

## Tender Details

**Tender No:** SCL/PS5/2018E0091101

**Tender Date:** 24/01/2018

**Purchase Entity:** Pur\_Entity5

## Tender Notice

SEMI-CONDUCTOR LABORATORYE-procurement Tender no. SCL/PS5/2018E0091101, SEMI CONDUCTOR LABORATORY (SCL) invites ONLINE offers in TWO part system through e-tender portal <https://eprocure.isro.gov.in> for Supply Installation, Testing and Commissioning of Chillers, Air Handling Units, Split and Cassette AC Piping, ducting, insulation etc. for Air conditioning of Auditorium as per Technical Specifications and drawings enclosed.

Tender Documents can be downloaded from 25.01.2018 hrs.1401 to 26.02.2018 up to 1030 hrs. The vendors need to get enrolled in the e-tender portal to access tender and submit their offer online. Vendors need to have Digital Signature Certificate as detailed on our e-portal and corporate e-mail ID to register on the above portal. Only online tenders will be accepted. No Manual/Postal/courier/ e-mail/fax tender will be entertained. Please note Tender fee shall not be applicable for tenders submitted on-line through this portal.

A Pre-bid conference shall be held with the prospective bidders at SCL on 15.02.2018 from 14.00 hours (IST) onwards to clarify issues regarding the specifications and other associated technical details of the subject procurement. The prospective bidders must, therefore, ensure that they or their authorized representatives attend the said pre-bid conference at SCL as per the given schedule. In order to enable

meaningful discussions in the Pre-bid conference, the prospective Bidders are requested to list the queries/clarifications planned to be sought by them on this Tender in the Pre-bid conference, and send us the said Queries in advance to reach us at least two days before the Pre-bid Conference.

Before submitting the bids, all prospective bidders are requested to go through the minutes of proceeding of the pre-bid conference which shall be placed at our website and take the same into account while submitting the bids.

Please note that Tender of a firm who has not attended the Pre-bid conference shall be disqualified.

Vendors interested to participate in this e-Tender are required to register themselves as vendors, if not already registered, in our e-procurement portal <https://eprocure.isro.gov.in> by downloading plugins and help demos listed on the home page of the e procurement link mentioned above to complete the vendor registration process. They can seek help from help desk 0091-20-25315555/9167969601 (Email:support.isro@nextenders.com) also the home page of e procurement portal may be accessed for any technical help for registration and subsequent process. Vendors may please note that without registering in our E-procurement portal they will not be able to quote for this tender.

## **Tender Attachments**

### **Technical Write-up/Drawings**

#### **Attachment - I:**

IDT0015650000000000isro05401.pdf

#### **Attachment - II:**

IDT0015650000000000isro05402.pdf

#### **Attachment - III:**

IDT0015650000000000isro05403.pdf

#### **Attachment - IV:**

#### **Attachment - V:**

### **Instructions to Tenderers (PT)**

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Instructions to Tenders (PT)1. Interested tenderers may, at their option, login to <http://eprocure.isro.gov.in> and submit offers as per details of notification

2. This being a two part tender - Technical and Commercial part separate, the Technical part should not contain Pricing information. The tenders containing Price details in Technical part will be treated as unsolicited offers and rejected.

#### **3. Eligibility Criteria:**

Bidder shall meet the following criteria to qualify for submitting the bid: Only those parties/ Firms/Contractors/vendors who have successfully executed at least two (02) Similar installations in the last five (5) years, each involving S/I/T/C of (i) High end side of AC system i.e Chiller(s) of total capacity not less than 60 TR, (ii) low and side of AC system i.e. AHU(s) of capacity not less than 20,000 CFM including ducting, piping and associated electrical works and (iii) Cassette type/ Ductable split AC units of total capacity not less than 50 TR, are eligible to participate in the tender.

Necessary documents i.e duly certified copies of order (purchase order/work orders) and completion certificates from the respective clients in support of the fulfilment of the above mentioned eligibility criteria shall be submitted with the Technical and un-priced bid.

4. A Pre-bid conference shall be held with the prospective bidders as per schedule given in the Tender Notification at Semi-Conductor Laboratory, S.A.S. Nagar (Mohali), Punjab, India to clarify issues regarding the specifications and other associated technical details of the subject procurement. The prospective bidders must, therefore, ensure that they or their authorized representatives attend the said pre-bid meeting at SCL as per the given schedule.

In order to enable meaningful discussions in the Pre-bid conference, the prospective Bidders are requested to list the queries/clarifications planned to be sought by them on this Tender in the Pre-bid conference, in a Query Sheet and send us the said Query Sheet over email address [hps@scl.gov.in](mailto:hps@scl.gov.in) / [nks@scl.gov.in](mailto:nks@scl.gov.in) in advance to reach us at least two days before the Pre-bid Conference. Foreign bidders (in case visit of foreign national is for more than one day) to intimate their willingness to attend the Pre-bid conference at least 10 days in advance in the prescribed standard format at the e-mail ids given above.

In the event, the Foreign bidder unable to attend the Pre-bid conference physically and do not have establishments/representative in india . SCL may arrange Pre-bid conference through Video conference/Skype. The vendor shall inform 10 days in advance to SCL, the points to be discussed in pre-bid conference.

Please note that Tender of a firm who has not attended the Pre-bid conference shall be disqualified.

5. Request for the extension of the due date will not be considered.

6. SCL reserves the right to accept or reject any / or all the tenders in part or full without assigning any reasons thereof. The bidder is at liberty to seek information related to bidding conditions, bidding process and/or rejection of its bid.

7. In this tender either the Indian Agent on behalf of the Principal/OEM or the Principal/OEM itself can bid, but both cannot bid simultaneously for the same item. Indian agents while quoting on behalf of their principals shall provide necessary latest authorization letter obtained from their Principals/Manufacturers in their bid.

8. If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the tender for the same item. If submitted, all offers submitted by the said agent shall be excluded from the procurement process.

09. The tenders of vendors who have not agreed to furnish Security Deposit or Performance Bank Guarantee as sought vide this tender shall be excluded from the procurement process.

10. The tenders of bidders where the validity of the tender is shorter than the period specified in the tender enquiry shall be excluded from the procurement process.

11. Late tenders, delayed tenders, fax quotations and e-mail quotations are not considered.

Bids submitted other than EGPS mode shall not be considered.

12. SCL reserves the right to verify all claims made by the bidder.

13. SCL reserves the right to change any milestone date of the tendering activity / tender schedule.

14. Tender which is not submitted in terms of instructions mentioned herein is liable to be rejected.

15. If tender opening date happens to be a public holiday, tender will be opened on the next working day and interested bidders may depute their representatives to attend the Tender Opening, with proper authorization.

16. The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portions of the quantity offered and the tenderers shall supply the same at the rates quoted.

17. It is expressly agreed that the acceptance of the Stores Contracted for is subject to final approval in writing by the Purchaser.

18. It is to be noted that the drawings, specifications, end-use, etc., given by the purchaser, are confidential and shall not be disclosed to any third party.

19. Prices are required to be quoted according to the units indicated in the tender. When quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished.

20. The quote should indicate quantity wise unit rate separately which have to be filled online. The Prices are to be mentioned both in figures as well as in words. The taxes, duties etc. are to be calculated and indicated in the column provided in online forms explicitly.

21. Bidders are expected to comply with commercial and other terms and conditions given in vendor specified terms of this tender. In case of any deviation, the reasons thereof should be clearly specified in the vendor specified terms column.

22. All available technical literature, catalogues and other data in support of the specifications and details of the items should be furnished along with the offer.

23. Samples, if called for, should be submitted free of all charges by the tenderer and the Purchaser shall not be responsible for any loss or damage thereof due to any reason whatsoever. In the event of non-acceptance of tender, the tenderer will have to remove the samples at his own expense.

24. Specifications: Stores offered should strictly confirm to our specifications. Deviations, if any, should be clearly indicated by the tenderer in his bid. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples, wherever necessary, along with the quotations. Test Certificates, wherever necessary, should be forwarded along with

supplies. Wherever options have been called for in our specifications, the tenderer should address all such options. Wherever specifically mentioned by us, the tenderer could suggest changes to specifications with appropriate response for the same.

25. The tenderer should provide, the name of his bankers as well as the latest Income-Tax clearance certificate duly countersigned by the Income-Tax Officer of the Circle concerned under the seal of his office, if required by the Purchaser during evaluation of tender.

26. Approximate net and gross weight of the items offered shall be indicated in your offer. If dimensional details are available the same should also be indicated in your offer.

27. Subletting and Assignment: The contractor/supplier cannot sublet, transfer or assign the order/Contract or any part thereof or interests therein or benefit or advantage thereof in any manner whatsoever, to any other party save with the previous written consent of the purchaser. Such consent by the purchaser, however, shall not relieve or discharge the contractor/supplier from any obligation, duty or responsibility under the Purchase Order/ Contract.

28. The contractor/supplier shall indemnify the purchaser against Workmen Compensation Act.

29. The authority of the person submitting the tender, if called for, should be produced.

30. The bids shall be opened as per schedule indicated in the Tender in the presence of the bidders/their authorized representatives who may like to attend the tender opening against presentation of Authorization letter. Due to any breakdown in server/link, bid opening will be continued on the following dates.

The schedule of opening of Price bids shall be intimated separately to the technically qualified bidders only.

#### 31. PROCEDURE FOR EVALUATION OF TENDERS:

##### Technical Evaluation Criteria:

Vendor meeting the eligibility criteria and basic technical specifications mentioned in SCL Tender shall be considered to be technically qualified.

##### Evaluation of Price Bids

The following elements shall be considered for evaluation of Priced Commercial offer:

a. Price quoted by the bidder in the price bid template for meeting the functionalities given in the Tender and Technical Specifications sheet. Bid shall be evaluated on overall cost basis. b. Charges for installation, testing and commissioning if any in case quoted separately.

c. Compliance with the Payment Terms prescribed in this tender document. In the event, the bidder offers Payment Terms stringent than SCL prescribed Payment Terms, the bid of the bidder shall be loaded based on Base Rate of SBI prevailing on the date of opening of price bids.

d. In the event of the bidder seeking a Confirmed Letter of Credit, the bidders bid shall be loaded at the rate 0.5 percent of the LC value towards confirmation charges.

e. In the event of the bidder requiring SCL to bear bank charges outside India (foreign bank charges), the bidders bid shall be loaded at the rate 0.5percent of the LC value towards bank charges outside India.

32. The bid should contain the following information:-

a. Agency Commission: Bidders are required to provide the following information in respect of their authorised Indian Agent, if any, alongwith technical bid as the same is mandatory as is required for consideration of the bid. Name, Address, Telephone no. , fax no., email of the Indian Agent including the contact person. A letter from the Manufacturer/supplier in the current date certifying that the said Indian Agent is their authorised Indian Agent and also indicating the responsibilities/role of the Indian Agent under the proposed purchase. Renumeration/service charges payable to the Indian Agent under the proposed purchase. The amount of agency commission included in the price and payable to Indian Agent of the contractor shall be paid directly to the Indian Agents by the Purchasers in equivalent in Indian rupees on the basis of an invoice from him applying TT buying rate of exchange ruling on the date of placement of the Purchase Order and which shall not be subject to any further exchange variations. The payment will be released to the Indian Agents within 30 days from the date of acceptance of the goods.

b. Details of any technical service, if required for erection, assembly, commissioning and demonstration.

33. The FOB/FCA prices quoted should be inclusive of all taxes, levies, duties arising in the tenderer country.

34. The details of Import License will be furnished in the Purchase Order.

35. Instruction/operation manual containing all assembly details including wiring diagrams should be sent wherever necessary in duplicate. All documents/correspondence should be in English Language only.

36. Part shipment is not allowed unless specifically agreed to by us.

37. As far as possible, stores should be dispatched by Indian Flagged Vessels/ Air India or through any Agency nominated by us.

