

**MINISTRY OF HEALTH & FAMILY WELFARE,
GOVT. OF INDIA, NEW DELHI
(Department of AYUSH)**

TENDER

FOR

**Supply, installation testing, commissioning of HVAC work for
All India Institute of Ayurveda (AIIA) at Sarita Vihar, New
Delhi .**

VOLUME-V

(BILL OF QUANTITIES)

JANUARY 2011



**HSCC (INDIA) LTD.
(CONSULTANTS & ENGINEERS FOR MEGA HOSPITALS & LABORATORIES)
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Tender No. HSCC/BU-II/171/AIIA/2010

Project : HVAC work (Package-II) for All India Institute of Ayurveda including AMC for one year at Sarita Vihar, New Delhi						
Bill Of Quantities						
ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	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	<u>WATER CHILLING UNITS (SCREW TYPE IMPORTED)</u>					
	Supply, installation, testing & commissioning of 250 TR (actual) capacity screw type water chilling units as specified and shown in equipment schedule complete as per specifications. (4 working + 1 standby)					
	a. Compressors with motors.					
	b. Drive package.					
	c. Lot Mounting frames for all components					
	d. Water-cooled condenser with accessories.					
	e. Chiller with accessories.					
	f. Lot Refrigerant piping, fitting, accessories ,valves etc & necessary flow switch in water line					
	g. Lot Insulation of chiller and suction line.					
	h. Lot First charge of refrigerant and oil.					
	i. Lot base frame with Vibration isolators .					
	j. Lot Safety controls, flow switches, pressure gauge, thermometer etc. as per specifications.					
	k. Lot Automatic capacity control arrangement.					
	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.	Nos.	5			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
2.0	<u>WATER CIRCULATION PUMPS</u>					
2.1	Supply, installation, testing and commissioning of End suction back pull out vertical discharge chilled & condenser water recirculation pumps mounted on a common base etc each capable of delivering specified flow rate complete with following as per specifications & schedule of equipments.					
	a. Pump with TEFC/SPDP 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.					
2.1.1	Rated capacity of each pump = 600 USGPM at 15 m head chilled water pump. (4 working +1 stand by)	Nos.	5			
2.1.2	Rated capacity of each pump = 1000 USGPM at 27 m head condenser water pump. (4 working+ 1 stand by)	Nos.	5			
2.2	Supply, installation, testing and commissioning of mono block type hot water recirculation pumps mounted on a common base etc each capable of delivering specified flow rate complete with following as per specifications & schedule of equipments.					
	a. Pump with TEFC/SPDP induction motor					
	b. Channel base with vibration isolators, coupling, coupling guard etc.					
	c. Pump insulation of chilled/hot 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.					
2.2.1	Rated capacity of each pump = 50 USGPM at 27 m head hot water pump. (1 working+ 1 stand by)	Nos.	2			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
3.0	<u>SECONDARY CHILLED WATER PUMPS & VARIABLE SPEED PUMPING SYSTEM</u>					
	Supply, installation, testing and commissioning of horizontal split casing with side suction & top discharge secondary variable speed pumping system consisting of 3 Nos. secondary pumps, 1 No. dedicated microprocessor based pump controller with parallel pumping software duly downloaded, 2 Nos. adjustable frequency drives and multiple differential pressure sensor/ transmitters as necessary and as described in the specifications.					
	The entire system alongwith secondary pumps must be sourced from single manufacturer only for unit responsibility.					
	The system shall be complete in all respects and suitable for following rating.					
3.1	Secondary chilled water pumps 1200 USGPM at 18 mt. head. (one standby)	Nos.	3			
4.0	<u>COOLING TOWER</u>					
	Supply, installation, testing and commissioning of FRP induced draft type cooling tower of following capacity complete with FRP basin body, fan, distribution pipes, overflow pipe, ladder etc. as per specifications and drawings of following parameters. (5 working + 1 standby)					
	water flow rate - 1000 USGPM					
	Temp. In / Out - 97.5 / 90 deg. F					
4.1	Capacity - 300 TR	Nos.	5			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
5.0	<u>AIR HANDLING UNITS</u>					
5.1	Supply, installation, testing and commissioning of Air Handling Units (double skin) of horizontal/ vertical type as specified and shown in schedule of equipment complete with the following :-					
	a. Fan Section and canvas connection. (double skin type)					
	b. Centrifugal blower					
	c. Cooling coil section/s with cooling coil/s as per specifications.					
	d. Pre filters with filter section 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,necessary foundations, 2 nos pressure gauge, 2 nos thermometer etc					
	j. Double skin section for housing suction side of unit shall have Microvee filters as required complete as per specifications					
	k. Heating coil section with heating coil as per specifications.					
	l. Controls (thermostat, humidistat, 2 way modulating cum pressure independent balancing valves with motor & actuator and associated wiring), pressure guages and stem type thermometer at CHW coil inet and outlet					
	m. Electrical panel board with earthing.					
5.1.1	4,000 cfm / 8 RD cooling coil / 2 RD Heating coil / 40 mm Static	No.	1			
5.1.2	3,500 cfm / 8 RD cooling coil / 2 RD Heating coil / 40 mm Static	Nos.	2			
5.1.3	3,000 cfm / 8 RD cooling coil / 2 RD Heating coil / 40 mm Static (with mixing box)	No.	1			
5.1.4	2,400 cfm / 8 RD cooling coil / 2 RD Heating coil / 40 mm Static	No.	1			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
