

**DR. RML HOSPITAL UNDER
MINISTRY OF HEALTH & FAMILY WELFARE,
GOVT. OF INDIA, NEW DELHI**

PACKAGE-II

Tender

**HVAC works at sixth floor for Setting up of Microbiology Laboratory and
other miscellaneous works at PGIMER at Dr. RML Hospital New Delhi.**

Volume-IV

Bill Of Quantities

JULY 2011



**HSCC (INDIA) LTD.
(CONSULTANTS & ENGINEERS FOR MEGA HOSPITALS & LABORATORIES)
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PQ No. HSCC/335 /Fur/BU-HP-II/2011

BILL OF QUANTITIES FOR MICROBIOLOGICAL LAB AT SIXTH FLOOR. PGIMER, Dr. RML HOSPITAL, NEW DELHI (HVAC WORKS)

| ITEM NO 1 | DESCRIPTION OF ITEM 2 | Qty. | UNIT 4 | RATE IN FIGURES (in RS) 5 | RATE IN WORDS (in RS) 6 | AMOUNT (Rs.) 7 |
|---|---|-------------|------------------|--|-----------------------------------|--------------------------|
| The prices are to be quoted in the below mentioned form and shall include the supply, installation, testing & commissioning at site of all the equipments, ancillary materials as specified and all such items what so ever which may be required to fulfill the intent and purpose as laid down in the specifications and or the drawings. | | | | | | |
| The tenderer shall quote rates in figures and in words under column 5&6 and extend amount to column 7 | | | | | | |
| 1.0 | AIR COOLED CHILLING UNITS. | | | | | |
| 1.1 | Supply, installation, testing & commissioning of 36 TR (actual capacity)air cooled scroll type water chilling units as specified and shown in equipment schedule complete as per specifications with. | | | | | |
| | a. Compressor with motor. | | | | | |
| | b. Drive package. | | | | | |
| | c. Mounting frames for all components | | | | | |
| | d. Air-cooled condenser with accessories. | | | | | |
| | e. Chiller with accessories. | | | | | |
| | f. Refrigerant piping, fittings, accessories and valves etc. | | | | | |
| | g. Insulation of chiller and suction line. | | | | | |
| | h. First charge of refrigerant (zero ODP) and oil. | | | | | |
| | i. Base frame with Vibration isolators | | | | | |
| | j. Automatic capacity control arrangement. | | | | | |
| | k. Lot Safety controls, flow switches, pressure gauge, thermometer etc. as per specifications. | | | | | |
| | l. Suitable capacity motor with necessary insulation , starter panel complete with all necessary switchgears and control complete as required | | | | | |
| | m. Necessary water drain &air purge valves wherever required | | | | | |
| | n. Necessary lubrication device as per specifications complete. | | | | | |
| | o. Microprocessor based control panel complete with accessories as per specifications. (1 Working +1 Stand by) | 2 | Nos | | | |

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|--------------|--|------|-----------|---------------------------------|----------------------------|-------------------|
| 2.0 | WATER CIRCULATION PUMPS | | | | | |
| | Supply, installation, testing and commissioning of monobloc type chilled water recirculation pumps with bronze impeller and mechanical seal each capable of delivering specified flow rate complete with following as per specifications & schedule of equipments. | | | | | |
| | a. Pump with TEFC induction motor | | | | | |
| | b. Channel base with vibration isolators, coupling, coupling guard etc. | | | | | |
| | c. Pump insulation of chilled water pump, etc | | | | | |
| | d. 2 Nos.- 150 mm dia dial type pressure gauge | | | | | |
| | e. Pumps shall be suitable for 415V/3ph/ 50 Hz/AC power supply. | | | | | |
| | Rated capacity of each pump 87 USGPM at 20 m head chilled water pump. (1 Working+1 Stand by) | 2 | Nos | | | |
| 3.0 | AIR HANDLING UNITS | | | | | |
| | Supply, installation, testing and commissioning of Air Handling Units (double skin type) of horizontal type as specified & shown in schedule of equipment complete with the following :- | | | | | |
| | a. Fan Section and canvas connection,mixing box . (double skin type) | | | | | |
| | b. Centrifugal blower | | | | | |
| | c. Coil section with cooling/heating coil/s as per specifications. | | | | | |
| | d. Pre filters with filter section as required in all AHUs. | | | | | |
| | e. Fine and hepa filters with filter section wherever specifically specified as per AHU schedule .Wherever fine/hepa filters are specified, item shall include factory fabricated double skin plenum of same specifications as AHU panels and complete with filter frameworks.Fine/hepa filter section along with discharge plenum shall be part of AHU in upper tier. | | | | | |
| | f. Drain pan, drain connection. | | | | | |