## Bid Templates

### Scope of Work and Eligibility Criteria

#### Item Specifications

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	Scope of work: The scope of work involves Design, Supply, Installation, Testing and Commissioning of complete AC system including chilled water system on High side and normal AC system on low side for Auditorium. The other areas shall be provided with split AC units.			
2	The inside conditions for Auditorium shall be maintained at 23 +/- 2 Deg C and RH of less than 60 percent. And for AC areas, comfort conditions shall be maintained.			
3	ELIGIBILITY CRITERIA Only those parties/ firms/contractors/ vendors who have successfully executed at least two (02) similar installations in the last five (5) years, each involving S/I/T/C of (i) High end side			



	<p>of AC system i.e. Chiller(s) of total capacity not less than 60 TR, (ii) low end side of AC system i.e. AHU(s) of capacity not less than 20,000 CFM including ducting, piping and associated electrical works and (iii) Cassette type /Ductable split AC units of total capacity not less than 50 TR, are eligible to participate in the tender. Necessary documents i.e. duly certified copies of orders (Purchase orders/work orders) and completion certificates from the respective clients in support of the fulfilment of the above mentioned eligibility criteria shall be submitted with the Technical &amp; un-priced bid.</p>			
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**Part A - High side of AC system**

**Item Specifications - I**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	1. Design, supply, installation, commissioning and testing of factory assembled, microprocessor controlled air-cooled, scroll chiller packages of minimum			

	<p>capacity of 36TR (108000 Kcal/hr). The chiller package shall house multiple compressors. The leaving water temperature from the chiller shall not exceed 7 Deg C when entering water temperature is 12 Deg C.Each package chiller will comprise of the following:</p>			
2	<p>a) Semi hermetic/hermetic compressors operating on eco-friendly refrigerants such as R134a/407c/410a complete with controls and accessories, crankcase heaters, automatic modulating capacity control, suction and discharge ports, forced feed lubrication system with oil separator, acoustic enclosure etc. The motor shall be refrigerant cooled in case of semi-hermetic/hermetic type, and shall be of squirrel cage type.</p>			
3	<p>b) Air-cooled condensers made of copper tubes mechanically expanded into aluminium fins,statically and dynamically balanced low noise condensor fans and motors.The condensor shall be complete with relief valve,purge valve,receiver of adequate</p>			

	storage capacity, shut-off valves etc. A dedicated controller with temperature probe to manage ON/OFF solenoid valve shall be provided.			
4	c) Shell and tube DX type/Flodded type chiller with steel shell and copper tube and complete with drain points. Chiller shall be insulated with 30 mm thick Nitrile rubber/cross linked polyethelene or equivalent faced with aluminium foil of minimum 200 micron thickness. Chiller shall be with suitable baffles and adequate tube surface area and complete with cooling and antifreeze thermostats. Antifreeze thermostat shall be factory set and sealed at 37 deg .F.			
5	d) Microprocessor based control centre unit in fully enclosed steel cabinet (IP 55 Protection) with power and safety operating controls in separate compartments and complete with monitoring facilities for suction/Discharge pressure, oil pressure, suction line super heat etc.			
6	e) Power supply panel (IP			

	55 protection) housing all main power connections, starters for compressors and condensers, factory wiring for compressors, condensers. For compressors, DOL/Star Delta starter shall be provided.			
7	f) Suitable capacity squirrel cage induction motor for compressor drive in case open type compressor is offered and the same shall be complete with DOL/Star Delta starter. Motor shall be suitable for continuous operation in ambient conditions of Chandigarh. Necessary space heaters shall be provided.			
8	g) MS Supporting framework for items mentioned above, suitable spring type vibration isolators shall be provided.			
9	h) Refrigerant piping made of copper with necessary controls such as TEV, Pilot operated solenoid valves to interconnect compressors, condensers and chiller. Liquid cum moisture indicators shall be provided and also strainer complete with bypass valves. Individual pilot solenoids shall be			

	provided wherever chiller consists of two refrigerant circuits.			
10	i) The entire package is proposed to be located on the ground. Necessary spring type vibration isolators shall be provided for the Units as a whole.			
11	j) Initial charge of refrigerant R134a/407c/410a and oil			
12	k) Detailed specifications of the chiller are enclosed as Annexure I. Party to provide compliance for all the specifications provided as Annexure I. Deviation(s) if any should be clearly brought out here.			
13	2) Design, supply, installation of suitable model chilled water pumpset of Inline type, running at 2900 rpm, driven by minimum 5 HP motor complete with base, star delta starter as specified elsewhere. The pump shall handle minimum 330 lpm of water against a head of minimum 25M. Pump shall be insulated with 30 mm thick Nitrile rubber/cross linked polyethelene or equivalent insulation faced with aluminium cladding minimum 24 SWG thick.			

	<p>The inline pump shall be vertical multistage centrifugal type with suction &amp; discharge ports at same level (In-line) enabling installation in horizontal one pipe system. The pump head and base are made of cast iron -all other wetted parts are made of stainless steel. Tenderer should take into account pressure drop in his equipment and pipes, and flow rate for which minimum specifications are indicated above.</p>			
14	<p>3) Painting of equipment and accessories indicated above with two coats of synthetic enamel paint of approved colour and as specified by Engineer-in-charge</p>			
15	<p>4) Supply &amp; installation of suitable GRP panel expansion tank as per attached specification of size 1.0 m x 1.0 m x 1.0m (1.0 cubic metre capacity) insulated with 40 mm thick polyurethane foam. All the joints shall be sealed by using sealant based on Virgin butyl rubber with polyester fibreglass lining on the 'V' grooves inside the tank for 100% sealing. The tank</p>			

	shall be with float valve, drain, overflow and make up connection. All hardware used should be hot dip galvanised. The tank should be suitable for chilled water application. The tank shall be located as shown in the tender drawing (Above AHU room)			
16	a) Detailed specifications of the expansion tank are enclosed as Annexure II. Party to provide compliance for all the specifications provided as Annexure I. Deviation(s) if any should be clearly brought out here.			
17	5) Chilled water Piping: Chilled water piping shall be comprising of the following:			
18	a) Pre-insulated/ insulated at site - chilled water and drain piping of MS class C pipes complete with all accessories and specials. The pipes shall be insulated with 50/30 mm thick puf insulation pipe sections with minimum density of 36 kg/cu.mtr. and compressive strength of 40 psi.			
19	b) The insulation shall completely fill the annular space between service			

	<p>pipe and jacket and shall be bonded to both.</p> <p>Insulation shall be done on a high pressure injection machine. Direction of flow shall be marked on the pipes.</p>			
20	<p>c) The piping shall include valves strainers, measuring instruments etc as indicated below. The piping shall be complete with suitable supports wherever required. After the pipes are installed &amp; pressure tested, the joints/fittings shall be insulated as per manufacturer's recommendations and complete as required.</p>			
21	<p>d) The outer jacket shall be 0.6 mm lock seam spiral GI for sizes up to 600 mm dia pipes.</p>			
22	<p>e) The pipes shall be rated Class 0 as per BS 476.</p>			
23	<p>f) The chilled water piping shall be complete with following: 100 mm and 80 mm dia MS class C pipe, 80 mm dia butterfly valve, 80 mm dia flexible pipe connector assembly, 80 mm dia non return valve, 80 mm dia Y strainer, 80 mm dia balancing cum flow measurement valve, Differential water pressure</p>			



	<p>switch, Dial type thermometer ,100mm dia pressure gauges ( with pet cock / gate valve ), Automatic Air vent, Drain plugs, Hand held Digital Manometer(Multi scale Differential Pressure Meter) of advance make or equivalent.</p>			
24	<p>Note: 1. Insulation for pipes from 40 mm to 150 mm dia will be with 30 mm thick pipe sections and pipes above 150 mm dia shall be with 50 mm thick pipe sections. For pipes of 32 mm dia and less, 25 mm thick pipe sections shall be used. Outdoor pipes shall be suitably supported from AC plant room to each AHU. Wooden/Steel/rubber pad supports for piping in Trench/vertical run etc shall be included in A/C vendor's offer. (Trench will be provided by department.)</p>			
25	<p>Note: 2. The pre-insulated/insulated at site pipe shall run to the expansion tank from the main chilled water return line running at highest level.</p>			
26	6)Electrical works			

	<p>comprising of supply, installation, testing and commissioning of complete power system supply and control system for the satisfactory operation of the A/C plant. Sub-panels shall be provided in AHU room as indicated elsewhere. The electrical work shall be comprising of following:</p>			
27	<p>a) Panel: Electrical panel for AC plant room/ pump room power supply catering to 2 Nos. Air cooled scroll chiller packages and 3 Nos. chilled water pumpsets. Panel shall be Indoor floor mounted cubicle, dead front type, main MV panel, dust and vermin proof, fully tropicalised construction, with 14 SWG CRCA sheet with necessary anti-corrosive treatment and powder coating of approved quality and colour. The panels shall be suitable for operation on 415V, 3 phase, 4 wire, 50 Hz AC supply complete with all interconnections and consisting of the following:</p>			
28	<p>i) Main incoming MCCB of rating as indicated in the SLD with 36 kA symmetrical breaking</p>			

	capacity, earth leakage protection, micro processor based release and having door interlocking facility.			
29	ii) Metering: Digital Multi-function meter with CTs of suitable range as indicated elsewhere/SLD, Phase indication lamps with fuse and control			
30	Multi-function meter shall be of digital type and possess the following features:-a) Shall be of size 96 x 96mm b) Display shall be LCD c) Record and read voltage, current, frequency, power factor active power (P), reactive power (Q), apparent power (S) & THD. d) AC/DC auxiliary supply e) Real-time clock (RTC) f) Facility to read individual harmonic up to 21st order g) Shall have four outputs/ports: RS 485, analog, digital and pulse h) Protection class of meter shall be IP 65			

**Part A - High side of AC system (Continue)**

**Item Specifications -II**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
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31	iii) TPN Aluminum, bus bar of suitable capacity, mounted on non-hygroscopic, glass fibre reinforced insulators			
32	iv) Outgoing MCCBs of suitable capacity along with starters (DOL/Star delta as applicable) contactors, O/L relay, single phase preventors as applicable for motors of compressors, air cooled/water cooled condensers and chilled water pumps.			
33	v) Electrolytic GI wire/strip on either sides of the panel of sizes as indicated in SLD including supply and fixing using MS/Aluminium spacers, saddles, welding with all fixing materials required when laid inside the building, including excavation & refilling of earth when laid outside the building and tinning of all the joints & terminations interconnections with earth pit and equipment, terminations/ interconnections in an approved manner as per IS 3043 (with latest amendments) including supply of all hardwares			

	complete as required.			
34	vi) Surge Protection Device (SPD) of type -1 100kA (3P+1)			
35	vii) 20A 4 pole MCB for protection to SPD			
36	viii) Earth leakage Relay (ELR) for the Incomer settable upto 2A.			
37	b) Suitable power factor improvement capacitors shall be provided for compressor motors, pump motors, condensor fan motors to improve and maintain a power factor of not less than 0.95 at any time. Capacitors will be located near the motors they serve. All the capacitors shall be tested as per IS:2834 and shall be complete with necessary discharge and protective devices and interconnections, earthing, cabling etc. and complete as required.			
38	c) Cabling and End terminations:i) Supply and laying of 1.1 kV, XLPE insulated, overall sheathed, stranded Aluminium/copper conductor, flat steel strip/ wire armoured cables conforming to IS 7098: Part I (with latest			

