



MAHATMA GANDHI MISSION TRUST
MGM INSTITUTE OF HEALTH SCIENCES, CENTRAL PURCHASE DEPARTMENT (CPD)

3. B) Etender for Lowside HVAC System.

Tenders invited from reputed Manufactures or their authorised distributors / dealers of Lowside HVAC System at MGM Hospital, Sanpada, Navi Mumbai in the format given below:

Name & Address of Vendor: _____

HVAC SYSTEM - BOQ

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	HVAC SYSTEM					
1.00	Installation of AHRI certified water cooled screw chilling machines having minimum capacity of min. 250 TR at site condition with VFD, suitable for operation comprising of the following complete as per specification & Data Sheet. i) Single/Multiple screw type compressor semi-hermetic complete with automatic capacity control, safety switches, speed increasing gears, forced feed lubrication system etc. as per specifications. ii) The unit shall be designed to unload upto 25% of its rated capacity at Constant Condenser Water Entering Temperature at AHRI conditions. The compressor shall have mechanism for stable operation at part loads. iii) Lot- Initial/first charge of refrigerant gas and compressor oil. iv) Lot- Necessary vibration isolation mountings for the chilling unit as per manufacturer's drawing. v) All other items mentioned in the Technical Data sheet. vi) Active Harmonic filters to restrict upto 5% on all percentage load shall be considered as integral part of the chiller. (The Chiller Manufacturer shall give a testing at factory or site including the harmonic filters. The chiller display shall also have the indication of Harmonic levels at all the percentage of loads. Note - The Chiller AMC shall be inclusive of Harmonic filter and other associated banks also)	2	Each			
2.00	Installation of AHRI certified Magnetic Oil Free chilling machines having minimum capacity of min. 250 TR at site condition with VFD, suitable for operation comprising of the following complete as per specification & Data Sheet. (All the detials remain same as Water Cooled Screw Chilling Machine)	1	Set			
3.00	Installation of AHRI certified Air cooled screw chilling machines having minimum capacity of min. 250 TR at site condition with VFD, suitable for operation comprising of the following complete as per specification & Data Sheet. (All the detials remain same as Water Cooled Screw Chilling Machine)	1	Each			
4.00	Installation, testing & commisioninng of Anti Fouling Condenser System for 4# Chillers (2# present and 2# in the future), the Common Skid for the required number of chillers shall include 7" Touch Screen Graphical PLC, one injection/collection pump, motorized valves and complete with all accessories and Low side activities of piping connections from Ball traps to Ball collectors and Chillers. The motorized valve shall give signals to PLC of their functioning and all process of injection and collection should be shown on the PLC while in operation. The Common Skid piping, Ball Trap to suit chiller capacity and chiller quantity.	1	Set			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
5.00	<p>CHILLER PLANT OPTIMIZER as described below.</p> <p>a) Installation of CHILLER PLANT OPTIMISER (CPO) as per specifications and IO summary to control and monitor chillers and other auxiliary equipment in the plant room and as given below and to provide output in BacNet over IP. The cost to be inclusive of supplying & installing all necessary accessories as required to complete the installation. Inclusive all necessary sensors, cabling etc. complete as required.</p> <p>i) - Chillers of 250TR - 4Nos. (3# Water Cooled and 1# Air Cooled) ii) - Variable Condenser Water Pumps - 3 Nos. iii) - Variable Primary Chilled Water Pumps - 4 Nos. iv) - Variable Secondary Chilled Water Pumps - 6 Nos (Zone A-3# & Zone B - 3#) v) - Cooling Towers - 3 Nos. v) Twin Pump Pressurisation Unit with Expansion tank & automatic water makeup - 1 Set</p> <p>b) Installation of the Central Control Stations consisting of Operator Workstation Intel i7 +Processor(Latest Technology) with min 1 TB HDD, min 16 GB RAM, 2 GB Enhanced graphic Card, DVD Combo Drive, Ethernet Port with Dual Screen Ports. With Windows 10 License suitable to BMS software or any latest version of OS with Anti virus, complete as per Specification.Latest version of MS office package to be provided - 1 Lot.</p> <p>c) 24" colour monitor flat screen LED display with complete wall mounted /table mounted Brackets as per specifications- 1 Lot. d) Manufacturer to give a performance bank guarantee for a minimum period of 5 years for the Highside plant power consumption for the committed value) e) 2# Chillers will be installed in phase 1. The plant optimiser is having all the provision for accomdating the balance 2 chillers and other equipments in phase 11 with out any addition of modification of plant optimiser.</p>	1	Job			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	<p>e) - SOFTWARES</p> <p>i) Installation of the Software for CPO System as per technical Specifications with minimum 3 nos. of web license. Supervisory controller should be directly Integrated with BMS server on BACnet over IP. Software shall have the capacity to accommodate hard points as per IO summary.</p> <p>ii) Supply of software interface with PUMPS / Cooling Towers' VFD (12 Nos.) for two way flow of data between CPM and panels. The price quoted shall include the necessary integrator required for integration and also the networking of all chiller panels. All VFD's will be integrated on Open Protocol over IP with CPM (VFD quantity are mention in IO Summary)- 1 Lot</p> <p>iii) Supply of software interface for Energy Meter (Upto 20 Nos.) for Chillers, Primary Pumps, Secondary Pumps, Condenser Pumps and Cooling Towers .The price shall include the necessary integrator / gateway required for integration. All EMs will be integrated on open Protocol over IP with CPM - 1 Lot</p> <p>f) Supply of equipment for CPO Stand alone Microprocessor based 32 Bit, UL Listed DDC Controllers with BACnet testing lab certified (BTL) & Network & Supervisory controller on BACnet/IP units for connecting all field DDC controllers as per the specifications for hard wired IO points. The contractor shall decide upon the number of controllers, depending on his Controller capacity. Expandable modules for Inputs/Outputs. Plug in relays , DDC shall be with all accessories & shall be suitable for future expansion. The above shall be housed in IP45, lockable ,Standard Power Supply, Secure MS powder coated Cabinets to be supplied along with the DDC Controller's Connecting Cables. The CPO should be seamlessly Integrated with BMS on Bacnet Over IP Protocol. Necessary cabling from field devices to plant Manager shall be included- 1 Lot.</p>					
	<p>g) Supply, Installation, testing & commissioning of following Sensors & Field devices</p> <p>i) - Pressure transmitters for measuring pressure in water (0-16 Kg/cm. sq). Price should be with all necessary fittings & Accessories to install the same as per Specification- 2 Nos.</p> <p>ii) - Water Differential pressure switches across the pumps for indicating the pumps Run status. Price should be with all necessary fittings & Accessories to install the same as per Specification- 13 Nos.</p> <p>iii) - Water Differential pressure Transmitter (0-8 Kg/cm. sq) across the Evaporator for measuring the flow. Price should be with all necessary fittings & Accessories to install the same as per Specification- 4 Nos.</p> <p>iv) - Water Differential pressure Transmitter (0-2 Kg/cm. sq) across hydraulically farthest AHUs. Price should be with all necessary fittings & Accessories to install the same as per Specification- 1 Nos.</p> <p>v) - Level transmitter suitable for mounting in cooling tower basin for high-low level monitoring as per technical Specification- 3 Nos.</p> <p>vi) - Immersion Temperature Sensor with Thermowell as per technical Specification- 40 Nos.</p> <p>vii) - Outside Air Temperature & Humidity Sensor as per technical Specification- 1 No.</p> <p>viii) - 2 C x 1.5 Sqmm ATC (Annealed Tinned Copper) Shielded armoured cable - 500 RMT.</p> <p>ix) - 2 Pair 18 AWG Shielded ATC armoured communication cable - 250 RMT.</p>					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
6.00	<p>COOLING TOWER: Installation of "CTI" certified cooling towers. Fan and motor shall be suitable for operating through VFD Complete as required confirming to specification and technical data sheet. Cooling tower for air-conditioning system shall be selected on the basis of water IN temperature 36.8°C - OUT temperature 31.3°C and ambient wet bulb 28.3°C. Selected cooling tower shall be certified for test procedure as per CTI ATC-105 & CTI STD-201 with up to date amendment. The cooling tower shall be as follows:</p> <p>Cooling Tower as described above suitable for 250 TR Water Cooled screw Chillers. Heat Rejection Capacity - Suitable for 950000 Kcal/Hr Water Flow rate - 2850 LPM Condenser Water In - 36.8 °C Condenser Water Out - 31.3 °C</p> <p>Note: The foundation as required shall be constructed and is covered under civil scope of work. AC Vendor shall give the design intent of the foundation.</p>	2	Each			
7.00	<p>Primary Chilled Water Pumps. Instllation of Primary Chilled Water Pumps and suitable VFD panel as specified and details given in the data sheet. (3 pumps) Capacity : 1900 LPM of Each Pump Head : 16.0 m Min Pump Efficiency : 75%</p> <p>VFD panel. Installing & testing of VFD controlled pump panel for Chilled Water Pump consisting of variable frequency drive (VFD) for each pump, one dedicated microprocessor based pump controller per zone housed within the enclosure of one of the VFD with parallel pumping software duly down loaded and differential pressure sensor / transmitters along with complete control cabling from transmitter to VFD Panel as per the site requirement. The entire system along with pumps as described in the pump section must be sourced from single manufacturer only, to ensure unit responsibility. Necessary factory test certificates for entire system shall be submitted along with the equipment. Sensor / Transmitters as described in specification. System shall be BMS compatible with open protocol communication port, so that complete data can be transported to remote IBMS console. Pumps shall be installaed on inertia based foundation. (Set Consists of 4 pumps & VFD panel - 1 Pump and VFD will be installed later. All provision to add in later stage without any modification or addition)</p>	1	Set			
8.00	<p>Secondary Chilled Water Pumps. (Zone - A) Installation of Primary Chilled Water Pumps and suitable VFD panel as specified and details given in the data sheet. (3 pumps) Capacity : 2100 LPM of Each Pump Head : 24.0 m Min Pump Efficiency : 75%</p> <p>VFD panel. Installing & testing of VFD controlled pump panel for Chilled Water Pump consisting of variable frequency drive (VFD) for each pump, one dedicated microprocessor based pump controller per zone housed within the enclosure of one of the VFD with parallel pumping software duly down loaded and differential pressure sensor / transmitters along with complete control cabling from transmitter to VFD Panel as per the site requirement. The entire system along with pumps as described in the pump section must be sourced from single manufacturer only, to ensure unit responsibility. Necessary factory test certificates for entire system shall be submitted along with the equipment. Sensor / Transmitters as described in specification. System shall be BMS compatible with open protocol communication port, so that complete data can be transported to remote IBMS console. Pumps shall be installaed on inertia based foundation. (Set Consists of 3 pumps & VFD panel)</p>	1	Set			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
9.00	<p>Condenser Water Pumps. Installation of Condenser Water Pumps as specified and details given in the data sheet. (3 Pumps) Capacity : 2850 LPM of Each Pump Head : 22.0 m Min Pump Efficiency : 75%</p> <p>VFD panel. Installation, testing and commissioning of VFD controlled pump panel for Condenser Water Pump consisting of variable frequency drive (VFD) for each pump, one dedicated microprocessor based pump controller per zone housed within the enclosure of one of the VFD with parallel pumping software duly down loaded and differential pressure sensor / transmitters along with complete control cabling from transmitter to VFD Panel as per the site requirement. The entire system along with pumps as described in the pump section must be sourced from single manufacturer only, to ensure unit responsibility. Necessary factory test certificates for entire system shall be submitted along with the equipment. Sensor / Transmitters as described in specification. System shall be BMS compatible with open protocol communication port, so that complete data can be transported to remote IBMS console. Pumps shall be installed on inertia based foundation. (Set Consists of 3 pumps & VFD panel)</p>	1	Set			