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| | g. Drive motor IP 55 class 'F' insulation, drive arrangement, guard etc. | | | | | |
| | h. Necessary vibration isolators & supporting arrangement. | | | | | |
| | i. Fresh air intake arrangement,necessary water drain & air purge valves wherever required etc. | | | | | |
| | j. Canvass connections,necessary foundations, 2 nos pressure gauge, 2 nos thermometer etc | | | | | |
| | k Controls for AHUs comprising of a set of 3 way modulating proportional linear type motorised diverting/ mixing valve of required size having manual override facility alongwith proportional thermostat & wiring for interconnection with 1.5 sq. mm Cu Conductor multicore armoured complete as required. | | | | | |
| 3.1 | AHU-1- 4600 cfm/4 RD Cooling Coil/50 mm static | 1 | No. | | | |
| 3.2 | AHU-2- 2000 cfm(TFA)/8 RD Cooling Coil/80 mm static with fine filters | 1 | No. | | | |
| 4.0 | CEILING SUSPENDED UNITS | | | | | |
| | Supply, installation, testing and commissioning of Air Handling Units (double skin type) of ceiling suspended type as specified & shown in schedule of equipment complete with the following :- | | | | | |
| | a. Casing and canvas connection. (double skin type) | | | | | |
| | b. Centrifugal blower | | | | | |
| | c. Coil as per specifications. | | | | | |
| | d. Pre filters as required | | | | | |
| | e. Drain pan, drain connection. | | | | | |
| | f. Drive motor, drive arrangement, guard etc. | | | | | |
| | g. Necessary vibration isolators & supporting arrangement. | | | | | |
| | h. Fresh air intake arrangement,necessary water drain & air purge valves wherever required etc. | | | | | |
| | i. Canvass connections,suspension arrangement, 2 nos pressure gauge, 2 nos thermometer etc | | | | | |

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| | j. Controls for AHUs comprising of a set of 3 way modulating proportional linear type motorised mixing valve of required size having manual override facility alongwith proportional thermostat & wiring for interconnection with 1.5 sq. mm Cu Conductor multicore armoured complete as required. | | | | | |
| 4.1 | CSU 1- 2250 cfm/4 RD Cooling Coil/40 mm static | 1 | No. | | | |
| 4.2 | CSU 2- 1000 cfm/4 RD Cooling Coil/40 mm static | 1 | No. | | | |
| 4.3 | CSU 3- 1300 cfm/4 RD Cooling Coil/40 mm static | 1 | No. | | | |
| 4.4 | CSU 4- 2200 cfm/4 RD Cooling Coil/40 mm static | 1 | No. | | | |
| 4.5 | CSU 5- 1400 cfm/4 RD Cooling Coil/40 mm static | 1 | No. | | | |
| 5.0 | Ventilation Fan Sections | | | | | |
| | Supply, installation, testing and commissioning of single skin construction fan sections suitable for outdoor duty. The unit shall be complete with belt driven double inlet double width, backward curved centrifugal fan, squirrel cage induction motor, vibration isolators, canvass connections, belt drive, pulley mounted on motor and fan shaft, belt guard mounted within the housing, The item shall have pre, fine and hefa filters as per specifications. The motor shall be suitable for operation on 3 Phase, 415 +/- 10% V, 50 Hz AC supply. | | | | | |
| | a. Casing (single skin type in 18 G GSS) | | | | | |
| | b. Centrifugal blower | | | | | |
| | c. Fine and HEPA filters as per specifications. | | | | | |
| | d. Pre filters as required | | | | | |
| | e. Necessary foundations etc | | | | | |
| | f. Drive motor, drive arrangement, guard etc. | | | | | |
| | g Wiring for interconnection with AHU starter with 1.5 sq. mm Cu Conductor multicore armoured complete as required. | | | | | |
| 5.1 | EX-1 | 1 | No. | | | |
| | Space served :Containment Room exhaust | | | | | |
| | Air Quantity : 1700 CFM | | | | | |
| | Static Pressure : 90 mm wg | | | | | |