5.2	Supply, installation, testing and commissioning of Air Handling Units (double skin type) of horizontal/ vertical type as specified and shown in schedule of equipment complete with the following :-					
	a. Fan Section and canvas connection. (double skin type)					
	b. Centrifugal blower					
	c. Cooling coil section/s with cooling coil/s as per specifications.					
	d. Pre filters with filter section 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,necessary foundations, 2 nos pressure gauge, 2 nos thermometer etc					
	j. Controls (thermostat, humidistat, 2 way modulating cum pressure independent balancing valve with motor & actuator and associated wiring), pressure guages and stem type thermometer at CHW coil inet and outlet					
	k. Electrical panel board with earthing.					
5.2.1	24,000 cfm /4 RD/ 50 mm Static	No.	1			
5.2.2	18,000 cfm /4 RD/ 50 mm Static	No.	1			
5.2.3	12,000 cfm /4 RD/ 50 mm Static	No.	1			
5.2.4	10,000 cfm /4 RD/ 50 mm Static	No.	1			
5.2.5	9,000 cfm /4 RD/ 50 mm Static (Vertical type)	No.	1			
5.2.6	8,000 cfm /4 RD/ 50 mm Static (Vertical type)	Nos.	3			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
5.2.7	7,500 cfm /4 RD/ 50 mm Static (Vertical type)	No.	1			
5.2.8	7,000 cfm /4 RD/ 50 mm Static (Vertical type)	Nos.	6			
5.2.9	7,000 cfm /8 RD/ 50 mm Static (Vertical type)	No.	1			
5.2.10	6,000 cfm /4 RD/ 50 mm Static (Vertical type)	No.	1			
5.2.11	5,000 cfm /4 RD/ 40 mm Static	Nos.	3			
5.2.12	4,000 cfm /4 RD/ 40 mm Static	No.	1			
5.3	Supply, installation, testing and commissioning of Air Handling Units (double skin type) of ceiling mounted type as specified and shown in schedule of equipment complete with the following :-					
	a. Fan Section and canvas connection. (double skin type)					
	b. Centrifugal blower					
	c. Cooling coil section with cooling coil as per specifications.					
	d. Pre filters with filter section 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,necessary foundations, 2 nos. pressure gauge, 2 nos thermometer etc as per specifications					
	j. Controls (thermostat, humidistat, 2 way modulating cum pressure independent balancing valve with motor & actuator and associated wiring), pressure guages and stem type thermometer at CHW coil inlet and outlet					
	k. Electrical panel board with earthing.					
5.3.1	5,000 cfm /4 RD/ 40 mm Static	Nos.	6			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
5.3.2	4,500 cfm /4 RD/ 40 mm Static	Nos.	11			
5.3.3	4,200 cfm /4 RD/ 40 mm Static	Nos.	2			
5.3.4	4,000 cfm /4 RD/ 40 mm Static	Nos.	5			
5.3.5	3,500 cfm /4 RD/ 40 mm Static	Nos.	8			
5.3.6	3,000 cfm /4 RD/ 40 mm Static	Nos.	7			
5.3.7	2,500 cfm /4 RD/ 40 mm Static	Nos.	5			
5.3.8	2,200 cfm /4 RD/ 30 mm Static	Nos.	10			
5.3.9	2,000 cfm /4 RD/ 30 mm Static	Nos.	3			
5.3.10	1,600 cfm /4 RD/ 30 mm Static	Nos.	4			
5.3.11	1,200 cfm /4 RD/ 30 mm Static	Nos.	7			
6.0	<u>FAN COIL UNITS</u>					
6.1	Supply, installation, testing and commissioning of horizontal of sheet metal ceiling suspended FCU's each complete with 3 row deep cooling coil of copper tubes aluminium fins construction, centrifugal fan, 3 speed motor, filters insulated drain fan, coil piping connections, condensate drain connection, 2 way modulating cum pressure independent balancing valves with proportional thermostate, wiring complete as required complete with ball valve, ball valve with strainer as required as per specification & drawings with the following capacities:-					
6.1.1	1.5 TR	Nos.	25			
6.1.2	2.0 TR	Nos.	19			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
6.1.3	2.5 TR	Nos.	8			
6.1.4	3.0 TR	Nos.	2			
7.0	<u>ELECTRICAL HEATING SYSTEM / HOT WATER GENERATOR / HUMIDIFICATION ARRANGEMENT</u>					
	Supply, installation, testing and commissioning of electric hot water generator/boiler complete with heaters, electrical control panel with contactors, wiring and controls,necessary flow switch, pressure gauge, thermometer thermostats and insulation as per specifications and technical data.					
7.1	Heating capacity : 325 KW Water in temp. : 110 deg.F Water out temp : 125 deg.F	Nos.	4			
7.2	Heating capacity : 50 KW Water in temp. : 110 deg.F Water out temp : 125 deg.F	No.	1			
7.3	Supply, installation , testing and commissioning of electrical pan type humidification system suitable to meet the duty requirements incorporating heating elements / immersion type of water heaters complete with its power and control cabling, earthing etc. The humidification system shall be controlled by humidistats through through electromagnetic type contactors and safety thermostat / geyserstats as per specifications and technical data.					
7.3.1	Pan type humidifier with 9.0 KW heaters	No.	1			
7.3.2	Pan type humidifier with 7.0 KW heaters	Nos.	4			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
8.0	<u>HEAT RECLAIM VENTILATION UNIT</u>					
	Supply, installation , testing and commissioning of heat reclaim ventilation with inlet and exhaust blower with fan (Inlet & exhaust) desiccant absorption material non contact seal, modular design with Aluminium supports of extruded section, galvanized steel plate casing, self extinguishable polyurethane foam insulation, multi-directional fibrous fleeces air filter including electric panel with cabling & earthing complete as per requirements.					
8.1	1500 FAVE 75% efficiency (F/A - 882 cfm & R/A 882 cfm)	Nos.	3			
9.0	<u>PACKAGED TYPE AIRWASHER</u>					
	Supply, installation , testing and commissioning of packaged type airwashers of G.I. construction fabricated from 16 Ga G.I. sheet weather proof body, blower housing, centrifugal forward curved blower with motor, drive set, acetate paper cooling pad of 90% efficiency with stainless steel sump and body, pump, water connection, Aluminum filters, canvas connection, mounting base of angle iron/channel etc. blower & motor shall be mounted on common rail using cushy foot mounting, electrical panel board with cabling and earthing and M.S. frame for supports etc. as per specifications and drawings.					