10.00	<p>RECIRCULATED AIR HANDLING UNITS FOR OPERATING ROOMS +VE ISOLATION ROOM</p> <p>I) Supply ,Installation ,Testing and commissioning of Double skin Recirculating type Air Handling unit (Panel Thickness of 40mm+/- 2mm) with thermal break profile complete with casing of hot dip G.I Casing of thickness of 0.8 mm pre -coated and pre -plasticized G.I for outer skin and 0.8 mm plain & G.I for Inner Skin encasing with 40mm polyurethane foam insulation having a density of 40 Kg. / CuM factory injected between them by injection moulding machine with thermal break profile for Air Handling Unit.unit shall be Ceiling / Floor Mounted type with 1 / 2 fans direct drive backward curved plug fan suitable for static pressure as required, with 3 stage filtration banks of MERV 7 & MERV 14 (Shall be mounted after fan section) filtration efficiency & HEPA at Terminal, drive set , 8 row deep chilled water coil, 8 Row Deep Refrigerant DX-coil suitable to connect VRF/VRV ODU, Electric Heater Bank(For AHUs as mention below) for RH control, UVGI lamp with stand by in quantity for CHW coil (AHRI certified) & Refrigerant DX-coil (AHRI certified) as below specification, SS 304 insulated drain pan. The unit includes suitable class IE3 TEFC motor with IP55 protection, suitable for 415 +/- 10 % volt , 50 ±5% cycle , combined power supply variation of ±10%, 3 Phase AC supply , vibration isolators,Rubber pads (min 1 inch thick), canvas connection ,bulk head light, door limit switches as per specification/datasheet. AHU should supply with necessary VFD (Qty of VFD should be as per no. of Fan) . AHUs shall be fitted with Aluminum VCD's (Volume Control Damper) for supply /fresh air / purge air opening of AHU body with canvass connection. All supporting GI hangers, MS angles, channels nut , bolts, washers etc. necessary for unit installation shall be inclusive in the cost. All AHUs shall be suitable for Static Pressure as mentioned below. Vendor to consider the suitable size of FRLS power cable from panel to unit in scope of supply.</p> <p>II) The variable frequency drive shall be PWM type (Pulse width modulation) microprocessor based .The drive shall have a keypad control, a LCD display module, and manual ON/OFF switch and bypass switch. The VFDs shall have integrated, factory built metallic enclosures of IP 52 rating, without any de-rating. VFDs shall conform to the recognized international standards like IEC and manufactured according to ISO 9001, BS 5750 part 1 & 2 and shall be UL listed. The VFDs shall have internal harmonic filters on both limbs of the DC bus to reduce current harmonics and protection for Electronic motor overload, Protection to motor and VFD against input transients, phase loss, short circuit, under voltage, over voltage, phase imbalance, motor over temp., phase to phase short circuit or earth fault at motor terminals.VFD shall be ready for BMS .(VFD shall have lowest speed locking arrangement to maintain desired minimum ACPH inside the area). Interlocking terminals & control wiring for fire damper, motorized dampers etc. as per control scheme from panel to damper etc. Including suitable FRLS Power cable, Control Cabling & double run earthing , cable tray from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications.</p> <p>III) The VFD bypass starter panel shall include (a) Suitable rating incoming MCCB/MCB, (b) Suitable rating AC-3 duty contactor(s), (c) overload relay with built-in single phasing preventer, (d) star delta timer (For S/D starters), (e)digital voltmeter, ammeter, selector switches, CTs & control MCBs, (f) Phase indicating lights & control MCBs, (g) Push buttons for manual start/stop of motor, ON status indicating light for starter with control MCB, (h) Minimum 2 pole auto/manual selector switch 4 NO + 4 NC potential free aux. contacts for use by Building automation system (i) Time delay relay for delayed restart of motor (j) 200-220/24V control power transformer (k) Interlocking terminals & control wiring for fire damper, motorized dampers etc. as per control scheme from panel to damper etc. Including suitable Power cabling & double run earthing from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications. Cost of VFD drive & VFD bypass starter panel along with power control cabling, earthing ,cable tray etc. upto 15 mtr.length as mentioned below shall be inclusive in the AHU cost.</p>					

SI. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	IV) Supply, installation, testing and commissioning of the UVGI unit to be fitted upstream portion of Chilled Water coil & VRF refrigerant DX- cooling coil of Air cooled condenser outdoor unit (for Cooling Coil Treatment & to Improve Indoor Air Quality) with Reflector, lamp status display, audio-visual lamp failure alarm , lamp lifetime counter, lamp replacement reminder & SS stand.UVGI System shall be designed with scientifically developed UV sizing software in reference with CFD analysis & generate a report to prove the UV delivery of designed intensity.UVGI system for disinfection shall utilize high output UV lamp. The reflector shall "Dish Antenna" Shape to utilize 100% of UV & it MOC will be Anodized Aluminum. The electrical control system should utilize high frequency electronic ballasts and provide efficiency of more then 90%. System shall have a Dry Contacts or A 4-20 mA output shall also be provided for BMS compatibility. Control Power panel with necessary wiring & cabling to UVGI system unto 15 Mtr.length shall be inclusive in the cost. UVGI system shall be provided for following AHUS for Air capacities as mentioned below respectively					
10.01	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-1_AHU-01 CFM : 3200 TR : 7.1 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			
10.02	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-2_AHU-02 CFM : 3100 TR : 7.0 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			
10.03	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-3_AHU-03 CFM : 3000 TR : 6.5 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			
10.04	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-4_AHU-04 CFM : 3000 TR : 6.5 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
10.05	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-5_AHU-05 CFM : 3000 TR : 6.5 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			
10.06	Floor : Service floor (5th) AHU Tag No : 5F_FM_OT-5_AHU-05 CFM : 1200 TR : 2.4 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 8 Row DX Cooling coil : 8 Row UVGI Lamp : Yes ESP : 85 mmwg Mixing box : Yes	1	Each			
11.00	UVGI LAMP for (OT,ICU & +VE ISLOATION) Supply, installation, testing and commissioning of the UVGI unit to be fitted upstream portion of VRF Refrigerant DX- cooling coil (for Cooling Coil Treatment & to Improve Indoor Air Quality) with Reflector, lamp status display, audio-visual lamp failure alarm , lamp lifetime counter, lamp replacement reminder & SS stand.UVGI System shall be designed with scientifically developed UV sizing software in reference with CFD analysis & generate a report to prove the UV delivery of designed intensity.UVGI system for disinfection shall utilize high output UV lamp. The reflector shall "Dish Antenna" Shape to utilize 100% of UV & it MOC will be Anodized Aluminum. The electrical control system should utilize high frequency electronic ballasts and provide efficiency of more then 90%. System shall have a Dry Contacts or A 4-20 mA output shall also be provided for BMS compatibility. Control Power panel with necessary wiring & cabling to UVGI system upto 15 Mtr.length shall be inclusive in the cost. UVGI system shall be provided for following AHUS for Air capacities as mentioned below respectively.					
11.01	Floor- Service floor (5th), AHU Tag No: 5F_FM_OT-1_AHU-01	1	Each			
11.02	Floor- Service floor (5th), AHU Tag No: 5F_FM_OT-2_AHU-02	1	Each			
11.03	Floor- Service floor (5th), AHU Tag No: 5F_FM_OT-3_AHU-03	1	Each			
11.04	Floor- Service floor (5th), AHU Tag No: 5F_FM_OT-4_AHU-04	1	Each			
11.05	Floor- Service floor (5th), AHU Tag No: 5F_FM_OT-5_AHU-05	1	Each			
11.06	Floor- Service floor (5th), AHU Tag No: 5F_FM_ISOLATION (+VE) _AHU-09	1	Each			
11.07	Floor- Service floor (5th), AHU Tag No: 5F_FM_ICU RHS_AHU-08	1	Each			
11.08	Floor- Service floor (5th), AHU Tag No: 5F_FM_ICU-LHS_AHU-10	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
12.00	RECIRCULATED AIR HANDLING UNITS					
	I) Supply ,Installation ,Testing and commissioning of Double skin Air Handling unit (Panel Thickness of 40mm+/-2mm) with thermal break profile complete with casing of hot dip G.I Casing of thickness of 0.8 mm pre -coated and pre -plasticized G.I for outer skin and 0.8 mm plain & G.I for Inner Skin encasing with 40mm polyurethane foam insulation having a density of 40 Kg. / CuM factory injected between them by injection moulding machine with thermal break profile recirculating Air Handling Unit along with Mixing box. AHU should be ceiling / Floor Mounted type with 1 / 2 fans backward curved plug fan suitable for static pressure as required, with 2 stage filtration banks of MERV 7 & MERV 14 (Shall be mounted after fan section) filtration efficiency, drive set , 6/8 row deep chilled water coil, Electric Heater Bank(For AHUs as mention below) for RH control, UVGI lamp with stand by in quantity for CHW coil (AHRI certified) & Refrigerant DX-coil (AHRI certified) as below specification, SS 304 insulated drain pan. The unit includes suitable class IE2, TEFC motor with IP55 protection, suitable for 415 +/- 10 % volt , 50 ±5% cycle , combined power supply variation of ±10%, 3 Phase AC supply , vibration isolators,Rubber pads (min 1 inch thick) , canvas connection ,bulk head light,door limit switches as per specification/datasheet. AHU should supply with necessary VFD (Qty of VFD should be as per no. of Fan) . AHUs shall be fitted with GI VCD's (Volume Control Damper) for supply/return/fresh air / purge air opening of AHU body with canvass connection. All supporting GI hangers, ,MS angles, channels nut , bolts, washers etc. necessary for unit installation shall be inclusive in the cost. All AHUs shall be suitable for Static Pressure as mentioned below. Vendor to consider the suitable size of FRLS power cable from panel to unit in scope of supply.					
	II) The variable frequency drive shall be PWM type (Pulse width modulation) microprocessor based .The drive shall have a keypad control, a LCD display module, and manual ON/OFF switch and bypass switch. The VFDs shall have integrated, factory built metallic enclosures of IP 52 rating, without any de-rating. VFDs shall conform to the recognized international standards like IEC and manufactured according to ISO 9001, BS 5750 part 1 & 2 and shall be UL listed. The VFDs shall have internal harmonic filters on both limbs of the DC bus to reduce current harmonics and protection for Electronic motor overload, Protection to motor and VFD against input transients, phase loss, short circuit, under voltage, over voltage, phase imbalance, motor over temp., phase to phase short circuit or earth fault at motor terminals.VFD shall be ready for BMS .(VFD shall have lowest speed locking arrangement to maintain desired minimum ACPH inside the area). Interlocking terminals & control wiring for fire damper, motorized dampers etc. as per control scheme from panel to damper etc. Including suitable FRLS Power cable, Control Cabling & double run earthing , cable tray from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications.					
	III) The VFD bypass starter panel shall include (a) Suitable rating incoming MCCB/MCB, (b) Suitable rating AC-3 duty contactor(s), (c) overload relay with built-in single phasing preventer, (d) star delta timer (For S/D starters), (e)digital voltmeter, ammeter, selector switches, CTs & control MCBs, (f) Phase indicating lights & control MCBs, (g) Push buttons for manual start/stop of motor, ON status indicating light for starter with control MCB, (h) Minimum 2 pole auto/manual selector switch 4 NO + 4 NC potential free aux. contacts for use by Building automation system (i) Time delay relay for delayed restart of motor (j) 200-220/24V control power transformer (k) Interlocking terminals, control wiring & Power wiring for PIBC Valve , motorized dampers etc. as per control scheme from panel to damper etc. Including suitable Power cabling & double run earthing from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications. Cost of VFD drive & VFD bypass starter panel along with power control cabling, earthing ,cable tray etc. unto 10 mtr.length as mentioned below shall be inclusive in the AHU cost.					