	<p>amendments), complete as required. The cable shall bear ISI certification mark. The size and rating of the cabling shall be as indicated in the SLD.</p> <p>Cables shall be laid in cable trays of suitable size and shall include all necessary materials such as brackets, clamps, MS spacers complete as required and directed by EIC.</p>			
39	<p>ii) End terminations for 1.1 kV, XLPE insulated armoured Aluminium/ copper conductor cables of size/rating as indicated in the SLD including supply of cable gland, lugs, neoprene bushes, other materials and tools required complete with terminal connections, earthing of glands, complete as required and directed by EIC.</p>			
40	<p>iii) Necessary cabling/wiring is to be provided for all control circuits in between panels, all equipment and remote control/monitoring panel. All indoor cabling/control wiring shall be run in cable trays. Exposed wiring shall be routed through MS Box sections.</p>			

41	Notes for electrical panel works:1. Fire and corrosion resistant coating shall be applied in two coats with necessary primer			
42	2. Fire retardant DMC/SMC fillings for opening around bus-bar near the sectional barriers and Door interlocking facility for all compartments.			
43	3. Facilities in the terminals to have direct termination with aluminium/copper cables. All terminations shall be made with proper lugs in the approved manner.			
44	4. Shall have high mechanical strength			
45	5. Shall be mountable in any position in vertical plane for operation and suitable for horizontal expansion in the future			
46	6. Surface treatment to panel, frame and all steel parts of the panel shall be carried out through seven tank process			
47	7. After surface treatment, panel shall be painted through powder coating process with two coats of zinc chromate primer and			

	two coats of powder painting			
48	8. Neutral link of full rating shall be provided for all incoming/ outgoing feeders			
49	9. All MCCBs shall be with microprocessor release compatible for integration with SCADA/BMS.			
50	10. All exposed cables laid in trench /wall/ceiling/floor/trusses shall be provided with silicon based fire resistant coating compatible for PVC cables.			
51	11. All components, panels, cables etc., and panel fabrication shall conform to relevant IS Specifications and shall also be got approved by engineer in charge.			
52	12. Erection, testing and commissioning of the system and various components shall be done as per the releant IS Specifications.			
53	13. The electrical panel shall be got fabricated from approved manufacturers only. The list of approved panel manufacturers is enclosed.			



54	<p>NOTE: The single line diagram (SLD) indicating rating of switch gear type, cable size earthing scheme etc., is enclosed for reference. The rating of switch gear, cabling indicated in the schematic are tentative. However, the vendor shall submit the detailed SLD, General Arrangement drawings (GA) for the approval of Engineer-in-charge.</p>			
55	<p>7. Minor civil works like foundations/pedastals for Chiller packages, pumpsets etc. and cutting away and making good of openings in walls/ceiling etc for passage of pipes, ducts, cables, etc. complete as required. Wall brackets, angles, clamps etc as required for pipes, cables etc shall also be included in AC vendor's scope of work. Steel structural members like Channels, Beams etc required to mount the Chiller packages shall also be included in AC vendor's scope of work.</p>			

**Part B: Low side of AC System**

**Item Specifications -III**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	<p>1) Air Handling Unit (AHU) catering to Auditorium with following specifications:a) Design, supply, installation, commissioning and testing of 23±2 mm thick PUF insulated double skinned AHU of sectionalised sheet steel construction air handling unit of minimum capacity as indicated below and suitable for pumping air against a minimum static head as indicated and complete with fan section with DIDW centrifugal fan, coil section with cooling coil, face and bypass damper section with face and bypass damper with a provision for bypassing 30% of air around cooling coil, and filter section with 25 mm thick HDPE media filters.</p>			
2	<p>b) Technical parameters for AHU: The minimum number of rows, capacity, face velocity across the cooling coil etc.,shall be as indicated below:i) Min. Supply air qty - 40800 Cum/hrii) Dehumidified air qty- 40800 Cum/hriii) Capacity fo AHU motor - 15 HPiv) Minimum coil face area - 4.96 m2v)</p>			

	<p>Maximum coil face velocity - 137 mpmvi)</p> <p>Minimum number of rows - 04vii) No. of fins/meter - 480+/- 10 viii) Minimum cooling capacity of coil - 195000 kcal / hrix) ADP of cooling coil - 10 deg.C</p> <p>x) Static pressure - 50 mm of wg (minimum)</p>			
3	<p>c) The cooling coil shall be designed for EWT of 7.5 Deg C. The AHU shall be complete with drive motor as indicated below and with VFD as specified elsewhere and insulated drain pan and drain piping which shall be terminated at the drain point.</p>			
4	<p>d) Provision for belt adjustment shall be made available. The AHU shall be complete with cooling thermostat and interconnecting cables etc. as required.</p>			
5	<p>e) The recirculation AHU motor shall be suitable for VFD drive package specified elsewhere.</p>			
6	<p>f) Note : Brief Specification is enclosed as Annexure - III. Party to provide complaine for all the specifications provided as Annexure III. Deviation(s) if any should be clearly</p>			

	brought out here.			
7	2) Supply air Pre-fabricated ducting out of GSS confirming to latest IS:655 and complete with dampers, tab hangers, anchor fasteners, vanes, access door, frame work etc., and complete as required and as indicated below. GSS Sheet shall be grade 120 confirming to latest IS:277. All the entries into the facilites shall be provided with soft material all round at entry points of following thickness:i) 0.63 mm thickii) 0.8 mm thickiii) 1 mm thick			
8	3) Supply, installation and testing of galvanised steel construction volume control dampers within ducts to be provided with suitable ducts lever and quadrants for manual control of volume of air flow and for proper balancing of the air distribution.			
9	4) Supply air and return air Aluminium grilles/ diffusers with/without volume control dampers with necessary frame work etc. and complete as required including one coat of primer and two			

	coat of synthetic enamel paint of approved colour.			
10	a) SA grilles with VCD			
11	b) RA grilles without VCD			
12	5) Chilled water Piping: Chilled water piping shall be comprising of the following:a) Pre-insulated/ insulated at site - chilled water and drain piping of MS class C pipes complete with all accessories and specials. The pipes shall be insulated with 50/30 mm thick puf insulation pipe sections with minimum density of 36 kg/cu.mtr. and compressive strength of 40 psi.			
13	b) The insulation shall completely fill the annular space between service pipe and jacket and shall be bonded to both. Insulation shall be done on a high pressure injection machine. Direction of flow shall be marked on the pipes.			
14	c) The piping shall include valves strainers, measuring instruments etc as indicated below. The piping shall be complete with suitable supports wherever required. After the pipes are installed			

	&pressure tested, the joints/fittings shall be insulated as per manufacturer's recommendations and complete as required.			
15	d) The outer jacket shall be 0.6 mm lock seam spiral GI for sizes up to 600 mm dia pipes.			
16	e) The pipes shall be rated Class 0 as per BS 476.			
17	f) The chilled water line shall be complete with following:100 mm dia MS class C pipe, 80 mm dia MS class C pipe, 100 mm dia butterfly valve, 100 mm dia balancing cum flow measurement valve, 80 mm dia 3 way mixing valve with modulating motor and thermostat, 80 mm dia globe valve, 100 mm dia flexible pipe connectors, Dial type thermometer, 100 mm dia pressure gauges ( with pet cock / gate valve ), Automatic Air vents , Drain plugs.			
18	Note: 1. Insulation for pipes from 40 mm to 150 mm dia will be with 30 mm thick pipe sections and pipes above 150 mm dia shall be with 50 mm thick pipe sections. For pipes of 32 mm dia and			

	<p>less, 25 mm thick pipe sections shall be used. Outdoor pipes shall be suitably supported with Wooden/Steel/rubber pad supports for piping in Trench/vertical run etc shall be included in A/C vendor's offer. (Trench will be provided by department.)</p>			
19	<p>Note: 2. The pre-insulated pipe shall run to the expansion tank from the main chilled water return line running at highest level.</p>			
20	<p>6) Heating kit comprising strip heaters, safety thermostat, contactors including cabling and interconnections. The minimum capacity of strip heaters shall be as indicated below. The heaters should be arranged in three independently operating banks, in the main supply air duct at suitable location and complete as required. Strip heater capacity should cater for all seasonal variations and changes in equipment/product load from 0% to 100%. One bank shall be manually operated and other two banks on thermostat and</p>			

	<p>humidistat respectively.Heaters shall be connected in equal capacity across each phase.Auditorium AHU -12 kW (3 x 4kW)</p>			
21	<p>7) Stainless steel Panhumidifier kit of adequate capacity for seasonal operation comprising immersion heater, float valve assembly, inlet, make up and drain water connections, cabling and earthing etc. and complete as required with controls such as humidistat, geysersstat etc. Inlet pipe connections to panhumidifier from Dept. termination point:- GI class B of 20 mm dia of required length / as directed by EIC.</p>			
22	<p>8) Provision of motorised fire and smoke dampers in supply / return air duct / path of conditioned air in AHU room area. Testing of fire dampers shall be as per UL 555 and certified by CBRI.The dampers shall be complete with inbuilt temperature &amp; smoke sensors and the auxillary switch to trip the AHU &amp; close the damper simultaneously.These fire dampers shall also actuate</p>			



	in response to smoke detection sensor signal operating the shunt trip coil of the MCCB and thus closing the damper.			
23	9) Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers. The lowest louvers of the assembly shall extend out slightly to facilitate disposal of rain water without falling on the door / wall on which it is mounted and complete with all aluminium construction volume control dampers.			
24	10) Painting of all equipments and all the accessories indicated in this work with two coats of synthetic enamel paint of approved colour and as directed by Engr-in-charge.			
25	11) Thermal insulation of supply and return air ducting (Inside building) with 19 mm thick Physically crosslinked polyolefin foam insulation with factory laminated aluminium foil facing and self adhesive backing and with class 0 fire properties as per BS 476 and			

	<p>complete as required. The density of foam insulation shall be 25 kg per cu.mtr. and maximum thermal conductivity of 0.032 W/mK. All joints shall be butted firmly against each other and sealed with 120 mm wide strip of insulation material and covered with 75 mm reinforced aluminium foil tape.</p>			
26	<p>12) Supply &amp; Installation of duct silencers to be provided in SA and RA path. The silencers shall be designed to attenuate noise to meet NC-50 curve. Silencers shall consists of incombustible, inorganic, inert non-shedding glass fibre as acoustic fill to obtain sufficient density for the above noise reduction. Note: The area indicated above is the cross sectional area. The length of duct silencer shall be suitably designed and provided to meet NC-50 curve.</p>			
27	<p>13) Design, supply, installation and commissioning of Variable Frequency Drive (VFD) settable at required fixed speed for capacity as indicated below and other</p>			

	<p>switch gear suitable for 3Ph, 415V input supply, line choke etc, for controlling speed of centrifugal blower.</p> <p>Detailed specifications are as specified elsewhere in Annexure-IV.VFD package for AHU - 15 HP</p>			
28	<p>14) Electrical works comprising of supply, installation, testing, and commissioning of complete power system supply and control system for the satisfactory operation of the AHUs.</p> <p>The electrical work shall be comprising of following:a) Panel:Indoor floor mounted cubicle, dead front type, main MV panel, dust and vermin proof, fully tropicalised construction, with 14 SWG CRCA sheet with necessary anti-corrosive treatment and powder coating of approved quality and colour. The panels shall be suitable for operation on 415V, 3 phase, 4 wire, 50 Hz AC supply complete with all interconnections and consisting of the following:</p>			
29	<p>i) Main incoming MCCB of rating as indicated in the SLD with 36 kA symmetrical breaking</p>			

	capacity, earth leakage protection, micro processor based release and having door interlocking facility.			
30	ii) Metering: Digital Multi-function meter with CTs of suitable range as indicated elsewhere/SLD, Phase indication lamps with fuse and controlMulti-function meter shall be of digital type and possess the following features:-a) Shall be of size 96 x 96mm b) Display shall be LCDc) Record and read voltage, current, frequency, power factor active power (P), reactive power (Q), apparent power (S) & THD d) AC/DC auxiliary supplye) Real-time clock (RTC) f) Facility to read individual harmonic up to 21st orderg) Shall have four outputs/ports: RS 485, analog, digital and pulse h) Protection class of meter shall be IP 65			