9.1	20,000 CFM, 40 mmwg static pressure	No.	1			
9.2	6,000 CFM, 40 mmwg static pressure	No.	1			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
10.0	<u>EXHAUST SCRUBBER</u>					
	Supply, installation , testing and commissioning of packaged type airwashers of centrifugal exhaust scrubber of 18 G GSS weather proof casing duly powder coated inner & outer construction with fan with motor and drive (both fan and motor shall be mounted on a common frame using cushy foot mounting) with side suction and front discharge including vibration isolator, water tank with float valve, pump, distributor, nozzels, eleminator, piping & valve from tank to pump to distributor, electric panel board with cabling, earthing and M.S. frame for supports etc. as per specifications and drawings.					
10.1	23,000 CFM, 40 mmwg static pressure	No.	1			
11.0	<u>VENTILATION/ EXHAUST BLOWER</u>					
11.1	Duct Mounted Inline Fan/ Axial flow fan / Propeller Fan / Exhaust Blower					
	Supply, Installation, testing & commissioning of enclosed chamber type duct mounted inline/axial fans/propeller fan/ exhaust blower along with electrical panel, complete complete in all respect as per specifications and technical data as given in schedule of equipments.					
11.1.1	38,000 CFM with (30 mmwg static pressure) Axial	Nos.	4			
11.1.2	30,500 CFM with (30 mmwg static pressure) Axial	Nos.	5			
11.1.3	28,500 CFM with (30 mmwg static pressure) Axial	Nos.	8			
11.1.4	23,000 CFM with (30 mmwg static pressure) Axial	Nos.	10			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
11.1.5	12,500 CFM with (10 mmwg static pressure) Axial	Nos.	8			
11.1.6	14,000 CFM with (40 mmwg static pressure) Exhaust blower	No.	1			
11.1.7	11,500 CFM with (40 mmwg static pressure) Exhaust blower	Nos.	2			
11.1.8	7,000 CFM with (40 mmwg static pressure) Exhaust blower	No.	1			
11.1.9	2,400 CFM with (32 mmwg static pressure) Inline	No.	1			
11.1.10	2,000 CFM with (30 mmwg static pressure) Inline	Nos.	2			
11.1.11	1,800 CFM with (30 mmwg static pressure) Inline	No.	1			
11.1.12	1,350 CFM with (15 mmwg static pressure) Inline	Nos.	4			
11.1.13	1,200 CFM with (15 mmwg static pressure) Inline	Nos.	4			
11.1.14	1,000 CFM with (15 mmwg static pressure) Inline	No.	1			
11.1.15	600 CFM with (15 mmwg static pressure) Inline	No.	1			
11.1.16	500 CFM with (15 mmwg static pressure) Inline	Nos.	2			
11.1.17	450 CFM with (10 mmwg static pressure) Inline	Nos.	3			
11.1.18	300 CFM with (10 mmwg static pressure) Inline	Nos.	2			
11.1.19	200 CFM with (10 mmwg static pressure) Inline	Nos.	2			
11.1.20	150 CFM with (10 mmwg static pressure) Inline	Nos.	5			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
11.1.21	80 CFM with (5 mmwg static pressure) Inline	Nos.	17			
11.1.22	6,100 CFM with (5 mmwg static pressure) Propeller	Nos.	3			
11.1.23	4,911 CFM with (5 mmwg static pressure) Propeller	Nos.	3			
11.1.24	3,094 CFM with (5 mmwg static pressure) Propeller	No.	1			
11.1.25	1,676 CFM with (5 mmwg static pressure) Propeller	No.	1			
12.0	<u>CHILLED/HOT WATER PIPING</u>					
12.1	Supply, laying/fixing, testing and commissioning of M.S. heavy class ERW piping confirming to IS : 3589/IS:1239 with necessary clamps, supports, anti vibration mountings, hangers and fittings such as bends, tees, reducers etc necessary water drain & air purge valves wherever required etc, duly insulated and painted complete as per specifications :					
12.1.1	400 mm dia.	RMT	25			
12.1.2	350 mm dia.	RMT	150			
12.1.3	300 mm dia.	RMT	25			
12.1.4	250 mm dia.	RMT	220			
12.1.5	200 mm dia.	RMT	300			
12.1.6	150 mm dia.	RMT	240			
12.1.7	125 mm dia.	RMT	375			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
12.1.8	100 mm dia.	RMT	795			
12.1.9	80 mm dia.	RMT	1120			
12.1.10	65 mm dia.	RMT	1390			
12.1.11	50 mm dia.	RMT	1346			
12.1.12	40 mm dia.	RMT	795			
12.1.13	32 mm dia.	RMT	385			
12.1.14	25 mm dia.	RMT	600			
12.1.15	20 mm dia.	RMT	144			
12.1.15 A	Extra for providing 19 mm closed link preformed pipe sections of polythylene insulation with Aluminium metalised polyester foil on chilled water/hot water pipes, in place of resin bonded fibre glass wool pipe sections insulation.					
i)	350 mm dia.	RMT	15			
ii)	300 mm dia.	RMT	25			
iii)	250 mm dia.	RMT	30			
iv)	200 mm dia.	RMT	55			
v)	150 mm dia.	RMT	65			
vi)	125 mm dia.	RMT	75			
vii)	100 mm dia.	RMT	60			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
viii)	80 mm dia.	RMT	60			
ix)	65 mm dia.	RMT	30			
x)	50 mm dia.	RMT	50			
xi)	40 mm dia.	RMT	20			
xii)	32 mm dia.	RMT	20			
xiii)	25 mm dia.	RMT	20			
xiv)	20 mm dia.	RMT	20			
12.2	<u>VALVES & STRAINERS</u>					
	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:					
12.2.1	Butterfly valves					
12.2.1.1	250 mm dia	Nos.	2			
12.2.1.2	200 mm dia	Nos.	10			
12.2.1.3	150 mm dia	Nos.	28			
12.2.1.4	125 mm dia	Nos.	2			
12.2.1.5	100 mm dia	Nos.	2			
12.2.1.6	80 mm dia.	Nos.	4			
12.2.1.7	65 mm dia	Nos.	12			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
12.2.1.8	50 mm dia	Nos.	56			
12.2.1.9	40 mm dia	Nos.	56			
12.2.1.10	32 mm dia (Brass ball valve with strainer)	Nos.	25			
12.2.1.11	32 mm dia (Brass ball valve without strainer)	Nos.	25			
12.2.1.12	25 mm dia (Brass ball valve with strainer)	Nos.	7			
12.2.1.13	25 mm dia (Brass ball valve with/ without strainer)	Nos.	7			
12.2.2	Balancing valves					
12.2.2.1	150 mm dia	Nos.	9			
12.2.2.2	125 mm dia.	Nos.	2			
12.2.2.3	100 mm dia.	Nos.	2			
12.2.2.4	80 mm dia	Nos.	4			
12.2.3	Non return/Check valves					
12.2.3.1	200 mm dia	Nos.	3			
12.2.3.2	150 mm dia	Nos.	5			
12.2.3.3	40 mm dia	Nos.	2			
12.2.4	Y- strainers with drain valve					
12.2.4.1	200 mm dia	Nos.	3			
12.2.4.2	150 mm dia	Nos.	5			

