of Contract (in lakhs) | Period of Completion with dates  (in months) |
|  |  |  |  |  |

#### SIGNATURE OF BIDDER WITH SEAL

#### \

|  |  |  |  |
| --- | --- | --- | --- |
| **DETAILS OF ONGOING PURCHASE ORDERS OF SIMILAR NATURE** | | | |
| Sl. No. | Name of Client with full address, telephone numbers and nature of item | Description of work | Value of purchase order  (in lakhs) |
|  |  |  |  |

**SIGNATURE OF BIDDER WITH SEAL**

### SECTION VIII

### ACCEPTANCE FORM

(To be submitted in the letter head of the firm indicating full name and address, telephone & fax numbers etc.)

From

To

**Jt.General Manager (Materials)**

**HLL Lifecare Limited**

**(A Government of India Enterprise),**

**AKKULAM FACTORY, Sreekariam, Thiruvananthapuram – 695017,**

**Ph: (++91 471) 2442641, 2442642, 2445930**

**E-mail: materialsaft@lifecarehll.com**

Dear Sir,

I / We, hereby offer to supply as detailed in schedule hereto or such portion thereof as you may specify in the acceptance of Bid at the price given in the price bid and agree to hold this offer open for one year from the date of bid opening prescribed by the HLL. I/We have understood the terms and conditions mentioned in the invitation for bid and Conditions of Contract furnished by you and have thoroughly examined the specifications quoted in the bid document hereto and are fully aware of the nature of the scope of supply of item required and my/our offer is to comply strictly in accordance with the requirement and the terms and conditions mentioned above.

The following pages have been added to and form part of this bid.

Yours faithfully,

#### SIGNATURE OF THE BIDDERWITH SEAL

**SECTION IX**

INDEMNITY CLAUSE:

If the supplier fails to execute the order within the time prescribed for the delivery of goods ordered or violates or infringes the existing rates as agreed to as mentioned in the supply order, the supplier shall and will indemnify the company against all loses or damages whatsoever to be incurred or sustained including the legal cost or expenses incurred by the company by reason of non-delivery of goods at agreed quantity and rate within the time specified in the supply order. The company will initiate legal action if the supplier fails to execute the supply order as per the schedule in the supply order for the actual loss suffered. No quantity tolerance will be permitted in this regard unless otherwise prior approval is taken by the company before dispatching any excess quantity supplied which shall be returned back on freight to pay basis at the risk of the supplier. Responsiveness of the Bid shall be at the discretion of HLL.

The supplier shall have no right to change the quantity stipulated in the supply order.

Bid pronounced Non Responsive by HLL shall be summarily rejected.

The decision of HLL will be final and no correspondence of this shall be entertained.

We have read and understood the above conditions and agree to abide by the same.

PLACE: NAME AND SIGNATURE OF THE BIDDER

DATE: (WITH OFFICE SEAL)

**SECTION X**

### DECLARATION

We confirm having read and understood all the specifications, instructions, forms, terms and conditions and other requirements of the above tender (both expressed and implied) in full and that we agree to abide by all without any deviation.

SEAL OF THE BIDDER SIGNATURE

NAME AND ADDRESS OF BIDDER

**SECTION XI**

**CONTRACT AGREEMENT**

**(DRAFT)**

**(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)**

**CONTRACT AGREEMENT FOR THE WORK OF ----------------------------------------DATED--------- Between M/s------------------------------------------------------ hereinafter called the contractor (which term shall unless excluded by or repugnant to be subject or context include its successors and permitted assigns) of the one part**

**AND**

**HLL Lifecare Limited hereinafter called the HLL (which term shall unless excluded by or repugnant to the subject or context include its successes and assigns) of the other part.**

WHEREAS

* 1. The HLL is desirous that the supply, erection, commissioning and validation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ at \_\_\_\_\_\_\_\_\_\_ should be executed as mentioned, enumerated or referred to in the tender document vide tender no. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ including:
     1. Notice Inviting Tender,
     2. General Conditions of the Contract
     3. Special Conditions of the Contract,
     4. Schedule of Quantities and Rates
     5. Agreed Variations
     6. Tender Form, Manufacturer’s Authorization Form/s (if any)
     7. other documents, as called for in the Tender.
  2. The contractor has inspected the site and surroundings of the work specified in the tender documents and has satisfied himself by carefully examination before submitting his tender as to the form and nature of the site and local conditions the quantities, nature and magnitude of the work the availability of labour and materials necessary for the execution of work, the means of access to site, the supply of power and water thereto and the accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and things referred to or implied in the tender documents or having any connection therewith, and has considered the nature and extent of all the probable and possible situations, delays, hindrances or interferences to or with the execution and completion of the work to be carried out under the contract, and has examined and considered all other matters, conditions and things and probable and possible contingencies, and generally all matters incidental thereto and ancillary thereof affecting the execution and completion of the work and which might have influenced him in making his tender.

AND WHEREAS

HLL accepted the offer of M/s ----------------------------------------- (Contractor) for the supply, erection, commissioning and validation of ----------------------------------------------- at ---------------and conveyed vide letter No.--------------------------dated --------------at the rates stated in the Bill of quantities for the work and accepted by HLL (hereinafter called the Schedule of Rates) upon the terms and subject to the conditions of the contract.