12.01	Floor : Service floor (5th) AHU Tag No : 5F_FM_ICU RHS_AHU-08 CFM : 7350 TR : 21.0 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil : 6/8 Row DX Cooling coil : No UVGI Lamp : Yes ESP : 50 mmwg Mixing box : Yes	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	Floor : Service floor (5th) AHU Tag No : 5F_FM_ICU-LHS_AHU-10 CFM : 8000 TR : 23.0 Heater : (STRIP HEATER - 5 KW X 3Nos.) Chilled water coil: 6/8 Row DX Cooling coil : No UVGI Lamp : Yes ESP : 50 mmwg Mixing box : Yes	1	Each			
13.00	RECIRCULATED AIR HANDLING UNITS					
	<p>i) Supply ,Installation ,Testing and commissioning of Double skin Air Handling unit (Panel Thickness of 40mm+/-2mm) with thermal break profile complete with casing of hot dip G.I Casing of thickness of 0.8 mm pre -coated and pre -plasticized G.I for outer skin and 0.8 mm plain & G.I for Inner Skin encasing with 40mm polyurethane foam insulation having a density of 40 Kg. / CuM factory injected between them by injection moulding machine with thermal break profile recirculating Air Handling Unit along with Mixing box. AHU should be ceiling / Floor Mounted type with 1 / 2 fans backward curved plug fan suitable for static pressure as required, with 2 stage filtration banks of MERV 7 & MERV 14 (Shall be mounted after fan section) filtration efficiency, drive set , 6/8 row deep chilled water coil, Electric Heater Bank(For AHUs as mention below) for RH control, in quantity for CHW coil (AHRI certified) as below specification, SS 304 insulated drain pan. The unit includes suitable class IE3, TEFC motor with IP55 protection, suitable for 415 +/- 10 % volt , 50 ±5% cycle , combined power supply variation of ±10%, 3 Phase AC supply , vibration isolators,Rubber pads (min 1 inch thick), canvas connection ,bulk head light,door limit switches as per specification/datasheet. AHU should supply with necessary VFD (Qty of VFD should be as per no. of Fan) & with necessary standalone controller for temperature, RH% & Electrical strip heater controlling with necessary cabling(except for STERILE & SEMI STERILE CORRIDOR AHU which will be control & monitor through BMS). AHUs shall be fitted with GI VCD's (Volume Control Damper) for supply/return/fresh air / purge air opening of AHU body with canvass connection. All supporting GI hangers, ,MS angles, channels nut , bolts, washers etc. necessary for unit installation shall be inclusive in the cost. All AHUs shall be suitable for Static Pressure as mentioned below. Vendor to consider the suitable size of FRLS power cable from panel to unit in scope of supply.</p>					
	<p>ii) The variable frequency drive shall be PWM type (Pulse width modulation) microprocessor based .The drive shall have a keypad control, a LCD display module, and manual ON/OFF switch and bypass switch. The VFDs shall have integrated, factory built metallic enclosures of IP 52 rating, without any de-rating. VFDs shall conform to the recognized international standards like IEC and manufactured according to ISO 9001, BS 5750 part 1 & 2 and shall be UL listed. The VFDs shall have internal harmonic filters on both limbs of the DC bus to reduce current harmonics and protection for Electronic motor overload, Protection to motor and VFD against input transients, phase loss, short circuit, under voltage, over voltage, phase imbalance, motor over temp., phase to phase short circuit or earth fault at motor terminals.VFD shall be ready for BMS .(VFD shall have lowest speed locking arrangement to maintain desired minimum ACPH inside the area). Interlocking terminals & control wiring for fire damper, motorized dampers etc. as per control scheme from panel to damper etc. Including suitable FRLS Power cable, Control Cabling & double run earthing , cable tray from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications.</p>					
	<p>iii) The VFD bypass starter panel shall include (a) Suitable rating incoming MCCB/MCB, (b) Suitable rating AC-3 duty contactor(s), (c) overload relay with built-in single phasing preventer, (d) star delta timer (For S/D starters), (e)digital voltmeter, ammeter, selector switches, CTs & control MCBs, (f) Phase indicating lights & control MCBs, (g) Push buttons for manual start/stop of motor, ON status indicating light for starter with control MCB, (h) Minimum 2 pole auto/manual selector switch 4 NO + 4 NC potential free aux. contacts for use by Building automation system (i) Time delay relay for delayed restart of motor (j) 200-220/24V control power transformer (k) Interlocking terminals, control wiring & Power wiring for PIBC Valve , motorized dampers etc. as per control scheme from panel to damper etc. Including suitable Power cabling & double run earthing from starter panel to equipment's up to 15 mtrs length. All should be as mentioned in tender specifications. Cost of VFD drive & VFD bypass starter panel along with power control cabling, earthing ,cable tray etc. unto 10 mtr.length as mentioned below shall be inclusive in the AHU cost.</p>					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
13.01	Floor : Service floor (5th) AHU Tag No : 5F_FM_PRE & POST OP_AHU-06 CFM : 4500 TR : 14.0 Heater : No Chilled water coil : 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 50 mmwg Mixing box : Yes	1	Each			
13.02	Floor : STERILE-RESTRICTED CORRIDOR-1 AHU Tag No : FM-ST-PESSAGE-1-AHU-12 CFM : 900 TR : 2.2 Heater : No Chilled water coil : 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 50 mmwg Mixing box : Yes	1	Each			
13.03	Floor : STERILE-RESTRICTED CORRIDOR-2 AHU Tag No : FM-ST-PESSAGE-2-AHU-13 CFM : 600 TR : 1.4 Heater : No Chilled water coil : 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 50 mmwg Mixing box : Yes	1	Each			
13.04	Floor : First Floor Corridor AHU Tag No : AHU-1F-17 CFM : 5000 TR : 33.3 Heater : No Chilled water coil : 6 Row DX Cooling coil : No UVGI Lamp : Duct mounted UV Light ESP : 65 mmwg Mixing box : No	1	Each			
13.05	Floor : First Floor BIO MECHANICS LAB AHU Tag No : AHU-1F-18 CFM : 4000 TR : 6.8 Heater : No Chilled water coil : 6 Row DX Cooling coil : No UVGI Lamp : Duct mounted UV Light ESP : 55 mmwg Mixing box : No	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
13.06	Floor : 6th to 12th floor Corridor Treated fresh air unit AHU Tag No : AHU-6F to 12F -14 CFM : 5000 TR : 33.9 Heater : No Chilled water coil: 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 55 mmwg Mixing box : No	7	Each			
14.00	RECIRCULATED AIR HANDLING UNITS					
	I) Supply ,Installation ,Testing and commissioning of Double skin Air Handling unit (Panel Thickness of 40mm+/-2mm) with thermal break profile AHU complete with casing of hot dip G.I Casing of thickness of 0.8 mm pre -coated and pre -plasticized G.I for outer skin and 0.8 mm plain & G.I for Inner Skin encasing with 40mm polyurethane foam insulation having a density of 40 Kg. / CuM factory injected between them by injection moulding machine with thermal break profile along with Mixing box. AHU should be Floor Mounted type with 1 /2 backward curved centrifugal fans of belt drive type or direct drive type suitable for static pressure as required, with Single stage filtration banks of MERV 7 filtration efficiency, DOL / S-D-S Starter as per Latest OEM Type 2 Coordination chart , 6 row deep chilled water coil, SS 304 insulated drain pan.The unit includes suitable class IE2, TEFC motor with IP55 protection, suitable for 415 +/- 10 % volt , 50 ±5% cycle , combined power supply variation of ±10%, 3 Phase AC supply , vibration isolators,Rubber pads(min 1 inch thick), canvas connection ,bulk head light,door limit switches, Necessary standalone controller for temperature & RH% controlling with necessary cabling. AHUs shall be fitted with GI VCD's (Volume Control Damper) for supply/return/fresh air / purge air opening of AHU body with canvass connection. All supporting GI hangers, MS angles, channels nut , bolts, washers etc. necessary for unit installation,starter panel as mentioned below shall be inclusive in the cost. Vendor to consider the suitable size of FRLS power cable from panel to unit in scope of supply. All TFA's shall be suitable for Static Pressure as mentioned below :					
	II) The starter panel shall be Star-Delta/DOL type include (a) Suitable rating incoming MCB /MCCB, (b) Suitable rating AC-3 duty contactor(s), (c) overload relay with built-in single phasing preventer, (d) star delta timer (For S/D starters), CTs & control MCBs, (f) Phase indicating lights & control MCBs, (g) Push buttons for manual start/stop of motor, ON status indicating light for starter with control MCB, (h) Minimum 2 pole auto/manual selector switch & 4 NO + 4 NC potential free aux. contacts for use by Building automation system (i) Time delay relay for delayed restart of motor (j) 200-220V AC / 24V AC control transformer for control voltage (k) Interlocking terminals, control wiring from panel to PIBC Valve, motorized dampers etc. as per control scheme .All should be as mentioned in tender specifications.Panel Shall be suitable for Outdoor Conditions Minimum IP 52					
14.01	Floor : SERVICE FLOOR(5TH) AHU Tag No : 5F_FM_COMMON CORRIDOR_AHU-07 CFM : 2535 TR : 10.4 Heater : No Chilled water coil: 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 25 mmwg Mixing box : Yes	1	Each			
14.02	Floor : THIRD FLOOR(3RD) AHU Tag No : 3F_CS_AHU-11 CFM : 2400 TR : 6.0 Heater : No Chilled water coil: 6 Row DX Cooling coil : No UVGI Lamp : No ESP : 25 mmwg Mixing box : Yes	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
15.00	Supply, Installation, Testing & Commissioning of the Ceiling mounted Fan Coil Units, 3 speed Brushless DC motor, 3 rows cooling coil section, cleanable synthetic media filters, SS condensate drain pan with 9mm thick nitrile rubber insulation, powder coated galvanized steel housing, coil connections through copper pipes, condensate drain connections with insulated upvc pipe of 4mtr, wiring, control wiring in conduit up to thermostat boxes mounted on wall, Anchors, Hangers, Forged Brass ball valve set with and without strainer. The unit shall be provided with valve package comprising of pressure independent Balancing cum Control Valve with integrated 2 way motorized actuator in a single body for ON/OFF operation suitable for static pressure of 1600 kPa and actuator shall be capable of withstanding 400 kPa shut off pressure, suitable for 230 V AC incoming power supply, binder testing point, & automatic air vent. Fan coil unit shall be suitable for 230 ± 10% 50 Hz single phase power supply. Internal wiring 10 col along with power control cabling, earthing ,cable tray etc. unto 10					
15.01	1.0 TR nominal capacity as per Data Sheet given and mentioned above	RO	Each			
15.02	1.5 TR nominal capacity as per Data Sheet given and mentioned above	93	Each			
15.03	2.0 TR nominal capacity as per Data Sheet given and mentioned above	10	Each			
15.04	2.5 TR nominal capacity as per Data Sheet given and mentioned above	12	Each			
15.05	3.0 TR nominal capacity as per Data Sheet given and mentioned above	21	Each			
15.06	3.5 TR nominal capacity as per Data Sheet given and mentioned above	5	Each			
16.00	AIR COOLED VRF OUTDOOR UNITS FOR OT , +VE ISOLATION ROOM, UPS ROOM Supply, installation, testing & commissioning (SITC) of Air cooled VRV/VRF Outdoor Units with multiple compressors (preferred)/ complete with inverter based type hermetically sealed scroll compressors Enviornmental friendly refrigerant, cooling mode, low noise inverter based condenser fans, microprocessor panel with sequential starting of condensing unit, coils, electronic expansion valves, full gas charge,all vibration isolators, safeties etc. ODU to have specially factory coated treatment for heat & rust corrosion for panels, motor, electrical & heat exchanger etc. including suitable epoxy coated MS angle structure and Stand for mounting all Out Door Units with antivibration rubber pads, anchor fasteners, screw etc. Adequate length suitable cable of Power & controls with Starter Panel for connecting to respective ODU & IDU and suitable and sufficient provision of integration with Fire alarm system .Sufficient provisions for electrical interlocks to be provided. Contractor to select the system module capacity same or close to the mentioned capacity as per the availability of the ODU capacity as per manufacturing constraint. Air on condenser 45.0 Deg C.					
16.01	ODU tag no: VRF SYSTEM-01 HP-46, ODU type: Top discharge, Cowl piece- Required Area served: FOR FLOOR AHU - OT & + VE ISOLATION , Location: Terrace floor	1	Each			
16.02	ODU tag no: VRF SYSTEM-02 HP-10, ODU type: Top discharge, Cowl piece- Required Area served: FOR UPS ROOM HI WALL CASSETTE UNIT , Location: Terrace floor	1	Each			
17.00	Supplying, installing, testing and commissioning split type Inverter room Air conditioning unit having suitable to operate on250V, 50 cycles, A.C. supply having 1 no of air handling unit hiwall / floor mounting type complete with refrigerant R410 A/R32 and copper Condenser at position. Note :- Rates Should be inclusive of SITC of Necessary Copper piping with suitable thickness of insulation, Cable tray, Necessary control & power Cabling to the unit from Isolator to the unit (isolator will be located with 2mtr from unit).					
17.01	2.0 TR (800 CFM) HI Wall Unit	4	Each			
18.00	SITC of Centralized System Controller to control all the ODU's & IDU's with Machine coding, Colour display & Touch screen operated to control & operate all the indoor units per floor with self diagnoses of system. Vendor to submit catalogue of suggested model. Controller location & all controllers to synchronize with each other.	1	Set			
18.01	Supply, Installation, Testing & Commissioning of mirror finish inside / outside Refrigerant Piping, out of hard drawn copper pipes suitable for VRV system including all fittings like bends, elbows, tees with all internal joint type fittings. Pipe line must be tested for requisite pressure & must be supported at every 8 ft in intervals. Contractor is expected to make his own estimation as per site & drawing. All necessary supporting hanger, MS structure for supporting, anchor fastners, nut, bolts etc. to be included in the scope.	1	Lot			
18.02	Supply, installation, testing & commissioning of imported Refrigerant Distribution Joints (Refnets) complete with insulation for taking branches between one outdoor & various indoor units.	1	Lot			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
18.03	Supply, installation, testing & commissioning of insulation of All refrigerant piping with 19 mm thick class "O" closed cell nitrile rubber insulation with factory laminated one sided thicked glass woven clothed surface with density 45-60 kg/m ³ . Two coats of lag coating (Anti-fungal & vapour barrier -5590 standard. Joints shall be covered with nitrile rubber tape of 3 mm thick.	1	Lot			
18.04	Supply, installation, testing & commissioning of copper armoured power cables for outdoor & indoor units including necessary ancillaries like glands, clamps, screws, nut , bolts etc.	1	Lot			
18.05	Supply, installation, testing & commissioning of copper conductor communication cables for outdoor & indoor units including necessary ancillaries like glands, clamps, hangers, screws, nut, bolts etc.	1	Lot			
18.06	Supply, installation, testing & commissioning of ceiling suspended (Above false ceiling) perforated cable Trays for supporting refrigerant pipes, cables etc. running from outdoor to indoor units with necessary hangers, rods, washer, nut and bolts etc.	1	Lot			
18.07	Supply, installation, testing & commissioning of 16-gauge perforated GI Trays on terrace level for refrigerant pipes, cables etc including epoxy painted MS angle structure with necessary washer, nut, bolts etc.	1	Lot			
16.00	Supplying, installing, testing and commissioning split type Inverter room Air conditioning unit having suitable to operate on 250V, 50 cycles, A.C. supply having 1 no of air handling unit hiwall / floor mounting type complete with refrigerant R410 A/R32 and copper Condenser at position. Note :- Rates Should be inclusive of SITC of Necessary Copper piping with suitable thickness of insulation, Cable tray, Necessary control & power Cabling to the unit from Isolator to the unit (isolator will be located with 2mtr from unit).					