**Part B: Low side of AC System (Continue)**

**Item Specifications -IV**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
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31	iii) TPN Aluminum, bus bar of suitable capacity, mounted on non-hygroscopic, glass fibre reinforced insulators			
32	iv) Outgoing MCCBs of suitable capacity along with starters (DOL/Star delta as applicable) contactors, O/L relay, single phase preventors as applicable for motors of compressors, air cooled/water cooled condensers and chilled water pumps.			
33	v) Electrolytic GI wire/strip on either sides of the panel of sizes as indicated in SLD including supply and fixing using MS/Aluminium spacers, saddles, welding with all fixing materials required when laid inside the building, including excavation & refilling of earth when laid outside the building and tinning of all the joints & terminations interconnections with earth pit and equipment, terminations/ interconnections in an approved manner as per IS 3043 (with latest amendments) including supply of all hardwares			

	complete as required.			
34	vi) Earth leakage Relay (ELR) for the Incomer settable upto 2A.			
35	b) Suitable power factor improvement capacitors shall be provided for compressor motors, pump motors, condensor fan motors to improve and maintain a power factor of not less than 0.95 at any time. Capacitors will be located near the motors they serve. All the capacitors shall be tested as per IS:2834 and shall be complete with necessary discharge and protective devices and interconnections, earthing, cabling etc. and complete as required.			
36	c) Cabling and End terminations:i) Supply and laying of 1.1 kV, XLPE insulated, overall sheathed, stranded Aluminium/copper conductor, flat steel strip/ wire armoured cables conforming to IS 7098: Part I (with latest amendments), complete as required. The cable shall bear ISI certification mark. The size and rating of the cabling shall be as indicated in the SLD.Cables			

	shall be laid in cable trays of suitable size and shall include all necessary materials such as brackets, clamps, MS spacers complete as required and directed by EIC.			
37	ii) End terminations for 1.1 kV, XLPE insulated armoured Aluminium/ copper conductor cables of size/rating as indicated in the SLD including supply of cable gland, lugs, neoprene bushes, other materials and tools required complete with terminal connections, earthing of glands, complete as required and directed by EIC.			
38	iii) Necessary cabling/wiring is to be provided for all control circuits in between panels, all equipment and remote control/monitoring panel. All indoor cabling/control wiring shall be run in cable trays. Exposed wiring shall be routed through MS Box sections.			
39	d) Earthing:Necessary earthing work comprising of earthing to electrical equipment / motors including standard pipe earth stations with 2.5m long, 38 mm dia GI pipe,			

	conforming to IS 3043 (with latest amendments) and as per SLD and including supply of all materials and providing chamber complete as required. Note: Pipe earth used for earthing shall be 'medium' class with ISI marking.			
40	Notes for electrical panel works:1. Fire and corrosion resistant coating shall be applied in two coats with necessary primer			
41	2. Fire retardant DMC/SMC fillings for opening around bus-bar near the sectional barriers and Door interlocking facility for all compartments.			
42	3. Facilities in the terminals to have direct termination with aluminium/copper cables. All terminations shall be made with proper lugs in the approved manner.			
43	4. Shall have high mechanical strength			
44	5. Shall be mountable in any position in vertical plane for operation and suitable for horizontal expansion in the future			



45	6. Surface treatment to panel, frame and all steel parts of the panel shall be carried out through seven tank process			
46	7. After surface treatment, panel shall be painted through powder coating process with two coats of zinc chromate primer and two coats of powder painting			
47	8. Neutral link of full rating shall be provided for all incoming/ outgoing feeders			
48	9. All MCCBs shall be with microprocessor release compatible for integration with SCADA/BMS.			
49	10. All exposed cables laid in trench /wall/ceiling/floor/trusses shall be provided with silicon based fire resistant coating compatible for PVC cables.			
50	11. All components, panels, cables etc., and panel fabrication shall conform to relevant IS Specifications and shall also be got approved by engineer in charge.			
51	12. Erection, testing and commissioning of the system and various			

	components shall be done as per the relevant IS Specifications.			
52	13. The electrical panel shall be got fabricated from approved manufacturers only. The list of approved panel manufacturers is enclosed.			
53	NOTE: The single line diagram (SLD) indicating rating of switch gear type, cable size earthing scheme etc., is enclosed for reference. The rating of switch gear, cabling indicated in the schematic are tentative. However, the vendor shall submit the detailed SLD, General Arrangement drawings (GA) for the approval of Engineer-in-charge.			
54	15) Minor civil works like foundations/ pedestals for air handling units and cutting away and making good of openings in walls/ceiling etc for passage of pipes, ducts, cables, etc. complete as required.			

**Part C : Ductable Split AC Units**

**Item Specifications -V**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	<p>1. Design, supply, installation, testing and commissioning of ductable split air conditioning unit of minimum capacity 8.3 TR and 3300 CFMs for conference hall. The unit shall be comprising of one number indoor and one number outdoor unit as described below. The unit shall be provided with R-22 or equivalent eco friendly refrigerant.</p>			
2	<p>a) Outdoor unit suitable for operation on 415 V, 3 Phase, 50 Hz AC supply and consisting of suitable number of hermetically sealed scroll compressors, propeller type fans, psc type fan motors, and air cooled condensers fabricated out of copper tubes and aluminium fins, all housed in powder coated sheet metal cabinets. Outdoor units shall be suitable for ambient conditions at Chandigarh. The noise level of outdoor unit shall not exceed 65 db at a distance of 1 m from the unit. Units with twin compressors can be offered.</p>			
3	<p>b) Indoor unit comprising</p>			

	<p>of DIDW forward curved centrifugal fan driven by suitable HP motor with multispeed control, synthetic media filter and copper tube aluminium finned evaporator coil of minimum 3 rows, all housed in a powder coated sheet metal cabinet. Capacity of air delivered by fan shall be as indicated below. Fan shall be selected for sufficient static pressure to overcome losses through equipment and duct. The entire unit shall be acoustically insulated with 25mm thick fibre glass covered with RP tissue. The noise level of the indoor unit shall not exceed 50 db at a distance of 1 m from the unit.</p>			
4	<p>c) Interconnecting copper refrigerant piping between outdoor and indoor units, including rigid pipe insulation for suction lines, wherever required. Horizontal refrigerant pipes shall be mechanically protected, wherever running on ground.</p>			
5	<p>d) Controls such as suitable number of thermostat along with one number multispeed fan</p>			

	control.			
6	e) Supporting brackets for indoor units.			
7	f) Each unit shall be provided with microprocessor based control system and shall be fully automatic in operation. All motors shall be provided with suitable starters and shall be located conveniently within the outdoor unit. The unit shall be provided with microprocessor based panel housing microprocessor based motor protection device which includes overload relay, single phase preventor, phase reversal protection, short circuit protection, HP/LP cutouts etc and shall control the operation of split unit. The panel shall be provided with LED display for room temperature , set point temperature , current drawn by motors, status indication, fault display and trip indication. Auto sequence starting and auto sequence stopping shall be provided with predetermined time delays. Auto restart upon restoration of power after a power failure shall be an			

	inbuilt feature.			
8	g) The power supply for the ductable units shall be terminated with MCB in the Electrical Distribution board by Electrical contractor. Further connection from Electrical Distribution board to Indoor/outdoor unit including control wiring shall be under the scope of Air conditioning contractor.			
9	2. Supply air ducting fabricated out of GSS confirming to latest IS:655 and complete with dampers, tab hangers, anchor fasteners, vanes, access door, framework etc. and complete as required and as indicated below. GSS Sheet shall be grade 120 confirming to latest IS:277a) Duct - 0.63mm thick b) Duct - 0.8mm thick			
10	3. Supply air and return air powder coated Aluminium grilles with / without volume control dampers with necessary teak wood frame work etc. and complete as required including one coat of primer and two coats of synthetic enamel paint of approved colour.			

11	a) SA grilles/Diffusers with VCD			
12	b) RA grilles/Diffusers without VCD			
13	4. Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers. The lowest louvers of the assembly shall extend out slightly to facilitate disposal of rain water without falling on the door / wall on which it is mounted and complete with all aluminium construction volume control dampers.			
14	5. Provision of motorised fire and smoke dampers in supply / return air path of conditioned air in precision package unit area. Testing of fire dampers shall be as per UL 555 and certified by CBRI. The dampers shall be complete with inbuilt sensor & smoke sensors and the auxillary switch to trip the precision package unit & close the damper simultaneously. These fire dampers shall also actuate in response to smoke detection sensor.			
15	6. Acoustic insulation of supply air ducting			

	immediately after discharge of Split unit with 25 mm thick fibre glass and covered with R.P tissue and perforated aluminium sheet and complete as required.			
16	7. Drain piping to the extent of 10 RM with insulated 25 mm dia pipe and terminating at agreed drain points.			

**Part D : Cassette Split AC Units**

**Item Specifications -VI**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	1. Supply of Cassette split type A/C unitsa) Cassette split type A/C units, each of nominal capacity as indicated below suitable for operation on 415 V $\pm$ 10% or 230 V $\pm$ 10%, 50 Hz,three / single phase AC supply as applicable with R22 or eco-friendly refrigerant.			
2	i) Minimum 4 TR cassette type Split AC unit with cordless remote control for Exhibition Hall			
3	ii) Minimum 1.5 TR cassette type Split AC unit with cordless remote			



	control for lounge			
4	iii) Minimum 1 TR cassette type Split AC unit with cordless remote control for Green rooms			
5	iv) Minimum 3 TR cassette type Split AC unit with cordless remote control for Ground Floor Lobby/ Lounge			
6	v) Minimum 3 TR cassette type Split AC unit with cordless remote control for First Floor Lobby/ Lounge			
7	b) Each split type A/C unit shall comprise of outdoor unit suitable for ambient weather conditions at Chandigarh and cassette type Indoor unit suitable for ceiling mounting. Both units shall be inter connected through refrigerant (copper) tubing (encased in PVC pipes for mechanical protection where refrigerant pipes are run on ground) and complete with electrical wiring for satisfactory operation and complete as required.			
8	c) Outdoor (condensing ) unit shall be finished with powder coating & should include hermetically sealed suction gas cooled			

	compressors, overload protection, air cooled condenser coil made of copper of sufficient rows deep and of large face area, fitted with a propeller type fan and suitable motor, service valves arrangements, refrigerant filter etc. all housed in sheet metal cabinet.			
9	d) Cassette type Indoor (room) unit should include evaporator coil made of copper of sufficient rows deep with slide out washable nylon wire mesh/HDPE filters with dirt trap and aluminium frame work statically and dynamically balanced blower unit mounted on the shaft of the motor and housed in a scroll etc.			
10	e) Selector control unit with push button, selector switch for multispeed fan operation shall be provided for all units. Supply air grilles made out of non-corrosive material with 4 way adjustable air flow direction arrangement with throw of atleast 6.0 m and complete as required.			
11	f) The split units shall have following features. i) Auto			

	<p>mode operationii) Sleep mode operationiii)Auto setting with memory backupiv) Time delay featurev) Auto restartvi) Programmable timervii) Automatic drainage of condensate water through the drain pump Each unit shall include suitable controls like thermostat and complete as required.</p>			
12	<p>g) Each unit shall include suitable controls like thermostat and complete as required.</p>			
13	<p>h) Low noise level of unit inside the AC areas is required ( around 45 db ) . Manufacturers shall indicate average noise level in db at 1 metre from indoor unit.</p>			
14	<p>i) Three phase power supply for each of 4TR units, single phase power supply for each of 1.5TR units shall be provided nearer to the outdoor units by the Dept. Power supply from the DB to outdoor/Indoor units including control wiring shall be in the scope of AC vendor.</p>			
15	<p>j) The specification, testing and capacities of Split AC units shall confirm to IS</p>			

	1391 (Part I and Part II).			
16	2. Installation and commissioning of the above units and making good of opening in walls / ceilings for running refrigerant/drain pipes, and as directed by Engineer-in-Charge.			
17	3. Supply and installation of copper Refrigerant piping along with nitrile rubber insulation and with suitable power/control wiring interconnecting indoor and outdoor units as required and complete.			
18	4. Supply and installation of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point with 'U' trap.			
19	5. Supply and installation of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection			
20	6. Powder coated MS Stand for Out door Units.			