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| 6.0 | Inline Fans | | | | | |
| | Supply, installation, testing and commissioning of Inline Fans as shown in drawings and as per equipment schedule . Each fan shall be complete with centrifugal blowers, totally enclosed fan cooled motor. Fan motor shall be suitable for single phase, 220 +/- 6% V, 50 Hz AC supply. Item shall be complete with starter & cabling. | | | | | |
| 6.1 | Air Quantity :600 CFM Static Pressure :15 mm wg | 1 | Nos. | | | |
| 6.2 | Air Quantity :200 CFM Static Pressure :15 mm wg | 3 | Nos. | | | |
| 6.3 | Air Quantity :150 CFM Static Pressure :15 mm wg | 2 | Nos. | | | |
| 7.0 | MONSOON REHEATING ARRANGEMENT FOR AHUs | | | | | |
| | Supply, installation, testing & commissioning of monsoon reheating arrangements fixed in ducts/ plenums complete with strip heaters, fixing frame work, insulators, fire protection insulation in duct, controls such as heating thermostats, humidistats etc. The heaters banks shall be controlled by independent thermostats/ humidistats through electro magnetic type contactors and safety thermostats/ geysers as specified complete with wiring for interconnections with 1.5 sq.mm copper conductor multi core armoured cable. The heater capacity shall be as per schedule of equipment and specifications, drawing etc. | | | | | |
| 7.1 | 6KWx 2 banks | 2 | Nos. | | | |
| 7.2 | 1KWx 2 banks | 5 | Nos. | | | |

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| 8.0 | Supplying, installation, testing and commissioning of Pan Type Humidifier made from minimum 2mm thick stainless steel sheet top closed and insulated with 50mm thick expanded polystyrene (T.F. Quality) complete with incoming MCB, humidistat and control wiring. For TFA. | | | | | |
| | Capacity 6 KW | 1 | Nos. | | | |
| 9.0 | CHILLED WATER PIPING | | | | | |
| | Supply, laying/fixing, testing and commissioning of M.S. heavy class ERW piping conforming to IS : 3589/IS:1239 with necessary clamps, supports, anti vibration mountings, hangers and fittings such as bends, tees, reducers etc. duly insulated and painted as per specifications : | | | | | |
| 9.1 | 80 mm dia | 80 | RM | | | |
| 9.2 | 65 mm dia | 20 | RM | | | |
| 9.3 | 50 mm dia | 25 | RM | | | |
| 9.4 | 40 mm dia | 20 | RM | | | |
| 9.5 | 32 mm dia | 20 | RM | | | |
| 9.6 | 25 mm dia | 25 | RM | | | |
| 9.7 | 20 mm dia | 25 | RM | | | |
| 10.0 | VALVES & STRAINERS | | | | | |
| | Supply, fixing and testing of following valves, strainers, in the chilled water piping complete with companion flanges, nut bolts, gaskets, supports etc. duly insulated and painted as per specifications: | | | | | |
| 10.1 | Butterfly valves : | | | | | |
| 10.1.1 | 80 mm dia | 8 | Nos | | | |

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| 10.1.2 | 50 mm dia | 2 | Nos | | | |
| 10.1.3 | 40 mm dia | 2 | Nos | | | |
| 10.1.4 | 25 mm dia | 6 | Nos | | | |
| 10.1.5 | 20 mm dia | 4 | Nos | | | |
| 10.2 | Balancing valves : | | | | | |
| 10.2.1 | 80 mm dia | 2 | Nos | | | |
| 10.2.2 | 50 mm dia | 1 | Nos | | | |
| 10.2.3 | 40 mm dia | 1 | Nos | | | |
| 10.2.4 | 25 mm dia | 4 | Nos | | | |
| 10.2.5 | 20 mm dia | 2 | Nos | | | |
| 10.3 | Non return/Check valves : | | | | | |
| 10.3.1 | 80 mm dia | 2 | Nos | | | |
| 10.4 | Y- strainers with drain valve | | | | | |
| 10.4.1 | 80 mm dia | 2 | Nos | | | |
| 10.4.2 | 50 mm dia | 1 | Nos | | | |
| 10.4.3 | 40 mm dia | 1 | Nos | | | |
| 10.4.4 | 25 mm dia | 4 | Nos | | | |
| 10.4.5 | 20 mm dia | 2 | Nos | | | |
| 10.5 | Supply, installation, testing and commissioning cooling thermostats for various Air Handling Units | | | | | |
| 10.5.1 | Proportional thermostats for Air Handling Units | 7 | Nos. | | | |
| 11.0 | DRAIN PIPING | | | | | |

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| | Supply, laying/fixing, testing and commissioning of G.I. medium class ERW piping conforming to IS:1239 with necessary clamps, supports, anti vibration mountings, hangers and fittings such as bends, tees, reducers etc. duly insulated and painted as per specifications for condensate drain from air handling units and chillers etc. | | | | | |
| 11.1 | 40 mm dia | 30 | RM | | | |
| 11.2 | 32 mm dia | 50 | RM | | | |
| 11.3 | 25 mm dia | 60 | RM | | | |
| 12.0 | Expansion Tank | | | | | |
| 12.1 | Supply, installation, testing and commissioning of PVC., expansion tank of capacity 500 litres made of PVC 2 layer sheet complete with 50 mm thick fire retardant type expanded polystyrene insulation finished with two layers of sand cement plaster and painted complete with vent, drain connections , float valve, quick fill connection, manhole cover etc as specified. (Of double layered Sintex or equivalent make. | 1 | No. | | | |
| 13.0 | DUCTING | | | | | |
| 13.1 | GSS DUCTING | | | | | |
| | Supply, installation, testing and balancing of G.S.S ducting of following thickness including necessary supports, hangers, nut bolts, gaskets, splitter dampers, vanes canvass connections etc. complete as per specifications & drawings: | | | | | |
| 13.1.1 | 1.25 mm (18 G) GSS | 20 | Sqm | | | |
| 13.1.2 | 1.0 mm (20 G) GSS | 20 | Sqm | | | |
| 13.1.3 | 0.80 mm (22 G) GSS | 150 | Sqm | | | |
| 13.1.4 | 0.63 mm (24 G) GSS | 300 | Sqm | | | |

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| 14.0 | FIRE DAMPERS | | | | | |
| | Supply, installation, testing and commissioning of motorized combined smoke & fire dampers made out of GI sheet of at least 120 minutes fire rating complete with GI damper of required size, smoke sensor, etc as per specifications and shop drawings. | | | | | |
| 14.1 | Fire/smoke Damper | 3 | Sqm | | | |
| 14.2 | Actuator & control panel | 4 | sets | | | |
| | | | | | | |
| 15.0 | CEILING DIFFUSERS | | | | | |
| 15.1 | Supply, Installation, testing and balancing of square/circular supply air diffusers of powder coated extruded aluminium construction with attached volume control dampers as per specs.& drawings and duly approved by architects. | 12 | Sqm | | | |
| 15.2 | Supply, installation, testing and balancing of square/circular return air diffusers of powder coated extruded aluminium construction without volume control dampers and duly approved by architects. | 12 | Sqm | | | |
| | | | | | | |
| 16.0 | VOLUME CONTROL DAMPERS | | | | | |
| | Supply, installation and testing of volume control dampers of GI sheet, box type to be provided in ducts complete with suitable links, levers and quadrants for manual control of air volume and air balancing as per specifications and drawings. | 8 | Sqm | | | |
| 17.0 | GRILLES | | | | | |
| | Supply, installation, testing and balancing of supply/return air grilles with/without volume control dampers of powder coated extruded aluminium construction suitable for installation in walls, false ceiling boxing etc as per specifications & drawings and duly approved by architects.. | | | | | |

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| 17.1 | Supply air grilles in single louvers with volume control dampers. | 2 | Sqm | | | |
| 17.2 | Return air grilles in single louvers without volume control dampers. | 2 | Sqm | | | |
| 18.0 | DUCTING INSULATION | | | | | |
| 18.1 | Supply and fixing resin bonded fibre glass insulation on supply/return air ducts covered with polythene and finished as specified. | | | | | |
| 18.1.1 | 25 mm thick insulation (for duct in AC area) | 80 | Sqm | | | |
| 18.1.2 | 50 mm thick insulation (For duct in non AC area) | 30 | Sqm | | | |
| 18.1.3 | Supply and fixing of 15 mm thick foil faced FR Closed Cell Chemically Crossed Linked Polyethylene Foam insulation for supply air ducting as per the specifications and approved shop drawings. | 50 | Sqm. | | | |
| 19.0 | DUCT LINING | | | | | |
| | Supply and fixing resin bonded fibre glass hard board acoustic insulation in supply air ducting covered with tissue paper and perforated aluminium sheet as specified. | 50 | Sqm | | | |
| 20.0 | Main/ Emergency Air-conditioning MCC | | | | | |
| | INCOMER | | | | | |
| | 1 nos 250 Amp 415 volts, 35 KA , FP MCCB with thermal magnetic release having variable current settings of 0.8 to 1.0 In.Extended rotary operating mechanism with door interlock with defeat feature and padlock facility. MCCB should be with spreader link and phase barriers.Indicating lamps with 2A protection MCBs to indicate OPEN, CLOSE, TRIP for MCCB.Ampere Metre of suitable range with suitable set of CT's and ASS. | | | | | |
| | BUSBARS : | | | | | |

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| | 300 A, TPN Aluminium bus bar 415V , 50 Hz. | | | | | |
| | OUTGOING | | | | | |
| | 2 nos 160 Amp 415 volts, 35 KA , FP MCCB with thermal magnetic release having variable current settings of 0.8 to 1.0 In.Extended rotary operating mechanism with door interlock with defeat feature and padlock facility. MCCB should be with spreader link and phase barriers.Indicating lamps with 2A protection MCBs to indicate OPEN, CLOSE, TRIP for MCCB.Ampere Metre of suitable range with suitable set of CT's and ASS.For chillers. | | | | | |
| | 2 Nos. 32 Amp 415 volts, 15 KA , TP+NL MCCB with thermal magnetic release having variable current settings of 0.8 to 1.0 In.Extended rotary operating mechanism with door interlock with defeat feature and padlock facility. MCCB should be with spreader link and phase barriers.Indicating lamps with 2A protection MCBs to indicate OPEN, CLOSE, TRIP for MCCB.Ampere Metre of suitable range with suitable set of CT's and ASS with suitable starter ,SPP for 5 hp chilled water pumps. | | | | | |
| | 13sets- 16 A, 415 V TP+NL 15 KA MCCB with thermal magnetic release having variable current settings of 0.8 to 1.0 In.Extended rotary operating mechanism with door interlock with defeat feature and padlock facility. MCCB should be with spreader link and phase barriers. | | | | | |
| | 04 sets- 32 A, 415 V TP+NL 15 KA MCCB with thermal magnetic release having variable current settings of 0.8 to 1.0 In.Extended rotary operating mechanism with door interlock with defeat feature and padlock facility. MCCB should be with spreader link and phase barriers. | | | | | |
| | Complete panel as above | 1 | No. | | | |
| 21.0 | AHU STARTER PANELS | | | | | |

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| | Supply, installation, testing and commissioning of cubicle type totally enclosed wall/floor mounted free standing type, dust, damp and vermin proof for AHU made of 2mm thick CRCA sheet steel in compartmentalized design as per specification and drawings. These distribution boards shall be mounted on 50x50x6 MS angle frame work grouted to floor/walls of recessed. The rate includes the angle iron frame, support, painting, numbering, earthing etc. as required. | | | | | |
| 21.1 | AHU STARTER PANEL | | | | | |
| | OUTGOING : | | | | | |
| | 1 No. 16 Amps TPN MCCB 10 KA for 2/3 HP Motor with suitable Starters for motor with thermal overload protection,single phase preventor,spare NO_NC contacts for interlocking, ON-OFF indication lamps with push button,ammeter with ASS and CTs for AHU motor as required. | 3 | Nos | | | |
| 21.2 | AHU STARTER PANEL | | | | | |
| | OUTGOING : | | | | | |
| | 1 No. 16 Amps MCCB 10 KA for 1/1.5 HP Motor with suitable Starters for motor with thermal overload protection,single phase preventor,spare NO_NC contacts for interlocking, ON-OFF indication lamps with push button,ammeter with ASS and CTs for AHU motor as required. | 6 | Nos | | | |
| 22.0 | CABLING | | | | | |

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| | Supplying, laying, effecting proper connections, testing & commissioning of following size of 1.1 kv PVC insulated aluminium conducting armoured cables as per IS 1554 Part- 1 laid underground/cable tray/on surface of wall/hume pipe etc. & termination with brass compression glands as required. | | | | | |
| 21.1 | 3.5C x 120 sq.mm cable | 150 | Metre | | | |
| 22.1 | 3.5C x 70 sq.mm cable | 100 | Metre | | | |
| 22.2 | 4 C X10 sq. mm. Cable | 20 | Metre | | | |
| 22.3 | 4 C X 6 sq. mm. Cable | 80 | Metre | | | |
| 22.4 | 3 C X 6 sq. mm. Cable | 20 | Metre | | | |
| 22.5 | 3 C X 4 sq. mm. Cable | 70 | Metre | | | |
| 22.6 | 4 C X 4 sq. mm. Cable | 20 | Metre | | | |
| 23.0 | CABLE TRAYS | | | | | |
| | Supply & installation of following sizes of perforated MS cable trays including horizontal & vertical bends, reducers, tees, cross members and other accessories as required and duly supported from the ceiling/wall/floor with MS suspenders/supports and including painting etc. as required | | | | | |
| 23.1 | 100 mm widthx50 mm deep x1.6 mmthickness | 50 | Metre | | | |
| 24.0 | EARTHING | | | | | |
| 24.1 | Earth pits with GI earth plate of size 600mmx600mmx6mm thick including all accessories , down watering GI pipes 40mm dia and providing masonry enclosure with cover plate having interlocking arrangement and watering pipe etc. with charcoal of or coke and salt) complete as required | 1 | Set | | | |
| 24.2 | Providing & fixing GI earth strip 40mm x 6mm on surface or in recess for earth connections etc. as required | 25 | Metre | | | |

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| 24.3 | Providing and fixing GI earth strip on walls/ trenches complete as per specifications and as required. | | | | | |
| 24.3.1 | 38mmx 6mm | 20 | Metre | | | |
| 24.3.2 | 25mm x 3mm | 10 | Metre | | | |
| 24.4 | Providing and fixing earth wire of complete as per specifications as required. | | | | | |
| 24.4.1 | 6 SWG wire | 25 | Metre | | | |
| 24.4.2 | 8 SWG wire | 25 | Metre | | | |
| 25.0 | CONTROL CABLING | | | | | |
| | Supply, laying, effecting proper connections, testing & commissioning of 1.5 sq.mm. PVC insulated copper multicore cables from AHU's and AC equipments to central control console | | | | | |
| 25.1 | 19 core cable | 25 | Metre | | | |
| 25.2 | 14 core cable | 20 | Metre | | | |
| 25.3 | 10 core cable | 80 | Metre | | | |
| 25.4 | 6 core cable | 40 | Metre | | | |
| 25.5 | 4 core cable | 40 | Metre | | | |
| 26.0 | CONTROL CONSOLE /DESK | | | | | |

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| | Supplying, installation, testing & commissioning of floor mounted desk type control console cum indicating panel in the A.C. plant room containing various indications and controls for the complete air-conditioning system comprising chilling units, chilled/ Hot/ condenser water pumps, and AHUs/ Ex. blower/ Fans etc , Hot water boiler with test push button facility. The panel shall be fabricated from minimum 1.6mm thick M.S. powder coated sheet of approved design. The air-conditioning module of the central control cum indicating panel shall contain the following accessories. | | | | | |
| | Status indication (ON, OFF & fault) of each compressor for each chilling machine, hot water boiler etc. | | | | | |
| | Push buttons and indicating lamps for remote start & stop and status indication for every nos of the water circulating pumps, Air Handling Units, Ex blower, Fans etc. | | | | | |
| | Hooter and flashing lamp to indicate operation of any safety/ shut down with necessary contactors, accept, reset and test push buttons. | | | | | |
| | Complete wiring with copper conductor PVC insulated multicore 2.5 sq.mm stranded cable (including supply of cable, tray, clamps etc) from various equipments in the A.C. plant room, AHU's and cooling towers etc to the control console panel as required. | | | | | |
| | COMPLETE PANEL AS ABOVE | 1 | No | | | |
| | Total for HVAC Works | | | | | |