16.01	2.0 TR (800 CFM) HI Wall Unit	4	Each			
17.00	Supply, Installation & Testing of Chilled water cassette unit as specified and shown in the drawing, etc. consisting of: a) Valve package consisting of 2# Globe valve, 1# strainer, 1# Motorised two way on / off control valve rain valve, 3# Testing points, Automatic air vent and Flexible connection. b) Power wiring from the 5A switch socket within 2m along with a 5A plug top c) Control wiring (10C 1.5sqmm YRY cable) between the unit and thermostat including in conduit d) Supporting frame and suspenders, Earthing of motor and unit. e) Digital Thermostat for 220 V AC input					
17.01	0.8 TR nominal capacity as per Data Sheet given and mentioned above	11	Each			
17.02	1.6 TR nominal capacity as per Data Sheet given and mentioned above	3	Each			
18.00	Supply, Installation, Testing & Commissioning of the Digital on/off cooling thermostat with energy saving mode, LCD display, backlight, three speed controller for blower motor. Thermostat shall be mounted on the wall at suitable location. Internal wiring 10 core copper cable between Fan Coil unit and thermostat is included. Model no: Simens RDF510 or equivalent.	139	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
19.00	CIRCULAR INLINE FANS Supply, Installation, Testing and commissioning of Circular inline Fan shall be of DIDW, forward/ backward curved centrifugal impeller fitted with maintenance free external rotor motor, belt / direct drive type. Impeller material shall be Galvanized Steel. Motor shall be suitable for external power supply 200~220V/50Hz/Single Phase OR 415+10% v/50Hz/Three Phase. Fan should be of G.S.S. . Quoted price shall be inclusive of electronic speed regulator and wiring with 3 pin plug top between fan & speed regulator for single phase fans. Incase of 3 phase fans quoted price shall be inclusive of DOL starter panel with cabling between starter panel and fan. The incoming power supply to speed regulator / starter panel shall be provided by electrical contractor. All necessary supporting GI hanger, MS structure for supporting units, anchor fastners, nut, bolts ,MS angles, channels, washers etc. necessary for unit installation shall be inclusive in the cost. Gravity louver at fan discharge duct outlet shall be part of scope of supply. Static Pressure as mentioned below. Vendor to consider suitable size FRLS type power /signal cable supply for 3-phase application from relevant nurse station's industrial /normal socket to the starter panel of exhaust fan for manual starting of exhaust fans in case to expell out vomiting smell from ICU area. Industrial/normal socket provision shall be provided with other contractor.					
19.01	510 CFM, SP20 mm wg for OT-1 Exhaust fan-5th Floor	1	Each			
19.02	460 CFM, SP20 mm wg for OT-2 Exhaust fan-5th Floor	1	Each			
19.03	460 CFM, SP20 mm wg for OT-3 Exhaust fan-5th Floor	1	Each			
19.04	500 CFM, SP20 mm wg for OT-4 Exhaust fan-5th Floor	1	Each			
19.05	450 CFM, SP20 mm wg for OT-4 Exhaust fan-5th Floor	1	Each			
19.06	315 CFM, SP20 mm wg for Electrical room Exhaust fan-5th Floor	1	Each			
19.07	765 CFM, SP20 mm wg for OT isolation panel room Exhaust fan-4th Floor	1	Each			
19.08	1100 CFM, SP20 mm wg for Toilet area Exhaust fan-4th Floor	1	Each			
20.00	EXHAUST/FRESH AIR CENTRIFUGAL FANS : Supply, Installation,Testing & Commissioning of AMCA Certified (For Air and Sound Performance) ceiling hung / floor mounted cabinet type exhaust/ fresh air centrifugal fans of following capacity with GSS casing construction and Epoxy coated MS impellers with high efficiency aero-foil sections, blades, the impeller is belt driven by TEFC squirrel cage induction motor of IP 44 protection. Motor should be of high efficiency class IE3 (as per IS 12615) suitable for 3 Phase 50 Hz 415V ± 10 %, of class 'F' insulation, fire rated flexible connection etc. including all accessories complete as required and as per specifications. Fan total efficiency should not be less than 70%, noise level should not be more than as specified in the data sheet when measured in hemispherical reverberant room conditions. All the fans shall be hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen at inlet. The fan shall be provided with suitable rating TP MPCB with star delta starter within MS enclosure compete with cabling & Earthing between fan and starter panel, complete as required confirming to specification. Gravity louvers will be provided at the discharge of the fan so as to avoid reverse flow. Static pressure shall be checked/verified by contractor prior to order. Entire fan model & AMCA Seal shall appear in technical submittal of fan. Air moving capacity shall be as follows:					
20.01	1100 CFM, SP20 mm wg forToilet Exhaust fan-3rd Floor floor	1	Each			
21.00	RETURN/SUPPLY AIR AXIAL FLOW FANS : Supply, Installation, Testing & Commissioning of AMCA Certified (For Air and Sound Performance) ceiling hung / floor mounted supply air vane/tube axial flow fans of following capacity with GSS casing. construction and Epoxy coated MS impellers with high efficiency aero-foil sections, blades, the impeller directly driven by TEFC induction motor should be of high efficiency class IE3 (as per IS 12615) suitable for 3 Phase 50 Hz 415V ± 10 %, of class 'F' insulation, fire rated flexible connection etc. including all accessories complete as required and as per specifications. Fan total efficiency should not be less than 70 %, noise level should not be more than as specified in the data sheet when measured in hemispherical reverberant room conditions. All the fans shall be hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen / mechanical protection at inlet. The fan shall be provided with suitable rating TP MPCB with star delta starter within MS enclosure compete with cabling & Earthing between fan and starter panel, complete as required confirming to specification. Gravity louvers will be provided at the discharge of the fan so as to avoid reverse flow. Static pressure shall be checked/verified by contractor prior to order. Entire fan model & AMCA Seal shall appear in technical submittal of fan. Air moving capacity shall be as follows:					
21.01	2750 CFM, SP= 75 mm wg for Toilet Exhaust fan (refer data sheet)	2	Each			
21.02	3200 CFM, SP= 75 mm wg for Toilet Exhaust fan (refer data sheet)	2	Each			
21.03	8000 CFM, SP=60 mm wg for Lift shaft presseurisation fan (refer data sheet)	5	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
22.00	<p>CABINET INLINE FANS - ELECTRONICALLY COMMUNICATED: Supply ,Installation ,Testing and commissioning of Insulated Double Skin Cabinet Inline low noise fan (dB should not exceed 45 at 3Mtr.). Fan shall be of direct drive type complete with Brushless EC motor, high efficiency and low power consumption, suitable for single phase supply 230V±15%/50Hz, IP44, thermal overload protection. Fan speed 100% adjustable with the potentiometer placed in the connection box. Fan should be send Analogue input with terminals in the terminal box to control the fan with 0-10V input signal. Models are suitable for mounting in any orientation and operation within ambient air temperatures between -20°C up to +40°C. Impeller material shall be Galvanized Steel. Motor shall be suitable for external power supply 200~220V/50Hz/Single Phase OR 415+10% v/50Hz/Three Phase. Fan should be of G.S.S. Quoted price shall be inclusive of electronic speed regulator and wiring with 3 pin plug top between fan & speed regulator for single phase fans. Incase of 3 phase fans quoted price shall be inclusive of DOL starter panel with cabling between starter panel and fan. The incoming power supply to speed regulator / starter panel shall be provided by electrical contractor. Unit shall be suitable for 15 mmwg ESP.</p>					
22.01	1250CFM, SP= 20 mm wg for isolation room- 3rd Floor	1	Each			
23.00	<p>PROPELLER FANS: Supply, Installation, Testing and Commissioning of direct driven Propeller Fans for Exhaust along with gravity louver as shown in drawings. Each fan shall be complete with external rotor motor or shaded pole motor.3C x 1.5 Sq.mm.Power cable of 3 mtr.length with 3 pin plug top from unit motor to the nearest power socket shall be included in the scope of supply. All supporting GI hangers,MS angles, channels nut , bolts, washers etc. necessary for unit installation shall be inclusive in the cost. Motor shall be suitable for external power supply 220~240V/50Hz/Single Phase. Details of shall be as follows :</p>					
23.01	250CFM, SP= 15 mm wg for Solid utility- 3rd Floor	1	Each			
24.00	<p>CHILLED WATER PIPING: Supply, Laying/ fixing, testing and commissioning of following nominal sizes of chilled water piping inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc.) duly insulated with following PUF Insulation of minimum 36 - 40 Kg / cu m density, thermal conductivity 0.02 W/MK or better at 20 deg mean temperature with factory laminated crafted aluminium foil on the outer surface. The insulation shall be further clad with 24G Aluminium sheet with all the necessary accessories required for proper and neat installation.</p> <p>Note:-The Pipes of sizes 150 mm & below shall be M.S. 'C' class as per IS: 1239 and pipes size above 150 mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35 mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above. SMACNA Certified threaded rod system as per specifications with lock(s) and pre-crimped end fixing(s) to be used for supporting all pipes. For safety, the lock should not have inbuilt unlocking mechanism; separate key to be used to unlock it. To avoid wire slippage, locking mechanism should be wedge type, self locking and double channel type. Ball bearing(s) based or circular gear(s) based locking mechanisms are not acceptable. The threaded rod hangers should have a minimum safety factor of 5:1. Support system should be as per specifications.</p>					
24.01	250 mm dia with 50 mm thick insulation	425	metre			
24.02	200 mm dia with 50 mm thick insulation	180	metre			
24.03	150 mm dia with 50 mm thick insulation	780	metre			
24.04	125 mm dia with 50 mm thick insulation	40	metre			
24.05	100 mm dia with 50 mm thick insulation	91	metre			
24.06	80 mm dia with 40 mm thick insulation	261	metre			
24.07	65 mm dia with 40 mm thick insulation	342	metre			
24.08	50 mm dia with 40 mm thick insulation	762	metre			
24.09	40mm dia with 40 mm thick insulation	226	metre			
24.10	32 mm dia with 30 mm thick insulation	379	metre			
24.11	25 mm dia with 30 mm thick insulation	1333	metre			
24.12	20 mm dia with 30 mm thick insulation	RO	metre			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
25.00	<p>CONDENSER WATER PIPING: Supply, Laying/ fixing, testing and commissioning of condenser water pipes of following sizes of MS 'C' class along with necessary clamps, vibration isolators and fittings such as bends,tees, flexible connection etc.but excluding valves, strainers, gauges etc. adequately supported on rigid supports duly painted above 2 layers of FRP coating (each layer shall be 2mm thick) etc. as per specification and as required complete in all respect.</p> <p>Note:-The Pipes size 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS:3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. And from minimum 7mm thick MS sheet for pipes of 400 mm dia and above. SMACNA Certified threaded rod hangers system as per specifications with lock(s) and pre-crimped end fixing(s) to be used for supporting all pipes inside and at periphery of the building. For safety, the lock should not have inbuilt unlocking mechanism; separate key to be used to unlock it. To avoid wire slippage, locking mechanism should be wedge type, self locking and double channel type. Ball bearing(s) based or circular gear(s) based locking mechanisms are not acceptable. The threaded rod hangers should have a minimum safety factor of 5:1. Support system should be as per specifications.</p>					
25.01	250 mm dia	318	metre			
25.02	200 mm dia	20	metre			
25.03	150 mm dia	168	metre			
25.04	100 mm dia	24	metre			
25.05	80 mm dia	36	metre			
25.06	50 mm dia	24	metre			
26.00	<p>PRESSURE INDEPENDENT MOTORIZED BALANCING CUM CONTROL VALVE (FOR COOLING APPLICATION): Supply, Installation, testing & commissioning of following sizes insulated electronic, self-balancing, pressure independent type dynamic balancing valve with integrated 2 way modulating control valve in a single body. The actuator shall be capable of accepting upto 10V DC and upto 20 mA electric signal and shall provide similar transduced feedback output to control system. Maximum close off pressure shall not be less than 6 Bar for upto 50 mm valves and 7 Bar for 65 mm & above. Valves should have pressure rating of 16 Bar minimum. The valves & actuators for AHU's units shall be compatible of linking with Building Automation System as per specification and complete as required. valves should be insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specifications.</p>					
26.01	25 mm dia with 30 mm thick insulation	3	Each			
26.02	32 mm dia with 40 mm thick insulation	4	Each			
26.03	40 mm dia with 40 mm thick insulation	3	Each			
26.04	50 mm dia with 40 mm thick insulation	1	Each			
26.05	65 mm dia with 40 mm thick insulation	11	Each			
26.06	80 mm dia with 40 mm thick insulation	RO	Each			
27.00	<p>INSULATED VALVES: Supply, Installation, testing & commissioning of MANUAL BUTTERFLY VALVE (extended stem) with Diecast Aluminium body, SS Disc, EPDM Rubber Seal & O-Ring, PN-16 pressure rating of following size for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specifications.</p>					
27.01	250 mm dia with 50 mm thick insulation	3	Each			
27.02	200 mm dia with 50 mm thick insulation	2	Each			
27.03	150 mm dia with 50 mm thick insulation	30	Each			
27.04	125 mm dia with 50 mm thick insulation	R.O.	Each			
27.05	100 mm dia with 50 mm thick insulation	9	Each			
27.06	80 mm dia with 40 mm thick insulation	30	Each			
27.07	65 mm dia with 40 mm thick insulation	48	Each			
27.08	50 mm dia with 40 mm thick insulation	12	Each			
28.00	Supply, Installation, testing & commissioning of MOTORIZED BUTTERFLY VALVES with Diecast Aluminium Body, SS Disc, EPDM Rubber Seal & O-ring and minimum PN-16 pressure rating, conforming to BS 5155, IS 13095, with IP-55 actuator, capable of accepting upto 10V DC, and upto 20 mA electric signal and providing similar transduced feedback output to control system as required. (Third party BMS compatible) for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specifications.					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
28.01	150 mm dia with 50 mm thick insulation	4	Each			
28.02	125 mm dia with 50 mm thick insulation	RO	Each			
29.00	Supply, Installation, testing & commissioning of BALANCING VALVE WITH BUILT IN MEASURING FACILITY with C I body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating of following size for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification.					