**Part E: High wall Split AC Units**

**Item Specifications -VII**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	1. Supply, installation, commissioning and testing of Hi wall Split type AC units, each of nominal capacity of 2 TR with cordless remote for UPS room, suitable for operation on 230 V ± 10%, 50 HZ, single phase AC supply with R407c/ R410a or equivalent eco- friendly refrigerant.			
2	a) Each split type A/C unit shall comprise of outdoor unit suitable for ambient weather conditions at Chandigarh and high wall mounted Indoor unit with sleek outer cabinet . Both units shall be inter connected through refrigerant (copper) tubing (encased in PVC pipes for mechanical protection where refrigerant pipes are run on ground) and complete with electrical wiring for satisfactory operation and complete as required.			
3	b) Outdoor (condensing) unit shall be finished with powder coating & should include hermetically sealed suction gas cooled compressors, overload protection, air cooled condenser coil made of			

	copper of sufficient rows deep and of large face area, fitted with a propeller type fan and suitable motor, service valves arrangements, refrigerant filter etc. all housed in sheet metal cabinet.			
4	c) Hi-wall mounted Indoor (room) unit should include evaporator coil made of copper of sufficient rows deep with slide out washable nylon wire mesh/HDPE filters with dirt trap and aluminium frame work, statically and dynamically balanced blower unit mounted on the shaft of the motor and housed in a scroll etc.			
5	d) Selector control unit with push button, selector switch for multispeed fan operation shall be provided for all units.			
6	e) Supply air grilles made out of non-corrosive material with adjustable air flow direction arrangement with deflection louvers with throw of atleast 6.0 m and complete as required. The split units shall have following features. i) Auto mode operationii) Sleep mode operationiii)			

	<p>Auto setting with memory backupiv) Time delay featurev) Auto restartvi) Programmable timer</p>			
7	<p>f) Each unit shall include suitable controls like thermostat and complete as required. These units shall be installed at appropriate locations as indicated in A/c scheme and as directed by Engineer-in-Charge.</p>			
8	<p>g) The drain pipes from indoor unit will be terminated at agreed drain point. The refrigerant piping shall be provided with no joints in between and suction lines shall be insulated with elastomeric nitrile foam pipe insulation.</p>			
9	<p>h) Low noise level of unit inside the AC areas is required ( around 45 db). Manufacturers shall indicate average noise level in db at 1 metre from indoor unit. The finish of the cabinet of the indoor unit shall be got approved by the Engineer - in - Charge.</p>			
10	<p>i) Split AC units shall be energy efficient and shall be 5 Star rated as certified by Bureau of energy</p>			

	efficiency			
11	j) Single phase power supply for Split AC Units shall be provided near the indoor units by the Dept.			
12	k) The specification, testing and capacities of Split AC units shall confirm to IS 1391 (Part I and Part II).			
13	2. Installation and commissioning of the above units and making good of opening in walls / ceilings for running refrigerant/drain pipes as required and as directed by Engineer-in-Charge.			
14	3. Supply and installation of copper Refrigerant piping along with nitrile rubber insulation and with suitable power/control wiring interconnecting indoor and outdoor units as required and complete.			
15	4. Supply and installation of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point with 'U' trap.			
16	5. Supply and installation of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection			



17	6. Powder coated MS Stand for Out door Units.			
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## RECOMMENDED MAKES

### Item Specifications -VIII

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	Chiller: Blue Star/Carrier/Daikins/Trane /York			
2	Air Handling units: Edgetech/Zeco/Citizen/Carrier/Voltas/Daikins/Flakt Woods			
3	AHU Fan: Kruger/Nikotra/ Flaktwood/ Comefri/ Greenheck			
4	Motors: Siemens/ABB/Crompton/Bharat Bijlee			
5	Pumps: Johnson/ Grundfos /Armstrong/Tour and Anderson			
6	Cassette Split AC: Blue Star/Carrier/Daikins/Mitsubishi/ O-General			
7	Ductable Split AC: Blue Star/Carrier/Daikins/Mitsubishi/ O-General			
8	Butterfly and Ball valves: L&T/Microfinish/Avcon			

9	Check Valve: Advance/Intervolve/L&T			
10	Pipe MS: Tata/SAIL/Jindal			
11	Pressure and Temperature gauges: Waree/Ashcroft/Bells			
12	Three way mixing valve with modulating motor: Siemens/Honeywell/Johns on			
13	Sensors/Transducers: Seimens/Sauter/Honeywel l/Dwyer/Rockwell/Toshni wall/Vaisala			
14	GI Sheets: Sail/Tata/Jindal/Ispat			
15	Nitrile insulation: Armaflex/Aeroflex			
16	Diffuser Grills: Carryaire/Dynecraft/Ravist ar/Air master			
17	ACB: Siemens/Schneider			
18	MCCB: Siemens/Schneider			
19	Push button: Siemens/Schneider/ Teknic			
20	Selector Switch: Siemens/Schneider/ Teknic			
21	Fuse: Schneider/Siemens			
22	Timer: Siemens/Schneider			

23	Control Transformer:AE/IMP/Indc oil			
24	Power Terminal Block (Bus Bar type): Elmex/Connectwell/FTC			
25	Control Terminal: Elmex/Connectwell/FTC			
26	Meters: Conzerv/ L&T/ AE			
27	CTs & PTs: Kappa/Automatic Electric(AE)/Nippen			
28	Contactors: Schneider/Siemens			
29	Indications: Siemens/Schneider/ Teknic			
30	Relays: Schneider/Siemens/PLA			

**RECOMMENDED MAKE (continue)**

**Item Specifications -IX**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
31	MCB: Schneider/Siemens			
32	Cooling Fan: Rexnord/Sunon			
33	RCBO: Siemens/Schneider			
34	MCB DB: Siemens/ABB/Legrand			

35	VFD: Allen Bradley (Model: Powerflex 440)			
36	MPR: L&T, Siemens, Schneider			

### General Conditions

### Item Specifications -X

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	All equipment shall be heavy duty type suitable for continuous and trouble free operations			
2	The test certificates of the equipment like chillers, AHU, motors, pumps etc. & the materials like pipe, valves, insulation, fire dampers etc. tested at manufacturers works shall be supplied by the contractor.			
3	Necessary foundation bolts, nuts, leveling-screws vibration pads etc. wherever required, for mounting the equipments/machines, shall be provided by the contractor as per manufacturer's drawings/recommendations.			
4	Necessary power supply shall be provided from the			

	source. The contractor shall bring KWH meter, ELCB and Switch fuse unit with proper earthing system and necessary wires/cables for drawing power supply. The power shall be provided by SCL.			
5	Exact make and model of equipment/Technical leaflets/General layout of all machines showing their overall dimensions shall be provided along with the technical bid.			
6	The contractor shall provide complete training for operation, maintenance, servicing and working of the systems at SCL site to 6-8 SCL's personnel free of cost.			
7	The entire work shall be completed in four (4) months, which shall be reckoned from the 15th day of release of P.O.			
8	Contractor to provide certificate showing the date of manufacture of the equipment and certifying that the equipment being supplied is new and not a used/old/second hand/refurbished/reconditioned machine.			

9	The contractor should satisfy himself for the adequacy/completeness of the system and shall include any other item/s required for safe and satisfactory functioning.			
10	The quantities indicated against each item in the bill of quantities (BOQ) are indicative and are for the purpose of bidding only and final payment will be made based upon the actual measurement basis. Variation in quantities up to +25% shall be carried out by the contractor on the same (agreed) unit rates and terms & condition in all respects. In case of contract items which exceed the said limit of +25%, the contractor may claim revision of rates supported by proof, analysis and if the rate claim in excess of the rate specified in the bill of quantities, SCL's engineer-in-charge of the work shall after giving consideration to the analysis of rates submitted by the contractor determined by the rates on the basis of market rates and the contractor shall be paid in accordance with the rates so			

	determined.			
11	For measurement of piping, installed straight length including fittings (bends, flanges, Tee, reducers) etc. shall be considered and the payment shall be made as per unit rates based upon the measurements of actual work done. Valves shall be counted separately and paid at the agreed unit rates.			
12	For measurement of insulation of piping, installed straight length including all the fittings (bends, flanges, Tee, reducers, valves) etc. shall be considered and the payment shall be made as per unit rates based upon the measurements of actual work done.			
13	For measurement of ducting and its insulation, surface area of the installed duct shall be considered and the payment shall be made as per unit rates based upon the measurements of actual work done.			
14	In case of extra item (that are completely new and are in addition to the item contained in the contract), the contractor may claim			

	<p>rates supported by proper analysis and SCL's engineer-in -charge of the work shall after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of market rates and the contractor shall be paid in accordance with the rates so determined</p>			
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**Acceptance and Warranty**

**Item Specifications -XI**

Sl. No	Specifications	Compliance (Yes /No)	Offered Specifications	Re
1	<p>Acceptance Procedure:The systems/equipment will be run continuously for 7 days to check their satisfactory operation. If, during the trial run, the system is found not meeting the specifications, necessary replacement/rectification will be carried out by the contractor and the system will be put back to trial run again for 7 days before the acceptance is given. Warranty shall commence upon acceptance of all systems/equipments covered under the scope</p>			



	of Purchase order.			
2	Warranty: The contractor shall submit a written warranty for a period of two years from the date of commissioning & acceptance for successful / trouble free running of the entire system under scope. Any breakdown during guarantee period shall be attended by the contractor free of cost within 24 hours of information including replacement of the parts, if any, at his (contractor's) own cost.			

#### Vendor Specified Terms

Description	Vendor Terms
<p>1. Delivery Term:</p> <p>For imported stores, prices shall be quoted on FOB/FCA nearest International/Gateway airport basis.</p> <p>For indigenous stores, prices shall be quoted on F O R destination basis i.e. SCL S A S Nagar, Mohali, Punjab exclusive of GST and taxes as may be applicable.</p>	
<p>1. GST:</p> <p>Purchaser is entitled to concessional CGST of 2.5% and IGST of 5% as per Ministry of Finance Department of Revenue, Notification Nos 45/2017 Central Tax (Rate) and 47/2017 Integrated Tax (Rate) both dated 14th November 2017 respectively and would accordingly issue Exemption Certificate in favour of the contractor quoting in Indian Rupees. The bidder should take note of the same while quoting the</p>	

<p>prices in Indian Rupees.</p>	
<p>Delivery1.For imported materials, Purchaser is entitled to issue Customs duty exemption certificate (CDEC) to the contractor under customs notification no.51/96 dated 23.07.1996 and subsequent amendments to enable the contractor to avail off the benefit of concessional rate of customs duty under this notification. CVD under this notification is nil. In addition to the above CDEC any documentary support requested by the contractor from the purchaser for customs clearance of goods against the above CDEC shall be provided by the purchaser.</p> <p>(Purchaser will provide Customs Duty Exemption Certificate in case of Import Orders/ imported supplies/ High Sea Sales).</p>	
<p>4 Delivery Period:</p> <p>Project Completion Schedule:</p> <p>The entire work shall be completed in four (4) months, which shall be reckoned from the 15th day of release of P.O.</p>	
<p>5. Validity of Offer:</p> <p>The tender must be valid for a minimum period of 120 days from the date of opening of Technical bid and 90 days after opening of Price bid.</p>	
<p>6. TERMS OF PAYMENT IN CASE OF OVERSEAS SUPPLIER[S]:</p> <p>Being a Department of the Government of India, the normal terms of payment are by Sight Draft. The payment shall be remitted as under:</p> <p>90% of the value of the materials supplied shall be paid within 30 days of the receipt of the materials at purchaser site and the balance 10% amount shall be payable on successful installation, commissioning and acceptance of the entire project at Purchasers site against a</p>	