**NOW THIS AGREEMENT WITNESSTH & IT IS HEREBY AGREED AND DECLARED AS FOLLOWS.**

1. In consideration of the payment to be made to the contract for the work to be executed by him, the contractor hereby covenant with HLL that the contractor shall and will duly provide, execute, complete and maintain the said work and shall do and perform all other acts and things in the contract mentioned or described or which are to be implied and there-from or may be reasonably necessary for the completion of the said works and at the said times and in the manner and subject to the terms and conditions or stipulations mentioned in the contract, AND
2. In consideration of the due provisions execution, completion and maintenance of the said work, the HLL does hereby agree with the contractor that HLL will pay to contractor the respective amounts for the work actually done by him and approved by HLL at the Schedule or Rates and such other sum payable to the contractor under provision of the contract, such payment to be made at such time in such manner as prescribed for in the contract.

It is specifically and distinctly understood and agreed between HLL and the contractor that the contractor shall have no right, title or interest in the site made available by HLL for execution of the works or in the building, structures or works executed on the said site by the contractor or in the goods, articles, materials, etc. brought on the said site (unless the same specifically belongs to the contractor) and the contractor shall not have or deemed to have any lien whatsoever charge for unpaid bills will not be entitled to assume or retain possession or control of the site or structures and HLL shall have an absolute and unfettered right to take full possession of site and to remove the contractor, their servants, agents and materials belonging to the contractor and lying on the site.

In Witness whereof the parties hereto have here-into set their respective hands and seals in the day and the year first above written.

|  |  |  |
| --- | --- | --- |
| Signed and delivered for and  on behalf of HLL | | Signature and delivered for  and on behalf of the contractor |
|  |  | |
| (HLL LIFECARE LIMITED) | (Contractor) | |
| OFFICIAL ADDRESS |  | |
| Date | Date | |
| Place | Place | |
| IN PRESENCE OF TWO WITNESSES | | |
| SIGNATURE | SIGNATURE | |
| NAME | NAME | |
| SIGNATURE | SIGNATURE | |
| NAME | NAME | |

**PART 2**

**SECTION XII**

**PRICE BID FORM**

To:

**HLL Lifecare Limited,**

**Akkulam Factory,**

**Sreekariam P.O.**

**Thiruvananthapuram - 17**

Dear Sir

Having examined the Bidding Documents including Addenda Nos......................, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to supply and erect...........................................(Description of Goods and Services) in conformity with the said Bidding Documents for the sum of.............................. (Total Bid amount in Words and Figures) or such other sums as may be ascertained in accordance with the BOQ with prices attached herewith and made part of this bid.

We agree to abide by price per unit mentioned in price schedule, for the bid validity period specified in the bid document and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period.

Until a formal final contract is prepared and executed between us, this bid, together with your written acceptance of the bid and your notification of award, shall constitute a binding Contract between us. We understand that you are not bound to accept the lowest or any bid you may receive.

We confirm that we comply with the eligibility requirements as per ITB Clause 1 of the bidding documents.

Dated this ....... day of ............................ 20 ......

*(signature)*

*(in the capacity of) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Duly authorized to sign Bid for and on behalf of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**BILL OF QUANTITY**

**Please find annexure I**

|  |  |  |  |
| --- | --- | --- | --- |
| **BOQ - SUMMARY** | | | |
| SL NO | Description | Total Amount Supply(INR) | Total Amount Installation (INR) |
| PART 1 | HVAC SYSTEM |  |  |
| PART 2 | MODULAR |  |  |
| PART 3 | ELECTRICAL, COMMUNICATION & SECURITY SYSTEM |  |  |
| PART 4 | CIVIL WORKS |  |  |
| PART 5 | MISCELLANEOUS WORK |  |  |
| **TOTAL AMOUNT (BASIC)** | |  |  |
| **GRAND TOTAL (INCLUDING TAXES)** | |  |  |

VALIDITY: ONE YEAR FROM THE DATE OF OPENING OF PRICE BID

Conditions:

1. The party has to quote as per schedule.
2. **Before quoting, the party has to visit the site and clear all doubts with the officials of Project Department.**
3. After work, the party has to clean all the debris and waste materials and transfer the same to scrap yard.
4. After completion of the work bill to be submitted in duplicate based on the joint measurement.
5. Safety work permit has to be taken before starting the work.

The proof of remittance of PF & ESI charges to be submitted to HLL, otherwise statutory levies such as ESI, PFetc will be deducted from contractors bill as per rules.

Bidders shall have registration under Kerala VAT and shall produce necessary certificate from Kerala VATauthorityfor deduction at specified rate/non deduction of WCT, if any applicable under Kerala VAT.

In case the bidder do not have Kerala VAT registration WCT @ 10% as per Kerala VAT rules will be deducted from total contract value

Bidder shall provide Excise Invoice (manufacturer invoice / dealer invoice) for excisable goods under supply schedule

Statutory levies if any :

Any other Remark (s) :

NAME OF TENDERER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Place: ADDRESS AND SIGNATURE OF THE TENDERER Date: (WITH OFFICE SEAL)

**DRAWING OF NEW CLASS 10000 CLEAN ROOM**

* + - **Please find Annexure II**