29.01	150 mm dia with 50 mm thick insulation	10	Each			
29.02	100 mm dia with 50 mm thick insulation	4	Each			
29.03	80 mm dia with 40 mm thick insulation	15	Each			
29.04	65 mm dia with 40 mm thick insulation	1	Each			
29.05	50 mm dia with 40 mm thick insulation	2	Each			
29.06	40 mm dia with 40 mm thick insulation	2	Each			
29.07	32 mm dia with 30 mm thick insulation	1	Each			
30.00	Supply, Installation, testing & commissioning of NON - RETURN VALVE with duel plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating of following size for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification.					
30.01	150mm dia with 50 mm thick insulation	10	Each			
30.02	125 mm dia with 50 mm thick insulation	RO	Each			
31.00	Supply, Installation, testing & commissioning of Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer of following size for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification.					
31.01	150 mm dia with 50 mm thick insulation	10	Each			
31.02	125 mm dia with 50 mm thick insulation	RO	Each			
31.03	80 mm dia with 40 mm thick insulation	RO	Each			
31.04	65 mm dia with 40 mm thick insulation	11	Each			
31.05	50 mm dia with 40 mm thick insulation	1	Each			
31.06	40 mm dia with 40 mm thick insulation	3	Each			
31.07	32 mm dia with 40 mm thick insulation	4	Each			
31.08	25 mm dia with 30 mm thick insulation	3	Each			
32.00	Supply, Installation, testing & commissioning of BALL VALVE with flanged end type, PN 16 pressure rating for chilled water circulation piping duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification. (For pump Drain and AHU drain connection)					
32.01	20 mm dia with 30 mm thick insulation	RO	Each			
32.02	25 mm dia with 30 mm thick insulation	35	Each			
32.03	32 mm dia with 40 mm thick insulation	22	Each			
32.04	40 mm dia with 40 mm thick insulation	22	Each			
32.05	50 mm dia with 40 mm thick insulation	27	Each			
33.00	Supply, Installation, testing & commissioning of Binder test points at chilled water pipelines i.e. inlet & outlet of air handling units duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification.	76	Each			
34.00	Supply, Installation, testing and commissioning of Auto air vents valve 25mm dia including isolation valve, nut, bolts washer, gaskets etc. complete as required confirming to specification	33	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
35.00	Supply, Installation, testing & commissioning of Flexible connector for following Dia. pipe having PN 16 working pressure with anti vacuum rings complete with flanges, nuts, bolts, seal etc. complete as required confirming to specification to be installed at chillers, primary & secondary pumps and AHUs suction and discharge duly insulated to the same specifications as the connected piping and adequately supported complete as required confirming to specification.					
35.01	150mm dia with 50 mm thick insulation	25	Each			
35.02	100mm dia with 50 mm thick insulation	RO	Each			
35.03	80 mm dia with 40 mm thick insulation	RO	Each			
35.04	65 mm dia with 40 mm thick insulation	18	Each			
35.05	50 mm dia with 40 mm thick insulation	RO	Each			
35.06	40 mm dia with 40 mm thick insulation	RO	Each			
36.00	VALVES WITHOUT INSULATION FOR CONDENSER WATER LINE: Supply, Installation, testing & commissioning of BUTTERFLY VALVE (MANUAL) with Diecast Aluminium body SS disc & O - ring, EPDM Rubber seal & PN 16 pressure rating of following size for condenser water circulation complete as required confirming to specification					
36.01	300 mm dia.	3	Each			
36.02	250 mm dia.	RO	Each			
36.03	200 mm dia.	12	Each			
36.04	150 mm dia.	3	Each			
36.05	100 mm dia	RO	Each			
36.06	80 mm dia	6	Each			
36.07	65 mm dia	RO	Each			
36.08	50 mm dia	9	Each			
37.00	Supply, Installation, testing & commissioning of MOTORIZED BUTTERFLY VALVES with Diecast Aluminium Body, SS Disc, EPDM Rubber seal, O - ring and minimum PN-16 pressure rating, conforming to BS 5155, IS 13095, with IP-55 actuator, capable of accepting upto 10V DC, and upto 20 mA electric signal and providing similar transduced feedback output to control system as required. (Third party BMS compatible) for condenser water circulation complete as required confirming to specification.					
37.01	200 mm dia	6	Each			
38.00	Supply, Installation, testing & commissioning of BALANCING VALVE WITH BUILT IN MEASURING FACILITY with C I body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating of following size for condenser water circulation complete as required confirming to specification.					
38.01	200 mm dia	6	Each			
39.00	Supply, Installation, testing & commissioning of NON - RETURN VALVE with dual plate of CI body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating of following size for condenser water circulation complete as required confirming to specification.					
39.01	200 mm dia	3	Each			
40.00	Supply, Installation, testing & commissioning of Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer of following size for condenser water circulation complete as required confirming to specification.					
40.01	200 mm dia	3	Each			
40.02	50 mm dia	2	Each			
41.00	UPVC DRAIN PIPES: Supply, Installation, testing & commissioning of Rigid UPVC condensate drain pipes of following size duly insulated with 9 mm thick closed cell nitrile with factory laminated black treated woven cloth surface insulation in the form of pre-formed pipe sections and along with necessary clamps, fittings such as bends, tees etc. adequately supported complete as required confirming to specification.					
41.01	80 mm dia	48	metre			
41.02	65 mm dia	60	metre			
41.03	50 mm dia	33	metre			
41.04	40 mm dia	26	metre			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
41.05	32 mm dia	45	metre			
41.06	25 mm dia	660	metre			
42.00	Supply, Installation, testing & commissioning of industrial type pressure gauges with gun metal / brass valves complete as required.	84	Each			
43.00	Supply, Installation, testing & commissioning of the mercury in glass industrial type thermometers with thermowell.	58	Each			
44.00	Supply, Installation, testing & commissioning of thermowell.	38	Each			
45.00	Supply, Installation, testing & commissioning of Temperature sensors as shown in the scheme	24	Each			
46.00	Providing fixing and testing of Flow switch for chilled water and condenser water system compatible to connect with Chiller plant manager as per specification.	7	Each			
47.00	Providing fixing and testing of Purge valve	32	Each			
48.00	Dirt Separator Installation, Testing and commissioning of Dirt separator In-line for removal of dirt particles within chilled water system. The acceptable design shall incorporate a separating element to force water into tranquillity zones for dirt removal or a tube mesh construction made of copper wire and the flow to be guided through an area with a greater cross-section than the connection dimensions in order to reduce the flow. Dirt separator should have a removable flange base and a valve on the base of the vessel whilst ferrous particles down to 4 µm shall be captured by a magnetic device. It shall be able to remove 5 µm dirt particles. The flange base should allow thorough cleaning of sludge deposited inside the dirt separator. The magnet shall be retractable to enable ferrous particles to be released and discharged through the drain valve. The cylindrical vessel shall be manufactured from welded steel. Inlet and outlet of the unit shall be via horizontally-opposed, coaxial flanged connections in accordance with PN 10. Temperature range -10 C to 110 C The maximum permissible flow velocity shall be 3 m/s. The Dirt Separator shall be sized appropriate to the maximum operating pressure and flow velocity of the system complete as required confirming to specification. Given System Flow 1500 USGPM. Inlet and outlet of the unit (Dia-250mm).	1	Each			
49.00	Twin Pump Pressurisation Unit with Pressureless Expansion tank with built-in De-aerator & automatic water makeup: Supply, Installation, testing & commissioning of pressurization system comprising pressureless expansion tank, twin pump pressurization unit, Air separator, controls, pipings & fittings and controller, skid mounted system For Chilled Water Circuit complete as required confirming to specification & as per followings : System pressure shall be regulated within ± 0.2 bar (2.9 psi) of the set pressure. Expansion pressurization and deaeration of the system to be provided by an integrated pump with pressureless expansion tank. for Approximate system volume = 25000ltr at Max ambient temp. 40 Deg C and total Static Height 60 meters The whole system duly tested from factory conforming to international standards PED-97/23/EC. The system shall consist of minimum following components & features: a) Twin pump Pressurization Unit(orientation vertical/horizontal), Solenoid Valve, Flow regulator valve, Safety relief valve, Pressure sensor, Pipe fittings c/w Controller & display. b)Pressureless Expansion Tank c/w high quality butyl rubber bladder, weight sensor, capable of removing dissolved gases and air bubbles. c) Flexible Connection: to connect Pressureless Expansion Tank(s) with Pressurisation unit. d) Backflow Preventer chilled water strainer and shut-off valve. e) Controller with IP 54 rating, display unit showing system content, system pressure and status of the main operating components in real-time. top up function, flood limiter/shut down function in event of serious leak. In case of any fault controller shall display the fault code and generate the alarm. f) Unit shall be able to automatically fill in the required makeup water into the tank when the volume goes below the set limit Note: The capacity of tank given above is the minimum requirement. However, contractor shall calculate the total volume of water and submit the expansion tank of suitable size.	1	Set			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
50.00	Side Stream Filtration System Supply, Installation, testing and commissioning of SIDE STREAM FILTRATION SYSTEM to remove unwanted solids from a cooling tower sump using a centrifugalaction vortex separator. Control of solids in the recirculated cooling water system shall be accomplished via a side-stream flow of 5-25% of the full-stream system flow through a completely assembled separation / filtration package. The package's pump shall provide sufficient pressure for the re-introduction of sidestream fluid back into system flow. The side stream filtration unit shall have a flow rate of approx. 225 USGPM and pressure drop of 0.2-0.8 Bar, Maximum working pressure of 10.3 Bar and Maximum operating temperature of 37.0 deg.C. The complete packaged unit shall consist of the pump, Separator, automatic purge valve, unit inlet and outlet connection, purge outlet and piping and electrical control system complete as required confirming to specification.	RO	Set			
51.00	BTU meter Supply, Installation, testing and commissioning of electro-magnetic type BTU meter suitable to fix in the below mentioned chilled water pipe dia. to measure the flow in chilled water pipe line. The BTU meter shall be BMS compatible and shall be provided with display, thermowell brass, stem, thermometer sensor for water, bulb type, power supply input-230vac,50Hz, Output-24V AC, necessary fittings, by pass arrangement & electronic digital read out with BMS compatible. Necessary billing software also shall be part of the proposal.	1	Each			
51.01	200mm dia.	1	Each			
51.02	150mm dia.	1	Each			
52.00	Supply, Installation, testing and commissioning of Cladding with Alumnium sheet for exposed pipe thermal insulation & inside AC plant room piping with 0.63mm thick aluminum sheet.					
52.01	250 dia Nominal Bore	425	Rmt			
52.02	200 dia Nominal Bore	180	Rmt			
52.03	150 dia Nominal Bore	290	Rmt			
52.04	100 dia Nominal Bore	65	Rmt			
52.05	80 dia Nominal Bore	RO	Rmt			
52.06	65 dia Nominal Bore	RO	Rmt			
52.07	40 dia Nominal Bore	80	Rmt			
53.00	Supply, Installation, testing and commissioning of 300 dia POT strainer	1	Each			
54.00	Supply, Installation, testing and commissioning of Electromagnetic Water Meter shall be suitable of maximun flow of 80 gpm with isolation and bypass valves for cooling tower makeup water.	1	Each			
55.00	Supply, Installation, testing and commissioning of differential pressure sensor transmitter with 2Core 1.5 sq.mm armoured copper cabling. Unit shall transmit an isolated 4-20 mA dc signal.	2	Each			
56.00	Supplying, installation, testing and commissioning of automatic chemical dosing unit as show in schematic with necessary arrangement as per specification for Chilled water & Condenser water circuit.					
56.01	Chilled water circuit :- a) Corrosion inhibitor dosing system, b) Non- Oxidizing Biocides dosing system, c) Electrical & Instruments: Basic sensors (EC,pH,Temp), Remote monitoring,Auto dosing system,	1	Each			
56.02	Condenser water circuit:- a) Scale inhibitor dosing system, b)Corrosion inhibitor dosing system c)Copper corrosion inhibitor cum bio -dispersant dosing system, d) Oxidizing Biocides dosing system. e) H2SO\$ Dosing system. f) Electrical & Instruments : (Basic sensor (EC,pH,ORP,Temp), Timer based Dosing control panel ,Remote monotiring,Auto dosing system. g) Tubing -1o mtr MOC-PE.	1	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
57.00	DUCTING FOR AIR CONDITIONING / VENTILATION: - FACTORY FABRICATED DUCTING: Supply, Installation, balancing and commissioning of factory fabricated 180 GSM coated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per SMACNA standard and as per approved drawings and specifications of following sheet thickness complete as required. horizontal ducts shall be rigidly and securely supported, in an approved manner, with trapeze hangers formed of galvanized steel rods and galvanized steel angle/channel or a pair of brackets, connected by galvanized steel rod under ducts. vertical ductwork shall be supported by structural members on each floor slab. Duct supports may be through galvanized steel insert plates left in slab at the time of slab casting. Galvanized steel cleat with a hole for passing the hanger rods shall be welded to the plates. Support system should be as per specifications.					