<p>Performance Bank.</p> <p>All bank charges outside India related to the payment shall be borne by the Contractor and all bank charges in India shall be borne by the purchaser.</p> <p>In the event of the Contractor not being able to provide the Performance Bank Guarantee the payment of balance 10% amount shall be made after the expiry of the warranty period.</p> <p>Indian agent remuneration/service charge shall be payable by the Purchaser directly to the Indian agent in Indian Rupees based on T.T buying rate of exchange prevailing on the date of placement of purchase order within 30 days of acceptance of equipment at purchaser site.</p> <p>The Sight Draft will be operative on presentation of the under mentioned documents :</p> <p>a) Original Airway Bill</p> <p>b) Commercially certified invoices describing the stores delivered, quantity, unit rate and their total value, in triplicate. The invoice should indicate the discounts, if any, and Agency Commission separately.</p> <p>c) Packing List showing individual dimensions and weight of packages.</p> <p>d) Country of Origin Certificate in duplicate, wherever applicable.</p> <p>e) Test Certificate.</p> <p>f) Declaration by the Seller that the contents in each case are not less than those entered in the invoices and the quality of the Stores are guaranteed as per the specifications asked for by the Purchaser.</p> <p>g) Warrantee and guarantee Certificate/s as applicable.</p> <p>While the purchasers bank charges shall be borne by the purchaser, the contractor shall bear the bank charges payable to his banker including the charges towards advising/amendments/commissions etc.</p>	
<p>7. TERMS OF PAYMENT IN CASE OF INDIGENOUS SUPPLIER[S]:</p>	

<p>The payment shall be remitted as under:</p> <p>90% of the value of the materials supplied shall be paid within 30 days of the receipt of the materials at purchaser site and the balance 10% amount along with 100% installation charges shall be payable on successful installation, commissioning and acceptance of the entire project at Purchasers site against a Performance Bank Guarantee .</p> <p>In the event of the Contractor not being able to provide the Performance Bank Guarantee the payment of balance 10% amount shall be made after the expiry of the warranty period.</p> <p>While the purchaser bank charges shall be borne by the purchaser, the contractor shall bear the bank charges payable to his banker including the charges towards advising/amendments/ commissions etc.</p>	
<p><b>8. PERFORMANCE BANK GUARANTEE (PBG):</b></p> <p>The Contractor shall furnish a Bank Guarantee (as per format given by purchaser) from any nationalized/scheduled bank for an amount equivalent to 10% of the value of the Contract and shall be valid for a period of 60 days beyond the expiry date of warranty period. On the performance and completion of the Contract in all respects, the Bank Guarantee will be returned to the Contractor without any interest.</p>	
<p><b>9. SECURITY DEPOSIT:</b></p> <p>On acceptance of the tender, the Contractor shall submit security deposit for ten percent (10 percent) value of the Purchase Order (PO) within 15 days from the date of PO towards successful execution of the PO. Security Deposit shall be submitted through Demand Draft / Bankers Cheque/ fixed deposit receipt or Bank Guarantee from any of the Scheduled Banks executed on non-judicial stamp paper of appropriate value, and shall be valid for a period of sixty (60) days beyond the date for completion of the Purchase Order.</p> <p>(This will be returned by SCL immediately on execution of the PO satisfactorily as per order terms. If not, the amount will be forfeited).</p>	

<p>10. LIQUIDATED DAMAGES (LD).</p> <p>If the Contractor fails to deliver the stores within the time specified in the contract or any extension thereof, the purchaser shall recover from the Contractor as liquidated damages a sum of one-half of one percent (0.5 percent) of the Contract price of the undelivered stores for each calendar week of delay. The total liquidated damages shall not exceed ten percent (10 percent) of the Contract price.</p>	
<p>11. WARRANTY :</p> <p>The contractor shall submit a written warranty for a period of two years from the date of commissioning &amp; acceptance for successful / trouble free running of the entire system under scope. Any breakdown during guarantee period shall be attended by the contractor free of cost within 24 hours of information including replacement of the parts, if any, at his (contractors) own cost at site/works.</p>	
<p>12. WARRANTY REPLACEMENTS:</p> <p>a) If in the opinion of the purchaser it becomes necessary to replace or repair any defective equipment/parts during the warranty period, such replacement or repair shall be made by the Contractor free of all costs to the Purchaser provided the notice informing the Contractor of the defect is given by the Purchaser within a period of 26 months from the date of acceptance thereof.</p> <p>b) All replacement parts during the warranty period shall be supplied by the Contractor, free-of-cost on DDP (Delivery Duty paid) basis with freight and insurance upto Purchaser site at S.A.S. Nagar, Punjab and customs duty applicable in India to the Contractor account including compliance with the customs procedure in India. The indigenous replacement parts, if any, shall be supplied by the Contractor free of cost on F.O.R. Purchaser site at S A S Nagar, Punjab basis.</p> <p>All defective parts including the imported parts shall be returned by Purchaser to the Contractor, if requested, on Freight to pay basis.</p>	

<p>13 . GUARANTEE &amp; REPLACEMENT :</p> <p>a) The Contractor shall guarantee that the stores supplied shall comply fully with the specifications laid down, for material workmanship and performance.</p> <p>b) For a period of 12 months after the acceptance of the stores if any defects are discovered therein or any defects therein found to have developed under proper use arising from faulty stores design or workmanship the Contractor shall remedy such defects at his own cost provided he is called upon to do so within a period of 14 months from the date of acceptance thereof by the purchaser who shall state in writing in what respect the stores or any part thereof are faulty.</p> <p>c) If, in the opinion of the purchaser, it becomes necessary to replace or renew any defective stores such replacement or renewal shall be made by the Contractor free of all costs to the purchaser, provided the notice informing the Contractor of the defect is given by the purchaser in this regard within the said period of 14 months from the date of acceptance thereof.</p> <p>d) Should the Contractor fail to rectify the defects the purchaser shall have the right to reject or repair or replace at the cost of the Contractor the whole or any portion of the defective stores.</p> <p>e) The decision of the purchaser notwithstanding any prior approval or acceptance or inspection thereof on behalf of the purchaser as to whether or not the stores supplied by the Contractor are defective or any defect has developed within the said period of 12 months or as to whether the nature of the defects requires renewal or replacement shall be final conclusive and binding on the Contractor.</p> <p>f) PERFORMANCE BANK GUARANTEE:</p> <p>To fulfil guarantee conditions outlined in clause 8 (a) to (e) above the Contractor shall furnish a Bank Guarantee (as per format given by purchaser) from any scheduled bank/ bank approved by the Purchaser for an amount equivalent to 10 percent of the value of the Contract and shall be valid for a period of 60 days beyond the expiry date of warranty period. On the performance and completion of the Contract in all respects the Bank Guarantee will be returned to the Contractor</p>	

<p>without any interest.</p> <p>g) All the replacement stores shall also be guaranteed for a period of 12months from the date of arrival of the stores at purchasers site.</p> <p>h) Even while the 12 months guarantee applies to all stores in case where a greater period is called for by our specifications then such a specification shall apply in such cases the period of 14months referred to in clause 8 (b) &amp; (c) shall be the asked for guarantee period plus two months.</p>	
<p>14. QUANTITY VARIATION:</p> <p>The quantities indicated against each items in the Bill of Quantities (BOQ) are indicative and are for the purpose of bidding only. Variation in quantities upto +25 percent shall be carried out by the contractor on the agreed/Purchase order (PO) rates and terms &amp; conditions as in the purchase order (PO).</p>	
<p>15. GUARANTEED TIME DELIVERY :</p> <p>The time for and the date of delivery stipulated in the Purchase Order shall be deemed to be the essence of the Contract. Delivery must be completed within the date specified therein.</p>	
<p>16. MODE OF DESPATCH.</p> <p>In case of foreign orders, stores should be despatched to IGI Airport, New Delhi through freight forwarder nominated by the purchaser whose details shall be indicated in the purchase order.</p>	
<p>17. PORT OF ENTRY:</p> <p>In case of foreign suppliers</p>	

IGI Airport New Delhi.	
<p>18. CONSIGNEE:</p> <p>Sr. Purchase &amp; Stores Officer (Stores), Semi Conductor Laboratory Sector 72 S.A.S. Nagar (Mohali) Punjab India 160 071</p>	
<p>19. SHIPPING MARKS:</p> <p>The mark on the shipping documents such as invoice bill of lading and on the packages should be as follow:</p> <p>PURCHASE ORDER NO. DATED GOVERNMENT OF INDIA DEPARTMENT OF SPACE SEMI-CONDUCTOR LABORATORY DESTINATION: SECTOR 72 S.A.S. NAGAR (MOHALI) PUNJAB INDIA.</p>	
<p>20. INSURANCE OF THE STORES:</p> <p>Insurance wherever necessary will be arranged by the Purchaser. The necessity or otherwise of insurance will be as indicated in the Purchase Order/Contract.</p>	
<p>21. INSTALLATION AND COMMISSIONING :</p> <p>Installation commissioning and demonstration of performance of the tendered stores as per Purchaser tendered specifications shall be carried out by the Contractor at Purchaser site at S.A.S. Nagar Punjab</p>	



<p>India.</p> <p>The Contractor shall provide in advance guidelines for preparation of the installation site and list of items to be supplied by Purchaser during installation.</p> <p>On receipt of intimation from the Purchaser the Contractor shall depute its engineer(s) to Purchaser site within two weeks to carry out installation and commissioning and will demonstrate the functionality of the tendered equipment to Purchaser specifications as per mutually agreed acceptance procedure. The Contractor shall be responsible for any loss/damages sustained due to delay on the part of the Contractor to send its engineer for installation and commissioning.</p> <p>Failure to commission the tendered equipment successfully shall entitle Purchaser to full refund of the payment made and the interest thereon. Decision regarding successful installation and commissioning shall rest solely with the Purchaser.</p>	
<p>22. EXTENSION OF TIME :</p> <p>If the completion of supply of stores is delayed due to reason of force majeure such as acts of god, acts of public enemy, acts of Government fires floods epidemics quarantine restriction strikes freight embargoes etc., the Contractor shall give notice within 15 days to the purchaser in writing of his claim for an extension of time. The purchaser on receipt of such notice after verification, if necessary may agree to extend the Contract delivery date as may be reasonable but without prejudice to other terms and conditions of the Contract.</p>	
<p>23. INSPECTION AND ACCEPTANCE TEST:</p> <p>The Purchasers representatives shall also be entitled at all reasonable times during manufacture to inspect, examine and test on the Contractors premises the material and workmanship of all stores to be supplied under this Contract and if part of the said stores is being manufactured on other premises, the Contractor shall obtain for the purchasers representative permission to inspect, examine and test as if the equipment were being manufactured on the Contractors premises.</p> <p>Such inspection examination and testing shall not release the</p>	

<p>Contractor from the obligations under this Contract.</p> <p>For tests on the premises of the Contractor or of any of his sub-Contractors, the Contractor shall provide free of cost assistance labour material, electricity fuel and instruments as may be required or as may be reasonably needed by the purchasers representative to carry out the tests efficiently.</p> <p>When the stores have passed the specified test the purchaser representative shall furnish a certificate to the effect in writing to the Contractor. The Contractor shall provide copies of the test/s certificates to the purchaser as may be required.</p>	
<p>24. ADDRESS OF INDIAN AGENT: if any:</p>	
<p>25. REQUIREMENT OF ADDITIONAL NUMBERS OF THE STORES/SPARE PARTS ORDERED:</p> <p>The Contractor shall also undertake the supply of additional number of items covered by the order as considered necessary by the purchaser at a later date the actual price to be paid shall be mutually agreed to after negotiations.</p>	
<p>26 PACKING:</p> <p>a) The Contractor wherever applicable shall pack and crate all stores for sea /air/road shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road rail air or sea. The Contractor shall be held responsible for all damages due to improper packing.</p> <p>b) The Contractor shall ensure that each box / unit of shipment is legible and properly marked for correct identification. The failure to comply with this requirement shall make the Contractor liable for</p>	

additional expenses involved.

c) The Contractor shall notify the purchaser of the date of shipment from the port of embarkation as well as the expected date of arrival of such shipment at the designated port of arrival.

d) The Contractor shall give complete shipment information concerning the weight size content of each packages etc.

e) Trans shipment of equipment shall not be permitted except with the written permission of the purchaser.

f) Apart from the despatch documents negotiated through Bank the following documents shall also be airmailed to the purchaser within 7 days from the date of shipment by sea and within 3 days in case of air consignments:

- i) Commercial Bill of Lading / Air Way Bill / Post parcel Receipt. (Two non negotiable copies)
- ii) Invoice (3 copies)
- iii) Packing List (3 copies)
- iv) Test Certificate (3 copies)
- v) Certificate of Origin wherever applicable.