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1	2	3	4	5	6	7
12.2.4.3	100 mm dia	No.	1			
12.2.4.4	80 mm dia	Nos.	2			
12.2.4.5	65 mmdia	Nos.	3			
12.2.4.6	50 mmdia	Nos.	32			
12.2.4.7	40 mm dia	Nos.	27			
12.2.5	Pressure Gauge	Nos.	32			
12.2.6	Thermometer	Nos.	18			
12.3	UNDERGROUND PIPING					
12.3.1	Extra for laying CHW piping upto 350 mm dia. underground including making required trenches, providing tar felt coating on pipes, backfilling etc. complete as required as per specification.	Rmt	100			
13.0	CONDENSER WATER PIPING					
13.1	Supply, laying/fixing, testing and commissioning of M.S. heavy class ERW piping confirming to IS : 3589/IS:1239 with necessary clamps, supports, anti vibration mountings, hangers and fittings such as bends, tees, reducers etc, necessary water drain, air purge valves wherever required , duly painted as per specifications :					
13.1.1	400 mm dia	Rmt	120			
13.1.2	250 mm dia	Rmt	30			
13.1.3	200 mm dia	Rmt	80			

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1	2	3	4	5	6	7
13.2	VALVES & STRAINERS					
	Supply, fixing and testing of following valves, strainers, in the condenser water piping complete with companion flanges, nut bolts, gaskets, supports etc. duly painted as per specifications:					
13.2.1	Butterfly valves					
13.2.1.1	400 mm dia	Nos.	2			
13.2.1.2	200 mm dia	Nos.	30			
13.2.2	Balancing valves					
13.2.2.1	200 mm dia	Nos.	5			
13.2.3	Non return/Check valves					
13.2.3.1	200 mm dia	Nos.	5			
13.2.4	Y - Strainers with Drain valve					
13.2.4.1	200 mm dia	Nos.	5			
13.2.5	Pressure Gauge	Nos.	20			
13.2.6	Thermometer	Nos.	10			
14.0	<u>DRAIN PIPING</u>					
	Supply, laying/fixing, testing and commissioning of G.I. 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.					