57.01	Thickness 0.63 mm sheet	3066	Sqm			
57.02	Thickness 0.80 mm sheet	220	Sqm			
57.03	Thickness 1.00 mm sheet	RO	Sqm			
57.04	Thickness 1.25 mm sheet	RO	Sqm			
58.00	DUCTING FOR AIR CONDITIONING / VENTILATION: - SITE FABRICATED DUCTING: Supply, Installation, balancing and commissioning of factory fabricated 180 GSM coated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per SMACNA standard and as per approved drawings and specifications of following sheet thickness complete as required. horizontal ducts shall be rigidly and securely supported, in an approved manner, with trapeze hangers formed of galvanized steel rods and galvanized steel angle/channel or a pair of brackets, connected by galvanized steel rod under ducts. vertical ductwork shall be supported by structural members on each floor slab. Duct supports may be through galvanized steel insert plates left in slab at the time of slab casting. Galvanized steel cleat with a hole for passing the hanger rods shall be welded to the plates. Support system should be as per specifications.					
58.01	Thickness 0.63 mm sheet	77	Sqm			
58.02	Thickness 0.80 mm sheet	33	Sqm			
58.03	Thickness 1.00 mm sheet	RO	Sqm			
58.04	Thickness 1.25 mm sheet	RO	Sqm			
58.00	Supply, installation and testing of FACTORY FABRICATED Aluminum sheet metal ducts For Operating Rooms and +Ve Isolation Room in accordance with the approved shop drawings and as required by the specifications. Aluminium sheet will be as per ISS:737-1955 and fabrication will be as per IS-655/SMACNA. All necessary Aluminium supports using aluminium thread rods (as directed) and aluminium anchor bolts, food grade neoprene gaskets, food grade adhesive, food grade silicon sealant ,Aluminium turning vanes, splitters shall be included in the scope.No slip joint is allowed in any type of ducting.Only flanged joint with food grade rubber gasket is allowed.Duct Pressure testing of all main duct and main branches as per latest SMACNA standard for permissible air leakage shall be inclusive in the cost.No smoke or light test of duct is permitted.All duct joint, corners,flanges joints etc. shall be properly covered with food grade silicon sealant for leak proof application inspite of leak proof duct joints.Aluminium gauge shall be one gauge higher than as that of required for GI as per the duct sizes					
58.01	Thickness 0.63 mm sheet	RO	Sqm			
58.02	Thickness 0.80 mm sheet	560	Sqm			
58.03	Thickness 1.00 mm sheet	680	Sqm			
58.04	Thickness 1.25 mm sheet	10	Sqm			
59.00	Supply, installation and testing of SITE FABRICATED Aluminum sheet metal ducts For Operating Rooms and +Ve Isolation Room in accordance with the approved shop drawings and as required by the specifications. Aluminium sheet will be as per ISS:737-1955 and fabrication will be as per IS-655/SMACNA. All necessary Aluminium supports using aluminium thread rods (as directed) and aluminium anchor bolts, food grade neoprene gaskets, food grade adhesive, food grade silicon sealant ,Aluminium turning vanes, splitters shall be included in the scope.No slip joint is allowed in any type of ducting.Only flanged joint with food grade rubber gasket is allowed.Duct Pressure testing of all main duct and main branches as per latest SMACNA standard for permissible air leakage shall be inclusive in the cost.No smoke or light test of duct is permitted.All duct joint, corners,flanges joints etc. shall be properly covered with food grade silicon sealant for leak proof application inspite of leak proof duct joints.Aluminium gauge shall be one gauge higher than as that of required for GI as per the duct sizes					
59.01	Thickness 0.63 mm sheet	RO	Sqm			
59.02	Thickness 0.80 mm sheet	84	Sqm			
59.03	Thickness 1.00 mm sheet	102	Sqm			
59.04	Thickness 1.25 mm sheet	2	Sqm			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
60.00	Supply, Installation, balancing and commissioning of factory fabricated of galanised sheet 90 min 300 degree cel. fire rated metal ducting (18G) generally as specified complete with i) Galvanised companion flanges girth angles ii) Turning vanes iii) Galvanised structural support systems iv) Closed cell neoprene gasket v) Sealing of all joints as specified	RO	Sqm			
61.00	Supply, Installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc. as per approved drawings complete as required confirming to specification .	41	Sqm			
62.00	Supply, Installation, testing and commissioning of Non Return Dampers (NRD) made out of 1.55 mm thick galavanised steel frame and blades of 1.55 mm galavanised sheet .Sizes as follow.					
62.01	1200x600	1	Each			
62.02	1200x400	5	Each			
63.00	Supply, Fixing, testing and balancing of powder coated extruded aluminium Supply Air Grilles with aluminium volume control dampers as per approved drawings complete as required confirming to specification .	190	Meter			
64.00	Supply, Fixing, testing and balancing of powder coated extruded aluminium Return/exhaust Air Grills with louvers but without volume control dampers as per approved drawings complete as required confirming to specification .	334	Meter			
65.00	Supply, Fixing, testing and balancing of Supply Air Diffusers of powder coated aluminium with aluminium volume control dampers, plenum with anti smudge ring & removable core as per approved drawings complete as required confirming to specification.	RO	Sqm			
66.00	SITC of Disc Valves for room toilet exhaust of 80mm dia as per specificaiton	155	Each			
67.00	SITC of Disc Valves for room toilet exhaust of 125mm dia as per specificaiton	13	Each			
68.00	Supply, Fixing, testing and balancing of Supply Air Diffusers of powder coated aluminium with aluminium volume control dampers, plenum with anti smudge ring & removable core as per approved drawings complete as required confirming to specification.					
68.01	150x150	2	Each			
68.02	225x225	123	Each			
68.03	300x300	139	Each			
68.04	375x375	42	Each			
68.05	450x450	RO	Each			
68.06	525x525	RO	Each			
69.00	Supply, Fixing, testing and balancing of Return Air Diffusers of powder coated aluminium with aluminium volume control dampers, plenum with anti smudge ring & removable core as per approved drawings complete as required confirming to specification.					
69.01	150x150	2	Each			
69.02	225x225	10	Each			
69.03	300x300	6	Each			
69.04	375x375	38	Each			
69.05	450x450	RO	Each			
69.06	525x525	RO	Each			
70.00	Supply, Fixing, testing and balancing of Return Air Diffusers of powder coated aluminium without volume control dampers, plenum with anti smudge ring & removable core as per approved drawings complete as required confirming to specification .	RO	Sqm			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
71.00	FIRE DAMPERS: Supply, Fixing, testing and commissioning of UL certified (UL555 & UL555S) fire dampers in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal as per approved drawings complete as required confirming to specification .					
71.01	Fire damper	7	Sqm			
71.02	Actuator complete with control panel & wiring from 230V AC outlet	24	Each			
72.00	LOUVERS: Supply, Fixing of powder coated extruded aluminium Fresh/ Exhaust air louvers comprising of inclined blade & extended out blade for disposal of rain water, bird screen suitable for outdoor application as per approved drawings complete as required confirming to specification .	7	Sqm			
73.00	MOTORIZED DAMPERS: Supply, Fixing, testing and commissioning of motorized dampers in supply air duct/main branch and exhaust air duct as and where required of required sizes i/c control wiring with BMS compatible. The damper shall inter-locked with fans to facilitate opening/closing as per associated fans and as per fire signal as per approved drawings complete as required confirming to specification .					
73.01	Motorized damper	2	Sqm			
73.02	Actuator complete with control panel & wiring from 230V AC outlet	4	Each			
74.00	FUSE LINK DAMPERS: Supply, Fixing, testing and commissioning of fuse link damper in supply air duct/main branch and exhaust air duct as and where required of required sizes. The damper shall facilitate closing when fire occurs in the duct as per approved drawings complete as required confirming to specification .	5	Sqm			
75.00	Supply, installation, testing and balancing of Powder coated extruded aluminum construction gravity louvers for exhaust air as per approved shop drawings & specifications.(In to In sizes & cross sectional area to be taken into consideration to calculate Sq.mtr. area)	3	Sqm			
76.00	Supply , Installation ,Testing and Commissioning of Aluminium body Back Draft Damper complete with all accessories as per approved shop drawings.	1	Sqm			
77.00	DUCT INSULATION: Supply, installation, testing and commissioning of Duct Thermal insulation of fire retardant .The duct thermal insulation material shall be of closed cell structure nitrile rubber with factory laminated 7 mill glass cloth of density 40-60 kg/m3. The duct adhesive shall be as per OEM. The product shall have temperature range of -40°C to 105°C. The insulation material shall be fire rated for Class 0 as per BS 476 Part 6 : 1989 for fire propagation test and for Class 1 as per BS 476 Part 7, 1987 for surface spread of flame test. It should be CFC free.It should not be non-corrosive to copper and stainless when tested as per DIN 1988. The material should not develop crack when tested for Ozone resistance as per ASTM 1149. No cracks should be develop when exposed to UV as per ASTM G 154-04.The resistance microbiological growth should be in accordance to UL 181-and meet the acceptance criteria of resistance to fungal contamination as per ASTM G21. It should meet the acceptance criteria of resistance to bacterial contamination as per ASTM 2180.					
77.01	19 mm thick (For return air ducting)	890	Sqm			
77.02	32 mm thick (For supply air & fresh air ducting)	2800	Sqm			
78.00	Supply, Installation, testing and comissioning of 24 G Al cladding for Exposed duct insulation. it shall be fitted with necessary accessories and other requirements.	RO	Sqm			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
79.00	Supply, installation, testing and commissioning of Internal Duct acoustic Insulation material shall be Closed Cell Elastomeric Nitrile Rubber with UV resistant metal finishing on one side. Thermal conductivity of insulation material shall not exceed 0.035 W/(m.K) at mean temperature of 0°C as per EN 12667. Moisture Diffusion Resistance Factor or 'μ' value of laminated insulation material shall be minimum ≥ 60,000 as per EN 12086. Water Absorption by Volume of insulation material shall be < 0.2% as per ASTM C 1763 / ASTM C 209. The base insulation material shall have fire performance such that it passes Class 1 as per BS476 Part 7 for surface spread of flame and also passes Fire Propagation requirement as per BS476 Part 6 to meet the Class 'O' Fire category as per 1991 Building Regulations (England & Wales) and the Building Standards (Scotland) Regulations 1990. Density of laminated insulation material shall be between 50 to 70 Kg/m3. Density of base foam insulation material shall be between 40 to 55 Kg/m3. ponents & features: a) Twin pump Pressurization Unit(orientation vertical/horizontal), Solenoid Valve, Flow regulator valve, Safety relief valve, Pressure sensor, Pipe fittings c/w Controller & display. b)Pressureless Expansion Tank c/w high quality butyl rubber bladder, weight sensor, capable of removing dissolved gases and air bubbles. c) Flexible Connection: to connect Pressureless Expansion Tank(s) with Pressurisation unit. d) Backflow Preventer chilled water strainer and shut-off valve. e) Controller with IP 54 rating, display unit showing system content, system pressure and status of the main operating components in real-time. top up function, flood limiter/shut down function in event of serious leak. In case of any fault controller shall display the fault code and generate the alarm. f) Unit shall be able to automatically fill in the required makeup water into the tank when the volume goes below the set limit Note: The capacity of tank given above is the minimum requirement. However, contractor shall calculate the total volume of water and submit the expansion tank of suitable size.s shall be of motor duty icu=ics=433v=1 sec.. Supporting/Base rigid steel framework, TPN ACB's / MCCB's shall mean 3 pole ACB's / MCCB's with adequate size of neutral link.					
79.01	32 mm thick insulation for supply Air,Fresh air duct	750	Sqm			
79.02	19 mm thick insulation for Return air ducts	625	Sqm			
80.00	Supply, installation, testing and commissioning of Internal Duct acoustic insulation using food grade adhesive with open cell structured Fire Retardant nitrile rubber with minimum density 150 kg/m3 from inside of the AHU supply air ducting upto 4 mtr.length from AHU mouth as per the specifications. (Note : Internal acoustic insulation will not be applied for OT room supply & return air ducts strictly.Only thermal insulation is to be applied as specified above)					
80.01	15 mm thick	174	Sqm			
81.00	Supply, Installation & fixing acoustic lining on wall and ceiling of AHU rooms with 50mm thick, density 32 kg/cum resin bonded glass fiber insulation friction fixed in 61 Omm x 610 mm frame work made of 25X50X50X50X25 mm made out of 0.6mm thick GI sheet U shaped channel and covered with reinforced fiber glass tissue and finished with 0.80 mm perforated aluminium sheet etc. complete as required and as per specifications.					
81.01	50 mm thick resin bonded glass wool having density of 32 kg/m3 for AHU Rooms	280	Sqm			
82.00	UNDER DECK INSULATION: Supply, installation, testing and commissioning of Closed cell structure both side plain type 25mm thick nitrile rubber insulation of density 40-60 kg/m3 for underdeck ceiling insulation with food grade adhesive and proper fixing with required accessories etc.with two coats of lag coating (Anti-fungal & vapour barrier -5590 standard) over it. (For Below Terrace Floor).					