The Contractor shall also ensure that one copy of the packing list is enclosed in each case.

**27. ARBITRATION:**

If at any time any question, dispute or difference whatsoever shall arise between the purchaser and the Contractor upon or in connection with this Contract, either party may forthwith give to the other notice in writing of the existence of such question dispute or difference and the same shall be referred to the adjudication of two arbitrators one to be nominated by purchaser other by a Contractor and in the event of any difference of opinion the arbitrators will refer the matter to the umpire. The arbitration shall be conducted in accordance with the rules and procedure for arbitration of the International Chamber of Commerce at Paris. The expenses of the arbitrators and umpire shall be paid as may be determined by

<p>them. However the venue of such arbitration should be in India.</p> <p>In case of dispute arises with domestic/Indian suppliers the applicable Arbitration procedure shall be as per Indian Arbitration &amp; Conciliation Act, 1996.</p>	
<p>28 Applicable Law:</p> <p>The contract shall be interpreted, construed and governed by the laws of India.</p>	
<p>29.Any other Terms.</p>	

**Supporting Documents from Vendor**

**Attachment - I:**

**Attachment - II:**

**Price Bid Form**

Item Description	Slab Range	Qty	UOM	Currency	Unit Price
Supply of air cooled Scroll chiller package of minimum capacity 36 TR, with multiple scroll Semi-hermetic/hermati	-	2	No.	-	-

c compressors to supply chilled water at 7 Deg C at entering water at 12 Deg C. As per detailed specifications provided.					
Supply of Chilled water centrifugal pumps, vertical single/multi stage inline type, 2900 rpm, min. 5 HP motor, 330 lpm flow at head of min. 25m, complete with base frame, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Supply of Paint for painting of all the equipment and accessories specified with two coats of synthetic enamel paint of approved colour and as specified by Engineer-in-charge. As per detailed specifications provided.	-	1	Lot	-	-
Supply of Expansion tank for	-	1	No.	-	-

water, MOC: GRP panel, capacity 1.0 cubic meter, size 1.0 m x 1.0 m x 1.0 m, complete with float valve, drain, overflow and make up connections, insulation, complete with all the fittings, valves, base frame etc. As per detailed specifications provided.					
Supply of 100 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.	-	50	MTR	-	-
Supply of 80 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.	-	40	MTR	-	-
Supply of 80 mm dia butterfly valve complete with fittings and	-	10	No.	-	-

insulation As per detailed specifications provided.					
Supply of 80 mm dia flexible pipe connector assembly complete with fitting, insulation etc. As per detailed specifications provided.	-	10	No.	-	-
Supply of 80 mm dia non return valve complete with fitting, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Supply of 80 mm dia Y strainer complete with fitting, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Supply of 80 mm dia balancing cum flow measurement valve complete with fitting, insulation etc. As per detailed specifications	-	2	No.	-	-

provided.					
Supply of Differential water pressure switch complete with fitting, piping etc. As per detailed specifications provided.	-	2	No.	-	-
Supply of Dial type thermometer As per detailed specifications provided.	-	10	No.	-	-
Supply of 100mm dia pressure gauges ( with pet cock / gate valve ) As per detailed specifications provided.	-	10	No.	-	-
Supply of Automatic Air vent As per detailed specifications provided.	-	2	No.	-	-
Supply of Drain plugs As per detailed specifications provided.	-	4	No.	-	-
Supply of Hand held Digital Manometer(Multi scale Differential Pressure Meter)	-	1	No.	-	-



of advance make or equivalent. As per detailed specifications provided.					
Supply of Electrical panel and complete power system for AC plant room/ pump room power supply catering to 2 no. Air cooled scroll chiller packages and 3 Nos. chilled water pumpsets complete with Aluminum/Copper conductor cables, cable trays end terminations in between panels. As per detailed specifications provided.	-	1	Set	-	-
Supply of items for Minor civil works like foundations/pedastals for Chiller packages, pumpsets etc. and cutting away and making good of openings in walls/ceiling etc. As per detailed specifications	-	1	Set	-	-

provided.					
Installation, Testing and commissioning of air cooled Scroll chiller package of minimum capacity 36 TR, with multiple scroll Semi-hermetic/hermetic compressors to supply chilled water at 7 Deg C at entering water at 12 Deg C. As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Chilled water centrifugal pumps, vertical single/multi stage inline type, 2900 rpm, min. 5 HP motor, 330 lpm flow at head of min. 25m, complete with base frame, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Application of Paint for painting	-	1	Lot	-	-

of all the equipment and accessories specified with two coats of synthetic enamel paint of approved colour and as specified by Engineer-in-charge As per detailed specifications provided.					
Installation, Testing and commissioning of Expansion tank for water, MOC: GRP panel, capacity 1.0 cubic meter, size 1.0 m x 1.0 m x 1.0 m, complete with float valve, drain, overflow and make up connections, insulation, complete with all the fittings, valves, base frame etc. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of 100 mm dia MS class C pipe complete with	-	50	MTR	-	-

fittings, insulation, supports etc. As per detailed specifications provided.					
Installation, Testing and commissioning of 80 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.	-	40	MTR	-	-
Installation, Testing and commissioning of 80 mm dia butterfly valve complete with fittings and insulation As per detailed specifications provided.	-	10	No.	-	-
Installation, Testing and commissioning of 80 mm dia flexible pipe connector assembly complete with fitting, insulation etc. As per detailed specifications provided.	-	10	No.	-	-

Installation, Testing and commissioning of 80 mm dia non return valve complete with fitting, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Installation, Testing and commissioning of 80 mm dia Y strainer complete with fitting, insulation etc. As per detailed specifications provided.	-	3	No.	-	-
Installation, Testing and commissioning of 80 mm dia balancing cum flow measurement valve complete with fitting, insulation etc. As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Differential water pressure switch	-	2	No.	-	-

complete with fitting, piping etc. As per detailed specifications provided.					
Installation, Testing and commissioning of Dial type thermometer As per detailed specifications provided.	-	10	No.	-	-
Installation, Testing and commissioning of 100mm dia pressure gauges ( with pet cock / gate valve ) As per detailed specifications provided.	-	10	No.	-	-
Installation, Testing and commissioning of Automatic Air vent As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Drain plugs As per detailed specifications provided.	-	4	No.	-	-

Installation, Testing and commissioning of Hand held Digital Manometer(Multi scale Differential Pressure Meter) of advance make or equivalent. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of Electrical panel and complete power system for AC plant room/ pump room power supply catering to 2 no. Air cooled scroll chiller packages and 3 Nos. chilled water pumpsets complete with Aluminum/Copper conductor cables, cable trays end terminations in between panels. As per detailed specifications provided.	-	1	Set	-	-
Installation of items for items for Minor civil works like foundations/peda	-	1	Set	-	-

stals for Chiller packages, pumpsets etc. and cutting away and making good of openings in walls/ceiling etc. As per detailed specifications provided.					
Supply of Air handling unit, double skin with 23+/- 2 mm thick PUF insulation, with min. air flow of 24000 CFM , min. static pressure of 50 mm Wg, DIDW centrifugal fan with VFD drive. As per detailed specifications provided.	-	1	No.	-	-
Supply of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.63 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications	-	230	SQMTR	-	-



provided.					
Supply of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.8 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	75	SQMTR	-	-
Supply of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 1.0 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	65	SQMTR	-	-
Supply of Galvanised steel construction volume control dampers within ducts to be provided with suitable ducts	-	4.5	SQMTR	-	-

lever and quadrants. As per detailed specifications provided.					
Supply of Supply air Aluminium grilles/ diffusers with volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.	-	5	SQMTR	-	-
Supply of Return air Aluminium grilles/ diffusers without volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.	-	5	SQMTR	-	-
Supply of 100 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications	-	15	MTR	-	-

provided.					
Supply of 80 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.	-	10	MTR	-	-
Supply of 100 mm dia butterfly valve complete with fittings and insulation etc. As per detailed specifications provided.	-	2	No.	-	-
Supply of 100 mm dia balancing cum flow measurement valve complete with fittings and insulation etc. As per detailed specifications provided.	-	1	No.	-	-
Supply of 80 mm dia 3 way mixing valve complete with modulating motor, thermostat, fittings and insulation etc. As per detailed specifications	-	1	No.	-	-

provided.					
Supply of 80 mm dia globe valve complete with fittings and insulation etc. As per detailed specifications provided.	-	1	No.	-	-
Supply of 100 mm dia flexible pipe connectors complete with fitting, insulation etc. As per detailed specifications provided.	-	2	No.	-	-
Supply of Dial type thermometer As per detailed specifications provided.	-	2	No.	-	-
Supply of 100 mm dia pressure gauges ( with pet cock / gate valve ) As per detailed specifications provided.	-	2	No.	-	-
Supply of Automatic Air vents As per detailed specifications provided.	-	2	No.	-	-
Supply of Drain	-	2	No.	-	-

plugs. As per detailed specifications provided.					
Supply of Heating kit comprising of strip heaters, in three independent operating banks, in main supply air duct with a minimum capacity of 12 KW (3x4KW) complete with electrical and instrumentation. As per detailed specifications provided.	-	1	Set	-	-
Supply of Stainless steel Panhumidifier kit of adequate capacity for seasonal operation complete with all fittings, inlet lines, electrical and instrumentation. As per detailed specifications provided.	-	1	Set	-	-
Supply of Motorised fire and smoke dampers in	-	5	SQMTR	-	-

supply/return air duct/path complete with inbuilt temperature and smoke sensor, an auxiliary switch to trip the AHU and close damper. As per detailed specifications provided.					
Supply of Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers and complete with all aluminium construction volume control dampers. As per detailed specifications provided.	-	1	SQMTR	-	-
Supply of Paint for painting of all the equipment and accessories specified with two coats of synthetic enamel paint of approved colour and as specified by Engineer-in-charge As per detailed specifications	-	1	Lot	-	-

provided.					
Supply of Thermal insulation of supply and return air ducting. As per detailed specifications provided.	-	35	SQMTR	-	-
Supply of Duct silencers in the Supply air and Return Air path, designed to attenuate the noise to meet NC-50 curve. As per detailed specifications provided.	-	5	SQMTR	-	-
Supply of Variable frequency drive for AHU for minium capacity - 15 HP, suitable for 3Ph, 415V input supply, line choke etc, for controlling speed of centrifugal blower. As per detailed specifications provided.	-	1	No.	-	-
Supply of Electrical panel and complete power system for satisfactory operation of AHU	-	1	Set	-	-

with Aluminum/Copper conductor cables, cable trays end terminations in between panels. As per detailed specifications provided.					
Supply of items for Minor civil works like foundations/ pedestals for air handling units and cutting away and making good of openings in walls/ceiling etc for passage of pipes, ducts, cables, etc. complete as required. As per detailed specifications provided.	-	1	Lot	-	-
Installation, Testing and commissioning of Air handling unit, double skin with 23+/- 2 mm thick PUF insulation, with min. air flow of 24000 CFM , min. static pressure of 50 mm Wg, DIDW centrifugal fan	-	1	No.	-	-



with VFD drive. As per detailed specifications provided.					
Installation, Testing and commissioning of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.63 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	230	SQMTR	-	-
Installation, Testing and commissioning of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.8 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications	-	75	SQMTR	-	-

provided.					
Installation, Testing and commissioning of Pre-fabricated GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 1.0 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	65	SQMTR	-	-
Installation, Testing and commissioning of Galvanised steel construction volume control dampers within ducts to be provided with suitable ducts lever and quadrants. As per detailed specifications provided.	-	4.5	SQMTR	-	-
Installation, Testing and commissioning of Supply air Aluminium grilles/	-	5	SQMTR	-	-

diffusers with volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.					
Installation, Testing and commissioning of Return air Aluminium grilles/ diffusers without volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.	-	5	SQMTR	-	-
Installation, Testing and commissioning of 100 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.	-	15	MTR	-	-
Installation,	-	10	MTR	-	-