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1	2	3	4	5	6	7
14.1	50 mm dia	Rmt	120			
14.2	40 mm dia	Rmt	80			
14.3	32 mm dia	Rmt	180			
14.4	25 mm dia	Rmt	90			
15.0	Supply, installation, testing and commissioning of PVC storage tank of capacity 1000 litre made of PVC 2 layer sheet complete with vent, drain connections , inlet outlet, drain, makeup connections including float valve and stop valves,gate valves etc. as specified (Of double layered Sintex, Uniplas)	Set	2			
16.0	<u>DUCTING</u>					
16.1	<u>GSS DUCTING</u>					
	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:					
16.1.1	1.25 mm(18 G) GSS	Sqm.	376			
16.1.2	1.0 mm (20 G) GSS	Sqm.	1584			
16.1.3	0.80 mm (22 G) GSS	Sqm.	3460			
16.1.4	0.63 mm (24 G) GSS	Sqm.	10335			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
16.2	<u>ALUMINIUM DUCTING</u>					
	Supply, installation, testing and balancing of Aluminium Sheet ducting of following thickness including necessary supports, hangers, nut bolts, gaskets, splitter dampers, vanes canvass connections etc. complete as per specifications & drawings:					
16.2.1	0.80 mm (22 G)	Sqm	356			
17.0	<u>FIRE DAMPERS</u>					
17.1	Supply, installation, testing and commissioning of fire dampers made out of GI sheet of at least 90 minutes fire rating complete with GI damper of required size, etc. complete as per specifications.	Sqm	42			
17.2	Supply, installation, testing and commissioning of motor with actuator for fire dampers with required power and control cabling etc. complete in all respect as per specifications	Set	88			
18.0	<u>VOLUME CONTROL DAMPERS</u>					
a)	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.	Sqm.	118			
b)	Supply, installation and testing of volume control dampers of Aluminium 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.	Sqm	2.1			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
19.0	<u>AIR TERMINAL DEVICES</u>					
19.1	Supply, Installation, testing and balancing of square/circular supply air diffusers of powder coated aluminium construction with attached volume control dampers as per specs. and drawings.	Sqm	106			
19.2	Supply, installation, testing and balancing of square/circular return air diffusers of powder coated aluminium construction as per specifications and drawings and without volume control dampers.	Sqm	112			
19.3	Supply, installation, testing and balancing of supply air grilles with volume control dampers of powder coated aluminium construction suitable for installation in walls, false ceiling boxing etc as per specifications and drawings.	Sqm	62.6			
19.4	Supply, installation, testing and balancing of return air grilles without volume control dampers of powder coated aluminium construction suitable for installation in walls, false ceiling boxing etc as per specifications and drawings.	Sqm	82.8			
19.5	Supply, installation, testing and balancing of Exhaust air grilles without volume control dampers of powder coated MS construction suitable for installation in walls, false ceiling boxing etc as per specifications and drawings.	Sqm	19.6			
19.6	Supply, installation, testing and commissioning of Laminar Flow Diffusers for operation theatres complete with fixing arrangements etc. as per specifications and complete in all respect as required	Sqm	42			
19.7	Supply, installation, testing and commissioning of powder coated extruded aluminium louvers with wire mesh screen at the outlet of wall complete as per specifications and shop drawings. (For Exhaust & Fresh air)	Sqm	23			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
20.0	<u>DUCTING INSULATION</u>					
20.1	Supply and fixing resin bonded fibre glass insulation on supply/return air ducts covered with toughgaurd and finished complete as per specifications.					
20.1.1	25 mm thick insulation	Sqm	9528			
20.1.2	50 mm thick insulation	Sqm	1755			
21.0	<u>ACOUSTIC INSULATION</u>					
21.1	Supply and fixing resin bonded fibre glass acoustic insulation in supply air ducting covered complete with glass cloth and perforated aluminium sheet complete as per specifications.	Sqm	1875			
21.2	Supply and fixing of acoustic insulation on walls and ceiling of Air handling units rooms and plant rooms with 50mm thick resin bonded fibre glass wool fixed in GI frame work and finished with glass cloth and perforated GI sheet complete as per specifications and drawings.	Sqm	6000			
22.0	Providing & fixing of following filters in the upper tier of AHU/ Plenum, necessary aluminium mounting frame work complete with manometer as per specifications and as required					
22.1	Microvee filters of 99% efficiency down to 5 microns particle size.					
22.1.1.	610mmx610mmx305mm	Nos.	10			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
23.0	<u>ELECTRICAL PANEL BOARD (AIRCONDITIONING)</u>					
23.1	Providing and fixing of main panel board cubical compartmentalised, floor mounted made of 2.0 mm thick steel sheet duly painted complete with voltmeter, ammeter, indicating lights for selector switch, incoming/outgoing feeders CTS contactors for remote control operation, complete as per specifications and required.					
	1 No. 1600 Amps ACB incoming (50 KA)					
	1 set 1600 Amps triple pole and neutral Aluminium conductor bus bars duly sleeved.					
	7 Nos. 630 Amps outgoing for 4 Nos. chilling units & 3 Nos. for Hot water generator.					
	4 Nos. 125 Amps MCCB outgoing along with 4 Nos. star delta starter for 30.0 kw motor for condenser water pump.					
	2 Nos. 125 Amps MCCB outgoing along with 2 Nos. DOL starter for 22/30 kw motor for secondary chilled water pump and vacant space for VFD.					
	4 Nos. 63 Amps MCCB outgoing along with 4 Nos. star delta starter for 9.3 kw motor for primary chilled water pump.					
	4 Nos. 32 Amps MCB outgoing along with 4 Nos. DOL starter for cooling tower fan motor.	Set	1			
23.2	Providing and fixing of main panel board cubical compartmentalised, floor mounted made of 2.0 mm thick steel sheet duly painted complete with voltmeter, ammeter, indicating lights for selector switch, incoming/outgoing feeders CTS contactors for remote control operation, complete as per specifications and required.					