82.01	4th floor ceiling level	1621	Sqm			
82.02	2nd floor ceiling level. Note:- Required underdeck insulation in 2nd floor ceiling level, when 3rd floor is operational.	1621	Sqm			
82.00	Supply, Installation, Testing & Commissioning of Pressure Relief Damper (PRD) made out of 1.55 mm thick galavanised steel frame and blades of 1.55 mm galavanised sheet . Sizes as follow. Gravity operated pressure relief damper					
82.01	1250 x 600 mm	5	Each			
82.02	1500 x 600 mm	1	Each			
83.00	Supply, Installation, testing and commissioning of Metallic Fire Rated canvas connection for AHU It shall be installed for the Exposed ducting connecting to AHU . It shall be equipped with Zip lock for regular inspection.	23	Each			
84.00	Supply, Installation, testing and commissioning of Canvas connection for FCU It shall be installed for the Exposed ducting connecting to AHU . It shall be equipped with Zip lock for regular inspection.	139	Each			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
84.00	Supply, Installation, testing and commissioning of 100 mm dia Flexible ducting for toilet exhaust grille connections	150	mtr			
85.00	Supply, installation, testing and commissioning of 150 mm dia flexible preinsulated spiral duct in accordance with the approved shop drawings and specifications. (to be used only where rigid collar is not at all possible to connect diffusers).	17	mtr			
86.00	Supply, Installation, testing and commissioning of high density rock wool slab fire barrier with surface treated for fire retardation.	180	Sq.mtr			
87.00	Supply, Installation Testing & commissioning of Aircooled Split type Airconditioners comprising Indoor Air Handling Unit, Outdoor Condensing unit,Necessary thermostatic control, Refrigerant Copper Piping incuding thermal insulation, 25 mm Dia. CPVC condensate drain pipe with thermal insulation, Cutouts and vibration isolation pads					
87.01	2.0 TR Hiwall Unit	RO	Each			
87.02	1.5 TR Hiwall Unit	R.O	Each			
88.00	SOFTENER FOR COOLING TOWER MAKE UP					
88.01	Supply, installation, testing & commissioning of Softener with break tank all safety valves,and necessary accessories suitable for flow rate of 18 cum/Hr at 4.5 kg/sqcm pressure. The material of construction shall be MSEP. Softener shall be suitable of regenerating after 6 hours of operation.	1	Each			
	Inlet water hardness: 300 PPM (Approx) Outlet water hardness: 75 PPM					
88.02	Supplying,Installation,testing and commissioning of centrifugal filter feed water pumps CI head and base SS304/Bronze impeller along with motor,presure gauge with isolation cock ,isolation valve,NRV on delivery line,isolation valve,strainer at suction .Mechanical seal suitable vibration elimination pads of approved design,drain pipe with valve (25 dia) for the pump. The pump shall be suitable for 415+/-10% volts 3 phase AC supply (silid handling size for this pump shall be -5mm) (1w+1s).	RO	Set			
	Flow rate: 250 lpm each Pump (1working + 1 standby) Head -20 mtr.					
88.00	TOP CONNECTED TERMINAL HOUSING WITH MERV-17 HEPA FILTER (FOR +VE ISOLATION ROOMS)					
88.01	Supply, installation, testing and commissioning of terminal housing with HEPA filters (MERV-17) in hooded HEPA boxes stated as per above details, in zero leakage Aluminium made frame with monofilament material film fitted on HEPA outlet face., Aluminium Volume Control Damper suitable for non walk on ceiling mounting of following filter sizes:					
a	500 CFM (Size:-450 x 450) in mm	RO	Nos			
b	1000 CFM (Size:-600 x 600) in mm	2	Nos			
c	2000 CFM (Size:-600 x 600) in mm	RO	Nos			
88.02	Supply, installation, testing and commissioning of terminal housing without filters in hooded HEPA boxes stated as per above details,including SS 304 perforated sheet, Aluminium Volume Control Damper suitable for non walk on ceiling mounting as per specification , drawing and air flow diagram of following filter sizes:					
a	500 CFM (Size:-450 x 450) in mm	RO	Nos			
b	1000 CFM (Size:-600 x 600) in mm	2	Nos			
c	2000 CFM (Size:-600 x 600) in mm	RO	Nos			
89.00	OT AHU ACCESSORIES					
89.01	Supply, installation testing and validation of Aluminum made factory fabricated Laminar Flow OT Plenum Units of 14 gauge thickness comprising of Terminal MERV- 17 HEPA Filters of 99.997% Efficiency down to 0.3 Micron particle size installed in zero leakage Aluminum made frame with Aluminum made perforated plate type SA grille inclusive with all necessary 4 nos. supply air Aluminum made VCD in supply air tappings to plenum.All necessary supporting SS-304 made structure , SS-304 made hangers, SS-304 made nut ,bolts, washers,SS-304 made channels, SS-304 made fasteners etc. shall be part of scope of supply. The contractor shall submit the GA drawing with technical specification before ordering for the OT plenum.OT plenum shall be designed at minimum at 90-120 FPM outlet terminal velocity (As per revised NABH guideline) suitable for following mentioned supply CFM.					
a	Size : 8 feet x 6 feet for 3000 CFM	5	Nos			

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
89.02	Supply, installation testing and validation of Aluminum made 14 gauge thickness factory fabricated front openable with counter sunked screws (for cleaning purpose) return air risers with inbuilt Aerofoil Zero Leakage Aluminum made volume control Damper and fitted with Aluminum made Zero degree inclination return air grills at front bottom. Return air risers sizes and location (preferably at 4 extreme corners of OT section) shall be suitable for following air CFM for proper laminar flow air distribution throught the OT section area. All necessary supporting SS-304 made structure ,SS-304 made hangers, SS-304 made nut ,bolts, washers,SS-304 made channels, SS-304 made fasteners etc. shall be part of scope of supply. The contractor shall submit the GA drawing with technical specification before ordering for the OT risers.					
a	For Return Airflow of 630 CFM	20	Nos			
89.03	Supply ,Installation ,Testing and commissioning of the following UPVC pipes for Fresh air cut to required lengths and installed with necessary pipe supports & G.I.hangers, and providing and fixing in position the necessary elbows, tees and reducers,insulated with 25mm thick nitrile rubber insulation with factory laminated one sided thicked glass woven clothed surface with density 45-60 kg/m3.Two coats of lag coating (Anti-fungal & vapour barrier -5590 standard)					
a	100 mm dia	6	mtr			
b	150mm dia	2	mtr			
89.04	Supply ,Installation ,Testing and commissioning of the following UPVC type-B pipes for condensate drain cut to required lengths and installed with necessary pipe supports & G.I.hangers, and providing and fixing in position the necessary elbows, tees and reducers, U traps of appropriate heights,insulated with 9mm thick nitrile rubber insulation with factory laminated one sided thicked glass woven clothed surface with density 45-60 kg/m3.Two coats of lag coating (Anti-fungal & vapour barrier -5590 standard)					
a	50 mm dia	60	mtr			
b	40mm dia	35	mtr			
c	32mm dia	19	mtr			
d	25mm dia	41	mtr			
90.00	VAV (Variable Air Volume) - (Negative Isolation Room)					
90.01	Supply & Installation , Testing & Commissioning of Pressure Independent Variable Air Volume (VAV) boxes (AHRI certified), with microprocessor DDC controller (UL Listed), Damper actuator, low pressure velocity transducer, room thermostat with digital display, dynamically calibrated in factory for required air flow rate. VAVs should be communicable to BMS on BACnet platform. The controllers shall be BTL listed.Supply, installation, testing & commissioning of DP sensor with necessary probe for duct pressure monitoring for VFD with very low range application.To convert protocol from BACnet/MSTP to BACnet/IP This device is protocol converter. It shall be capable of connecting two or more networks.The device shall be UL listed and CE compliant. The device shall be certified by BTL. A) Operator workstation software package that combine an intuitive graphical user interface with and easy to use facility mangement tools.(Work station to be provided by client).OR B) Touch screen with required software & graphics to control field devices (VAVs). the device shall be wall or panel mounted. It shall allow monitoring and managing of BMS by using custom real time graphics. Note :- All cables and conduits to FRLS. 1 sqmm, 2 core shielded cable for communication (VAV to VAV daisy chain looping). CAT-5 cable for VAV to thermostat communication.					
a	1150 CFM	1	No			

SI. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
91.00	<p>SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF ALL LT PANELS WITH SPECIFIC INCLUSIONS: (THE LT PANELS SHALL BE AS PER FINALIZED DESIGN/DRAWING & DISCUSSIONS) The outgoing feeders as indicated in SLD shall have suitable range of followings. ALL Digital electronic MFM and KWH meter shall be provided with RS 485 port/RJ-45 communication port compatible for BMS & Three phase indicating lamps protected by 2 amps SP MCBs. All ACB's shall be EDO type or as specified, suitable for minimum 50 kA as specified in the items (Icu= Ics= Icw for 1 sec.) All MCCB's shall be suitable for (Icu= Ics= 100% at 415/433Volts, --kA for 1 sec as specified in the item, Wiring with space heater, thermostat and control MCB's shall be provided for all vertical sections of main LT panel, All breakers shall be interlocked as per schematic diagram through PLC with auto load management control. All incoming as well as outgoing feeders shall have pad locking facility, Suitable danger board shall be provided, All MCCB's shall be provided with front rotary handle and operating mechanism for door interlock with Pad locking of MCCB's handles in "OFF" Position, The Panel fabricator shall provide Al. Bus-bars link from Breakers wherever more than two nos. of cables are terminated in the breakers. Additional set of C.T.s, potential free contacts, connectors, contactors with wiring etc. are to be provided for BMS including space required for various transducers in Main Switch Board sections. Only transducers shall be supplied by BMS contractor. All hinged door shall be earthed through 2.5 sq mm tinned braided copper wire, All the panels containing switchgear upto 630A rating shall be PTTA as per IS 8623/IEC 60439, and above 630A shall be type tested assembly as per IEC:61439. 63A MCCB to 200A MCCB shall be thermo magnetic release and above 200A to 630A MCCB shall be microprocessor releases, All the ATS shall be suitable for withstanding the fault current same as of the panel & complying to the specifications, All the panels shall be internal arc protection for minimum 0.3 sec. as per IEC and specifications. All motor feeders MCCBs shall be of motor duty Icu=Ics=433v=1 sec.. Supporting/Base rigid steel framework, TPN ACB's / MCCB's shall mean 3 pole ACB's / MCCB's with adequate size of neutral link. Releases for Air Circuit breakers shall be communicable type.</p>					
	<p>All incoming and outgoing Air circuit breakers shall be placed on middle portion of the vertical in single tier formation. Painting/lettering on Breakers and distribution boards, the location they serve, providing on each panel its circuit diagram. CT's shall be properly mounted and clamped. Connection of CT's for measuring instrument / relays shall be done through connector / terminals. Model, current capacity location and frame size of switchgear shall be written inside of the panel doors with paint / permanent marker as approved shop drawings / site requirement. Final rating & various parameter, in addition to the specified above shall be selected on the bases of ambient conditions at site, approved equipments rating, client specific requirements, standards specified in the tender, requirement for the NOC from various statutory authorities,</p>					
	<p>All Back access panel shall be housed with encapsulated Spark gap based class-1/type-1 SPD with in built fuse for each incomer at each Bus Section of 100kA 10/350mS as per IS/IEC 62305-3 LPL-I. All front operated panel/Sub panels shall be housed with Mov(Metal Oxide Varistor) based class-2/type-2 SPD with in built fuse for each incomer at each Bus Section of In 10kA & Irms 20kA 5/20mS as per IS/IEC 62305-3 LPL-I.</p>					
91.01	HVAC POWER PANEL	1	Set			
	Incomers:					
	i) 1600 Amp. 4 Pole ACB EDO type 35KA - 1 set each consisting of followings (from Main LT panel R-side) ii) 1600 Amp. 4 Pole ACB EDO type 35KA - 1 set each consisting of followings (from Main LT panel L-side)					
	<p>Air Circuit Breaker Electrical drawout type of fault breaking capacity 35KA, Electrical Draw Out Motorised operated, fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/ test/isolated position indicators and frame earthing contact, conforming to IS/IEC-60947 as amended up-to date complete with Independent Electrical & manual spring closing mechanism, Shunt trip coil 24V D.C , Breaker Control Switch - 16A, Test terminal block set, circuits as per standard practice, auxiliary contactors with contacts (minimum 4NO+4NC) for positive interlocking of the breakers, necessary electrical interlocking with PLC auto controls etc. as required including accessories. Microprocessor based digital display with measurements, Current : phase / neutral / earth, average, max, Voltage : Phase, Line, Average; % loading of each phases in LED bargraph, on/ off, trip & ready to close breaker status communication on BMS.</p>					
	LED indication lamps for RYB, breaker 'ON/ OFF/ TRIP', spring charged, DC control supply healthy etc. with 2Amp control MCBs					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	Digital Multifunction Meter with RS45, accuracy class 0.5s, with LED screen of I ;V; Hz; Active, Reactive , Apparent Power & Energy; Power factor; % unbalance of current & voltage; , %THD , individual harmonics up to 7th level (complying with IEC61557-12) with RS 485 / Ethernet port with 3 Nos. cast resin current transformers of dual core CT's of suitable Amp. ratio, 15 VA Class1.0 metering. ,protection MCBs as required accessories to complete the system.					
	Required potential free contact (24V) for building management system - 2 nos (Incoming)					
	Bus couplers:					
	1600 Amp. 4 Pole ACB - 1 set					
	Air Circuit Breaker, molded case design, Horizontal drawout type of fault breaking capacity 35KA (Ics=Icu =Icw) upto 433V) Electrical Draw Out Motorised operated, fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/ test/isolated position indicators and frame earthing contact, conforming to IS/IEC-60947 as amended up-to-date complete with following accessories for each ACB.					
	3 Nos. Phase indication LED lamps with 2Amp back up MCB, breaker 'ON/OFF' indicating light with 2A MCB, test terminal block set, circuits as per standard practice, auxiliary contacts for positive interlocking of the breakers as required.					
	c) Microprocessor release(EMI & EMC certified) for with O/C S/C protection - 1 set.					