Testing and commissioning of 80 mm dia MS class C pipe complete with fittings, insulation, supports etc. As per detailed specifications provided.					
Installation, Testing and commissioning of 100 mm dia butterfly valve complete with fittings and insulation etc. As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of 100 mm dia balancing cum flow measurement valve complete with fittings and insulation etc. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of 80 mm dia 3 way mixing valve	-	1	No.	-	-

complete with modulating motor, thermostat, fittings and insulation etc. As per detailed specifications provided.					
Installation, Testing and commissioning of 80 mm dia globe valve complete with fittings and insulation etc. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of 100 mm dia flexible pipe connectors complete with fitting, insulation etc. As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Dial type thermometer As per detailed specifications provided.	-	2	No.	-	-

Installation, Testing and commissioning of 100 mm dia pressure gauges ( with pet cock / gate valve ) As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Automatic Air vents As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Drain plugs. As per detailed specifications provided.	-	2	No.	-	-
Installation, Testing and commissioning of Heating kit comprising of strip heaters, in three independent operating banks, in main supply air duct with a minimum capacity of 12 KW (3x4KW) complete	-	1	Set	-	-

Electrical and instrumentation. As per detailed specifications provided.					
Installation, Testing and commissioning of Stainless steel Panhumidifier kit of adequate capacity for seasonal operation complete with all fittings, inlet lines, electrical and instrumentation. As per detailed specifications provided.	-	1	Set	-	-
Installation, Testing and commissioning of Motorised fire and smoke dampers in supply/return air duct/path complete with inbuilt temperature and smoke sensor, an auxiliary switch to trip the AHU and close damper. As per detailed specifications	-	5	SQMTR	-	-

provided.					
Installation, Testing and commissioning of Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers and complete with all aluminium construction volume control dampers. As per detailed specifications provided.	-	1	SQMTR	-	-
Applicaion of Paint for painting of all the equipment and accessories specified with two coats of synthetic enamel paint of approved colour and as specified by Engineer-in-charge As per detailed specifications provided.	-	1	Lot	-	-
Installation, Testing and commissioning of Thermal insulation of	-	35	SQMTR	-	-



supply and return air ducting. As per detailed specifications provided.					
Installation, Testing and commissioning of Duct silencers in the Supply air and Return Air path, designed to attenuate the noise to meet NC-50 curve. As per detailed specifications provided.	-	5	SQMTR	-	-
Installation, Testing and commissioning of Variable frequency drive for AHU for minium capacity - 15 HP, suite for 3Ph, 415V input supply, line choke etc, for controlling speed of centrifugal blower. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of Electrical panel	-	1	Set	-	-

and complete power system for satisfactory operation of AHU with Aluminum/Copper conductor cables, cable trays end terminations in between panels. As per detailed specifications provided.					
Installation of items for Minor civil works like foundations/ pedestals for air handling units and cutting away and making good of openings in walls/ceiling etc for passage of pipes, ducts, cables, etc. complete as required. As per detailed specifications provided.	-	1	Lot	-	-
Supply of min. 8.3 TR Ductable split AC unit delivering 3300 CFM, with hermetically sealed scroll compressor(s), suitable for ambient	-	1	No.	-	-

conditions at Chandigarh. As per detailed specifications provided.					
Supply of Supply air GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.63 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	35	SQMTR	-	-
Supply of Supply air GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.8 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	25	SQMTR	-	-
Supply of Supply air Aluminium grilles/ diffusers with volume	-	0.75	SQMTR	-	-

control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.					
Supply of Return air Aluminium grilles/ diffusers without volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.	-	1.2	SQMTR	-	-
Supply of Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers and complete with all aluminium construction volume control dampers. As per detailed specifications provided.	-	0.16	SQMTR	-	-
Supply of Motorised fire	-	0.75	SQMTR	-	-

and amoke dampers in supply/return air duct/path complete with inbuilt temperature and smoke sensor an auxilary switch to trip the AHU and close damper. As per detailed specifications provided.					
Supply of Acoustic insulation of supply air ducting immediately after discharge of Split unit with 25 mm thick fibre glass and covered with R.P tissue and perforated aluminium sheet and complete as required. As per detailed specifications provided.	-	5	SQMTR	-	-
Supply of Drain piping to the extent of 10 RM with insulated 25 mm dia pipe and terminating at agreed drain points. As per detailed specifications	-	25	MTR	-	-

provided.					
Installation, Testing and commissioning of min. 8.3 TR Ductable split AC unit delivering 3300 CFM, with hermetically sealed scroll compressor(s), suitable for ambient conditions at Chandigarh. As per detailed specifications provided.	-	1	No.	-	-
Installation, Testing and commissioning of Supply air GSS duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.63 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.	-	35	SQMTR	-	-
Installation, Testing and commissioning of supply air GSS	-	25	SQMTR	-	-

duct confirming to IS:655, duct material grade 120 confirming to IS:277, thickness 0.8 mm, complete with dampers, hangers, anchor fasteners, vanes etc. As per detailed specifications provided.					
Installation, Testing and commissioning of Supply air Aluminium grilles/ diffusers with volume control dampers with necessary frame work etc. and complete as required including paint. As per detailed specifications provided.	-	0.75	SQMTR	-	-
Installation, Testing and commissioning of Return air Aluminium grilles/ diffusers without volume control dampers with necessary frame work etc. and complete as	-	1.2	SQMTR	-	-

required including paint. As per detailed specifications provided.					
Installation, Testing and commissioning of Fresh air intake louvers made of extruded aluminium with bird/insect screen provided with intake louvers and complete with all aluminium construction volume control dampers. As per detailed specifications provided.	-	0.16	SQMTR	-	-
Installation, Testing and commissioning of Motorised fire and amoke dampers in supply/return air duct/path complete with inbuilt temperature and smoke sensor an aiuxiliary switch to trip the AHU and close damper. As per detailed specifications	-	0.75	SQMTR	-	-



provided.					
Installation, Testing and commissioning of Acoustic insulation of supply air ducting immediately after discharge of Split unit with 25 mm thick fibre glass and covered with R.P tissue and perforated aluminium sheet and complete as required. As per detailed specifications provided.	-	5	SQMTR	-	-
Installation, Testing and commissioning of Drain piping to the extent of 10 RM with insulated 25 mm dia pipe and terminating at agreed drain points. As per detailed specifications provided.	-	25	MTR	-	-
Supply of Minimum 4 TR cassette type Split AC units with cordless remote control, with	-	8	No.	-	-

copper coils, suitable for ambient weather conditions at Chandigarh for Exhibition Hall. As per detailed specifications provided.					
Supply of Minimum 1.5 TR cassette type Split AC units with cordless remote control, with copper coils, suitable for ambient weather conditions at Chandigarh for lounge. As per detailed specifications provided.	-	2	No.	-	-
Supply of Minimum 1 TR cassette type Split AC units with cordless remote control, with copper coils, suitable for ambient weather conditions at Chandigarh for green rooms. As per detailed specifications provided.	-	2	No.	-	-

Supply of Minimum 3 TR cassette type Split AC units with cordless remote control, with copper coils, suitable for ambient weather conditions at Chandigarh for Ground Floor Lobby/Lounge. As per detailed specifications provided.	-	2	No.	-	-
Supply of Minimum 3 TR cassette type Split AC units with cordless remote control, with copper coils, suitable for ambient weather conditions at Chandigarh for First Floor Lobby/Lounge. As per detailed specifications provided.	-	2	No.	-	-
Supply of Copper Refrigerant piping along with nitrile rubber insulation and with suitable power/control wiring interconnecting	-	250	MTR	-	-

indoor and outdoor units as required and complete. As per detailed specifications provided.					
Supply of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point with "U" trap. As per detailed specifications provided.	-	210	MTR	-	-
Supply of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection As per detailed specifications provided.	-	110	MTR	-	-
Supply of Powder coated MS Stand for Out door Units. As per detailed specifications provided.	-	16	No.	-	-
Installation, Testing and commissioning of cassette type Split	-	16	No.	-	-

AC units and making good of opening in walls / ceilings for running refrigerant/drain pipes, and as directed by Engineer-in-Charge. As per detailed specifications provided.					
Installation, Testing and commissioning of Copper Refrigerant piping along with nitrile rubber insulation and with suitable power/control wiring interconnecting indoor and outdoor units as required and complete. As per detailed specifications provided.	-	250	MTR	-	-
Installation of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point with "U" trap. As per detailed	-	210	MTR	-	-

specifications provided.					
Installation of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection As per detailed specifications provided.	-	110	MTR	-	-
Installation of Powder coated MS Stand for Out door Units. As per detailed specifications provided.	-	16	No.	-	-
Supply of Minimum 2 TR Hi-wall Split AC units with cordless remote control, with copper coils, with 5 Star rating, suitable for ambient weather conditions at Chandigarh for UPS room. As per detailed specifications provided.	-	3	No.	-	-
Supply of copper Refrigerant piping along with nitrile rubber insulation and with suitable	-	25	MTR	-	-

power/control wiring interconnecting indoor and outdoor units as required and complete. As per detailed specifications provided.					
Supply of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point with "U" trap. As per detailed specifications provided.	-	15	MTR	-	-
Supply of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection As per detailed specifications provided.	-	20	MTR	-	-
Supply of powder coated MS stand for Out Door Units As per detailed specifications provided.	-	3	No.	-	-
Installation, Testing and	-	3	No.	-	-

commissioning of Minimum 2 TR Hi-wall Split AC units with and making good of opening in walls / ceilings for running refrigerant/drain pipes as required and as directed by Engineer-in-Charge. As per detailed specifications provided.					
Installation, Testing and commissioning of copper Refrigerant piping along with nitrile rubber insulation and with suitable power/control wiring interconnecting indoor and outdoor units as required and complete. As per detailed specifications provided.	-	25	MTR	-	-
Installation of 25 mm PVC drain pipe for taking condensate drain from indoor units and terminating at agreed drain point	-	15	MTR	-	-



with ""U"" trap. As per detailed specifications provided.					
Installation of PVC casing pipe of 75 mm dia for encasing refrigerant pipes for mechanical protection As per detailed specifications provided.	-	20	MTR	-	-
Installation of powder coated MS stand for Out Door Units As per detailed specifications provided.	-	3	No.	-	-

Break-up of other taxes and other costs should be specified in respective narration columns.

Sum of these Break-up values should be specified in respective value columns.

**Supporting Documents from Vendor (Commercial)**

**Document attachment with price bid**

**Attachment - I:**

**Attachment - II:**