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
	1 No. 630 Amps MCCB incoming (50 KA)					
	1 set 630 Amps triple pole and neutral Aluminium conductor bus bars duly sleeved.					
	2 Nos. 630 Amps outgoing for 1 No. chilling units & 1 No. for Hot water generator.					
	1 Nos 125 Amps MCCB outgoing along with 1 No. star delta starter for 30.0 kw motor for condenser water pump.					
	1 No. 125 Amps MCCB outgoing along with 1 No. DOL starter for 22.0 kw motor for secondary chilled water pump and vacant space for VFD.					
	2 Nos. 63 Amps MCCB outgoing along with 1 No. star delta starter for primary chilled water pump & 1 No. for star delta starter for cooling tower..					
	2 Nos. 16 Amps MCB outgoing along with 2 Nos. DOL starter for 1.5 kw motor of hot water pumps for O.T.	Set	1			
23.3	<u>ELECTRICAL PANEL BOARD (Terrace Lower)</u>					
	Providing and fixing of main panel board cubical compartmentalised, floor mounted made of 2.0 mm thick steel sheet duly painted complete with voltmeter, ammeter, indicating lights for selector switch, incoming/ outgoing feeders CTS contactors for remote control operation, complete as per specifications and required.					
	1 No. 32 Amps MCB incoming.					
	1 set 32Amps triple pole and neutral Aluminium conductor bus bars duly sleeved.					

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
	4 Nos. 16 Amps MCB outgoing along with 4 Nos. DOL starter for lift well pressurization fans.	Set	1			
23.4	<u>ELECTRICAL PANEL BOARD (TERRACE UPPER)</u>					
	Providing and fixing of subpanel board cubical compartmentalised, wall mounted made of 2.0 mm thick steel sheet duly painted complete with voltmeter, ammeter, indicating lights for selector switch, incoming/outgoing feeders CTS contactors for remote control operation, complete as per specifications and required.					
	1 No. 63 Amps MCCB incoming.					
	1 set 63 Amps triple pole and neutral Aluminium conductor bus bars duly sleeved.					
	2 Nos. 32 Amps MCB outgoing along with 2 Nos. DOL starter for lift lobby pressurization fans.					
	4 Nos. 16 Amps MCB outgoing along with 4 Nos. DOL starter for lift well pressurization fans.	Set	1			
23.5	<u>ELECTRICAL PANEL BOARD (BASEMENT VENTILATION)</u>					
	Providing and fixing of sub panel board cubical compartmentalised, wall mounted made of 2.0 mm thick steel sheet duly painted complete with voltmeter, ammeter, indicating lights for selector switch, incoming/outgoing feeders CTS contactors for remote control operation, complete as per specifications and required.					
	1 No. 800 Amps MCCB incoming.					
	1 set 800 Amps triple pole and neutral Aluminium conductor bus bars duly sleeved.					

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
	17 Nos. 63 Amps MCCB outgoing along with 5 Nos. star delta starter for Normal Exhaust, 4 Nos. for Fresh air, 8 Nos. for Emergency fresh air fans.					
	10 Nos. 32 Amps MCB outgoing along with 10 Nos. DOL starter for for Emergency smoke fans.	Set	1			
24.0	Supply of following sizes of 1.1 KV grade multicore aluminium conductor PVC sheathed armoured cable as per IS 1554.					
i)	3 Core 4 Sqmm.	Metre	400			
ii)	3 Core 6 Sqmm.	Metre	1200			
iii)	3 Core 10 Sqmm.	Metre	60			
iv)	3 Core 16 Sqmm.	Metre	50			
v)	3 Core 35 Sqmm.	Metre	30			
vi)	3.5 Core 185 Sqmm.	Metre	240			
vii)	4 Core 16 Sqmm.	Metre	200			
viii)	4 Core 25 Sqmm.	Metre	250			
25.0	Supplying and making end termination with brass compression glands of following sizes of 1.1 kV grade multicore aluminium conductor PVC insulated and PVC sheathed.					
i)	3 Core 4 Sqmm.	Each	16			
ii)	3 Core 6 Sqmm.	Each	60			
iii)	3 Core 10 Sqmm.	Each	15			

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
iv)	3 Core 16 Sqmm.	Each	15			
v)	3 Core 35 Sqmm.	Each	10			
vi)	3.5 Core 185 Sqmm.	Each	60			
vii)	4 Core 16 Sqmm.	Each	12			
viii)	4 Core 25 Sqmm.	Each	8			
26.0	Fabricating and installatin following size of perforated M.S. cable trays including horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with M.S. suspenderes and including painting etc. as required:-					
i)	150 mm. Width x 50mm. Depth x 1.6mm. Thickness.	Metre	120			
ii)	300 mm. Width x 62.5mm. Depth x 2.0 mm. thickness.	Metre	260			
iii)	450 mm. Width x 62.5mm. Depth x 2.0 mm. thickness.	Metre	500			
iv)	600 mm. Width x 62.5mm. Depth x 2.0 mm. thickness.	Metre	120			
27.0	Control Console Desk					
	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, cooling towers 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.					

ITEM NO	DESCRIPTION OF ITEM	UNIT	QTY.	RATE IN FIGURES (Rs.)	RATE IN WORDS (Rs.)	AMOUNT (Rs.)
1	2	3	4	5	6	7
	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.					
	Push buttons and indication lamps for remote start & stop and status indication (On, Off & Fault) for every nos. cooling tower motors and low water level indication for every Nos. cooling towers.					
	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, cooling towers, exhaust blowers etc to the control console panel as required.	System	1			
28.0	Miscellaneous					
	Providing new vehicle, Ambassdor or equivalent, at any time for exclusive use of Engineer during currency of contract. The number of vehicles and period shall be informed by the Engineer as per requirement. The rates shall be inclusive of services of drivers, fuel, oil, lubricants, consummables, maintenance, toll tax etc complete as directed by Engineer	KM	60000			
	TOTAL RS.					