	Interlocking:					
	Electrical Interlocking through advance contacts / contactors in MCCB's (Incomers) should be provided to ensure that only one supply is available at a time on each section of bus with suitable mechanical interlocking and to eliminate any possibility of accidentally approaching two supplies at one bus section as per single line diagram enclosed					
	Busbar:					
	Electrolytic high conductivity Copper extensible three phase and neutral busbars rated at 1600 amps , & auxiliary Bus Bars of suitable capacity insulated with heat shrinkable coloured PVC sleeves & suitable to withstand symmetrical fault level of 35 kA at 433 volts, i/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc.					
	Outgoings:					
	All MCCB (Ics=Icu) with O/L, S/C,E/F followings shall be applicable to each.					
	All outgoing MCCB for O/C, S/C,E/F protection (with On, off, trip indications) of following capacity and rating, 35 KA (Ics=Icu upto 433 V for 1s) with Set of Digital ammeter, with 3 Nos. cast resin current transformers of dual core CT's of suitable Amp. ratio, 10 VA Class 0.5 metering. ,protection MCBs as required accessories to complete the system. , Spreader links and phase barrier, solid neutral link complete with wiring , connections etc.					
	i)1 Nos. - Microprocessor based 630 Amp. 4P MCCB, 25KA					
	ii)3 Nos. - Microprocessor based 400 Amp. 4P MCCB, 25KA					
	iii) 4 No. -Thermal Magnetic 63 Amp. 4P MCB, 10KA					
	iii) 7 Nos. -Thermal Magnetic 50 Amp. 4P MCB, 10KA					
	iii) 13 Nos. -Thermal Magnetic 40 Amp. 4P MCB, 10KA					
91.02	COOLING TOWER STARTER PANEL- (IP-54)	3	Set			
	Incomers:					
	i) 1 No. 40Amps. 4P MCB 16KA, Icu=Ics with Thermal magnetic based release having O/L ,S/C earth fault protection & necessary accessories equipped with the following:					
	a) Breaker 'ON/OFF/TRIP' indicating light with 2A MCB each					
	b) Set of Digital ammeter, with 3 Nos. cast resin current transformers of dual core CT's of suitable Amp. ratio, 10 VA Class 0.5 metering. ,protection MCBs as required accessories to complete the system. , Spreader links and phase barrier, solid neutral link complete with wiring , connections etc.					
	Busbar:					
	Electrolytic high conductivity Copper extensible three phase and half neutral busbars rated at 40 amps , & auxiliary Bus Bars of suitable capacity insulated with heat shrinkable coloured PVC sleeves & suitable to withstand symmetrical fault level of 16 kA at 433 volts, i/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc.					
	For cooling tower VFD -1 Nos.					
	40 Amps. TP MCB (Motor Duty) 10 KA (Icu=Ics=433V=1 sec.)					
	Ammeter (0-40 Amps) with selector Switch & CT's etc.					
	Set of ON / OFF/ TRIP indication Lamps protected by MCB.					
	Suitable HP fully automatic VFD suitable for colling tower motor 15 KW with over load protection & current sensing type single phase preventor complete with					
	all accessories and internal wiring for automatic operation.					
	Set of Selector switches for Auto / Manual /OFF operation.					
	Set of ON & OFF Push Buttons					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	Set of 6 inch ventilaton fan and fresh air louvers with shutter					
	1 set of potential free Contact for Connections to Building Automation System each outgoing feeder.					
91.03	VENTILATION POWER PANEL (TERRACE FLOOR)	1	Set			
	Incomers: i) 1 No. 80 Amps. TPN MCCB, 16KA, thermal magnetic based release having O/L ,S/C earth fault protection & necessary accesseries equipped with the following: a) Breaker 'ON/OFF/TRIP' indicating light with 2A MCB each b) Digital Multifunction Meter, accuracy class 0.5s, with LED screen as per specs. with 3 Nos. cast resin current transformers of dual core CT's of suitable Amp. ratio, 10 VA Class 0.5 metering. ,protection MCBs as required accessories to complete the system.					
	Bus Bar : Electrolytic high conductivity aluminium extensible three phase and half neutral busbars rated at 80 amps , & auxiliary Bus Bars of suitable capacity insulated with heat shrinkable coloured PVC sleeves & suitable to withstand symmetrical fault level of 16 kA at 433 volts, i/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc.					
	Outgoings: All outgoing with MCB for O/C, S/C,E/F protection with capacity and rating, 10 KA (Ics=Icu=100%) Spreader links and phase barrier, solid neutral link complete with wiring , connections etc for each outgoing feeders.					
	i) 7 Nos. -25 Amp. TPN MCB, 10KA, 'ON' indicating light with 2A MCB					
	ii) Toilet Exhaust air fan- 2nos.					
	25 Amps. TPN MCB, 10 KA (Icu=Ics=433V=1 sec.)					
	Suitable HP fully automatic DOL starter suitable for fan motor 3.7KW with over load protection & current sensing type single phase preventor complete with all accessories internal wiring for automatic operation.					
	Ammeter (0-25 Amps) with selector Switch & CT's etc.					
	Set of Selector switches for Auto / Manual /OFF operation.					
	Set of ON & OFF Push Buttons					
	Set of ON / TRIP indication Lamps protected by MCB.					
	iii) Toilet Exhaust air fan- 2nos.					
	25 Amps. TPN MCB, 10 KA (Icu=Ics=433V=1 sec.)					
	Suitable HP fully automatic DOL starter suitable for fan motor 4.0KW with over load protection & current sensing type single phase preventor complete with all accessories internal wiring for automatic operation.					
	Ammeter (0-25 Amps) with selector Switch & CT's etc.					
	Set of Selector switches for Auto / Manual /OFF operation.					
	Set of ON & OFF Push Buttons					
	Set of ON / TRIP indication Lamps protected by MCB.					
91.04	HVAC OUTDOOR UNITS PANEL (OUTDOOR TYPE PANEL) @ TERRACE FLOOR	1	Set			
	Incomers: i) 1 No. 160 Amps. TPN MCCB, 16KA, thermal magnetic based release having O/L ,S/C earth fault protection & necessary accesseries equipped with the following: a) Breaker 'ON/OFF/TRIP' indicating light with 2A MCB each and phase indication lamp with 2A mcb b) Digital Multifunction Meter, accuracy class 0.5s, with LED screen as per specs. with 3 Nos. cast resin current transformers of dual core CT's of suitable Amp. ratio, 10 VA Class 0.5 metering. ,protection MCBs as required accessories to complete the system.					
	Bus Bar : Electrolytic high conductivity aluminium extensible three phase and half neutral busbars rated at 160 amps , & auxiliary Bus Bars of suitable capacity insulated with heat shrinkable coloured PVC sleeves & suitable to withstand symmetrical fault level of 16 kA at 433 volts, i/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc.					
	Outgoings: All outgoing with MCB for O/C, S/C,E/F protection with capacity and rating, 10 KA (Ics=Icu=100%) Spreader links and phase barrier, solid neutral link complete with wiring , connections etc for each outgoing feeders.					
	i)1 Nos. - 160 A TPN 16KA MCCB's, TM based overcurrent, short circuit Icu=Ics=100% (46 HP MACHINE FOR OT & POSITIVE ISOLATION)					
	ii)1 No. - 63 A TPN 16KA MCCB's, TM based overcurrent, short circuit Icu=Ics=100% (FOR 10 HP UPS ROOM STAND BY)					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
	iii) 4 No. - 25 A 2P 10KA MCB (FOR UPS ROOM) 4NOS STAND BY VRF INDOOR UNITS					
	iv) 3 Nos. - 25 A 2P 10KA MCB (SPARE)					
	v) 1 No. - 160 A TPN 16KA MCCB's, TM based overcurrent, short circuit icu=ics=100% (SPARE)					
	vi) 1 No. - 63A TPN 16KA MCCB's, TM based overcurrent, short circuit icu=ics=100% (SPARE)					
	Note: Vendor to provide adequate auto interlocking between feeders of working units & standby unit.					
92.00	Supply and laying heavy duty 1100V grade PVC / XLPE insulated sheathed & armoured (unless otherwise specified as flexible) Fire Retarded Low Smoke (FRLS) cables indoor or outdoor with AL / Cu conductors as specified and shown on drgs. complete with: a) Cable clamps on walls, trays, columns, beams, built-up trenches, cable markers etc. for indoor cables. b) Earthing the glands armouring etc.					
92.01	3.5 C 150 sqmm CU flexible cable	380	mtr			
92.02	3.5 C 120 sqmm CU flexible cable	R.O.	mtr			
92.03	4 C 10 sqmm YWY-CU	770	mtr			
92.04	4 C 6 sqmm YWY-CU	R.O.	mtr			
92.05	4 C 4 sqmm YWY-CU	345	mtr			
92.06	4 C 2.5 sqmm YWY-CU	200	mtr			
92.07	2 C 1.5 sqmm YWY-CU	RO	mtr			
93.00	Making cable end terminations including brass double compression crimping type copper lugs for cable sizes mentioned below					
93.01	3.5 C 150 sqmm CU flexible	18	Each			
93.02	3.5 C 120 sqmm CU flexible	R.O.	Each			
93.03	4 C 10 sqmm YWY-CU	38	Each			
93.04	4 C 6 sqmm YWY-CU	R.O.	Each			
93.05	4 C 4 sqmm YWY-CU	38	Each			
93.06	4 C 2.5 sqmm YWY-CU	50	Each			
93.07	3 C 2.5 sqmm YWY-CU	RO	Each			
93.08	2 C 1.5 sqmm YWY-CU	RO	Each			
94.00	Supply and laying, Testing and commissioning of following items for interconnecting the earthing stations ,panels, DBs etc. of the following sizes in built up trenches /surface/wall complete with holes & fixing, jointing / terminating accessories as per specifications & drawing complete as required.					
94.01	25mmx 6mm GI strip on surface or in recess or equivalent	200	mtr			
94.02	25mmx 3mm GI strip on surface or in recess or equivalent	350	mtr			
94.03	20mmx 4mm CU strip on surface or in recess or equivalent	RO	mtr			
94.04	10mmx 4mm CU strip on surface or in recess or equivalent	RO	mtr			
95.00	Supply and fixing of Perforated Cable tray with horizontal & vertical bends, reducers, Tee's, cross over , suitable supports and brackets and other accessories as required conforming to IEC-61537. The Tray shall be galvanized for corrosion protection conforming to DIN EN 10346 / ISO 1461 .The trays should be tested for a safe working load of 150 Kgs with a span distance of 1.5 meters and the deflection should be within the limits as per standard. The safety factor shall be 1.7 times of the safe working load. The perforated tray shall be supplied with the standard length of 3 Mtr .					
95.01	150 mm width x 50mm Height	380	mtr			
95.02	200 mm width x 50mm Height	60	mtr			
95.03	300 mm width x 50mm Height	40	mtr			
95.04	500 mm width x 50mm Height	50	mtr			
96.00	TESTING, COMMISSIONING, ADJUSTING AND BALANCING THE ENTIRE SYSTEM- With an approved testing & commissioning agent employed for the system balancing (air and water) and the results shall be approved by the Consultants. The profile of the party shall be submitted to the consultants for prior approval. The party must have completed at least 2 projects of this similar nature (Hotels) and the test readings taken shall be submitted along with the profile. The selected vendor shall be associated with the project form begining of installation and advice for the system time to time for any installation requirement.	1	Job			
97.00	Miscellaneous					

Sl. No.	ITEM DESCRIPTION	QTY	UNIT	MATERIAL (RS)	LABOUR (RS)	AMOUNT (RS)
97.01	Design, Fabrication, Supply, installation, testing & commissioning of secondary type supports of MS supports, guides, anchors, etc. including all MS plate, channel, angles, beams, hardwares, etc. complete with zinc chromate anti rust painting all for any kind of additional supporting required as per site condition	500	Kgs			
97.02	Provision for Site security ,Pota cabins for working staff ,all necessary site housekeeping ,stores ,dust control , noise control , minimum nuisance to existing traffic items, use of construction tools with silencer to minimize noise pollution etc. for carrying out work from starting to final handing over	1	Lot			
97.03	Cost Of building & removing scaffolding shall be added in Contractor scope (i.e. Facade work, double height work etc.)	1	Lot			
97.04	Cost of statutory /legal requirement /permissions/inspection/approval etc. from legal authorities if any shall be inclusive in the cost	1	Lot			
97.05	Provision of temporary adequate lighting on construction work space along with all necessary switches, power and control cabling	1	Lot			
97.06	Wall Breaking and filling civil opening with sand cement and plaster in brick wall and making good for MEP services entry /exit wherever necessary as per site condition with the prior approval of Client project manage	1	Lot			
97.07	Provision of temporary adequate lighting on construction work space along with all necessary switches, power and control cabling	1	Lot			
97.08	Removing & dismantling of existing HVAC equipments , ducts, pipes, supports etc. and making good for new installation	1	Lot			
97.09	Taking shutdown work for Underdeck Insulation for 2nd floor when 3rd floor is oprational	1	Lot			
	Total					

Kindly email your lowest quotation as above with your terms & conditions as well as applicable brochure / catalog, user list to only etenders@mgmuhs.com

<p>Date:</p> <p align="center">Signature of Tenderer:</p> <p align="center">Seal:</p>	Name:
	Designation:
	Email ID:
	Mobile No:
	Full Address: