

Bill of Quantities

1. All items of work under this Contract shall be executed strictly to fulfill the requirements laid down under "Basis of Design" in the specifications. Type of equipment, material specifications, methods of installation, testing, and type of controls shall be in accordance with the Specifications, the relevant BIS codes and other Standards and approved shop Drawings i.e. detailed fabrication drawings of various sizes of ducts / pipes and all associated accessories keeping in view the final commissioning and air / water balancing of the installation to give specified performance. However, capacity of each component and their quantities shall be such as to fulfill the above-mentioned requirement.
2. The rate for each item of work included in the Schedule of Quantities shall, unless expressly stated otherwise, include cost of :
 - a. All materials, fixing materials, accessories, appliances, tools, plants, equipment, transport, labour and incidentals required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of the work called for in the item and as per specifications and Drawings.
 - b. Wastage on materials and labour.
 - c. Loading, transporting, unloading, handling / double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and to fully complete the job in accordance with the contract documents, good practice and recognized principles
 - d. Liabilities, obligations and risks arising out of Conditions of Contract.
 - f. All requirements of Specifications, whether such requirements are mentioned in the item or not. The Specifications and Drawings where available, are to be read as complimentary to and part of the Schedule of Quantities and any work called for in one shall be taken as required for all.
3. The unit rate for each equipment or materials shall include cost in Rupees for equipment and material including the Customs Duty, Excise Duty, all taxes /duties, Works Contract Tax, VAT etc as applicable on the due date of submission of the tender and also including clearing, forwarding, freight and insurance up to Contractor's store at site, storage installation, testing, balancing, commissioning and other works required. Storage and safe custody of equipments /materials at site will be Contractor's own responsibility.
4. The extension for (total) amounts against each item shall be based on the quantities indicated in this Schedule
5. All equipment, quantities and technical data indicated in this Schedule are for the Contractor's guidance only, these are based on the documents prepared by the BHEL. This Schedule must be read in conjunction with these documents. The Contractor shall be paid for the actual quantity of work executed by him in accordance with the approved Shop Drawings at the contract rates. All measurements for ducts & insulation, pipes and insulated pipes, fittings, bends and valves etc. shall be taken along the center line.
6. The quantities given in this schedule are provisional, the BHEL reserve the right to increase or decrease the quantities of work or to totally omit any items of work and the Contractor shall not be entitled to claim any extras or damages on these grounds. These variations shall be permitted until such time Contractors shop drawings are approved. For items with variable quantities, the payment will be made on the basis of actual quantity executed at site.
7. This Schedule of Price Bid shall be fully priced and the extensions and totals duly checked. The rates for all items shall be filled in INK.
8. No alteration whatsoever is to be made to the text or quantities of this Schedule unless such alteration is authorized in writing by the BHEL. Any such alterations, notes or additions shall, unless authorized in writing, be disregarded when tender documents are considered.

9. In the event of an error occurring in the amount column of the Schedule, as a result of wrong extension of the unit rate and quantity, the unit rate quoted by the Tenderer shall be regarded as firm and the extensions shall be amended on the basis of the rates.
10. Any errors in totaling in the amount column and in carrying forward totals shall be corrected. Any error, in description or in quantity or omission of items from this schedule shall not vitiate this Contract but shall be corrected and deemed to be a variation required by the BHEL.
11. Necessary arrangement (sockets with valves) in CHW/HW/CDW shall be provided across all equipments for measuring water flow by suitable measuring devices, if so required in drawing/BOQ.
12. Rates quoted for all items in BOQ shall be on indivisible works contract basis and shall include excise duty, customs duty, sales tax, octroi, VAT, service tax or any other taxes as may be applicable.
13. No foreign exchange or assistance for import of any equipment / component shall be provided by the BHEL. It shall be Contractor's responsibility.
14. The HVAC drawings accompanying the tender shall be read in conjunction with Architectural /Structural drawings of the building and the actual site conditions.
15. All Ceiling Suspended AHUs and FCUs shall be provided with suitable hinged type inspection doors in the false ceiling creating adequate access to the unit for repair / maintenance /inspection.
16. Whereas all prices will be quoted / paid in Indian Rupees as per BOQ, the tenderer will also give FOB value in USD alongwith prevailing exchange rate and customs duty for all imported equipment / materials.
17. The BHEL reserve the right to get any equipment / material tested / checked, before accepting its delivery at site, at original manufacturers works or at any approved Govt. laboratory at Contractor's cost to establish conformity of quality / rating with tender specifications and the entire cost in this regard will be borne by the Contractor.
18. Samples of material / equipments / controls etc as required will be submitted for approval of the BHEL before delivering the equipment / material at site. No material / equipment will be delivered without approval of the sample.
19. Actual execution of work will start only after approval of shop drawings.
20. Buried pipes crossing roads / hard /finished floorings will be provided with adequate retaining brick walls on side and RCC slab on the top to protect the pipes from any damage due to movements of heavy vehicles etc.
21. Obtaining Statutory Approvals / Sanctions / Permits / Licence etc, if any, from the concerned Govt Authorities / Local Bodies will all be in the scope of contractor's work and the rates quoted will be inclusive of expenses / labour etc towards all these requirements. However, actual fees / charges paid to the authorities in this regard will be reimbursed to the contractor by the Employer upon production of proof of payment / receipt for the actual payment.
22. In case of any conflict between conditions / clauses of the tender document, the most stringent will prevail / take precedence and the decision of the BHEL in this regard will be final and binding.

Sl.No.	Description	Qty	Unit	Rate	Amount
A.	Equipments				
1	Water Chilling Machine: Supply, Installation, Testing and Commissioning of Air Cooled Screw Water Chilling Machine of 220 TR capacity as per specification of Sl.No.3.0 of Tender document and complete in all respect	1	No.		
2	Chilled / Hot Water Pumps Supply, Installation, Testing & Commissioning of Centrifugal split casing pumps with water flow rate is 285 USGPM (1079 LPM) as per specification of Sl.No.5.0 of Tender document and complete in all respect	1	No.		
	Supply, Installation, Testing & Commissioning of Centrifugal split casing pumps with water flow rate is 330 USGPM (1079 LPM) as per specification of Sl.No.5.0 of Tender document and complete in all respect	2	Nos.		
3	Hot Water Generator (Elec.) Supplying, Installing, Testing & Commissioning of electrical Hot Water Generator as per specification of Sl.No.13 of Tender document and complete in all respect	2	Nos.		
4	Main HVAC Panel (in Pump Room) Designing, Fabricating, Transporting to site, Installing, Testing and Commissioning of floor mounted, self supported, compartmentalized LT cubical pattern Panel (Extendable Type) as per specification of Sl.No.12.0 of Tender document and complete in all respect	2	Nos.		
5	Control Panels In AHU Room Design, Manufacture, Supply, Installation, Testing and Commissioning of control panel as per specification of Sl.No.12.0 of Tender document and complete in all respect				
	a. 12.5 - 15.0 HP Star Delta starter with 40/80 amps MCCB and contactors.	2	Nos.		
	b. 15.5 - 20.0 HP Star Delta starter with 40/80 amps MCCB and contactors.	2	Nos.		
6	Mini Building Management System (Mini BMS) Design, Manufacture, Supply, Installation, Testing and Commissioning of Mini BMS for Central Control-cum-Status-Indication of various equipments of HVAC system as per specification of Sl.No.11.0 of Tender document and complete in all respect	2	Nos.		

Sl.No.	Description	Qty	Unit																																
7	<p>Air Handling Units (AHUs) Supply, Installation, Testing and Commissioning of double skin draw thru Air Handling Units as per specification of Sl.No.6.0 of Tender document and complete in all respect</p> <table border="1"> <thead> <tr> <th>S.N. of AHU</th> <th>Air Qty CFM</th> <th>SP(mm)</th> <th>HP</th> <th>Qty</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>i. 1</td> <td>29000</td> <td>50</td> <td>20</td> <td>1</td> <td>No.</td> </tr> <tr> <td>ii. 2</td> <td>29000</td> <td>50</td> <td>20</td> <td>1</td> <td>No.</td> </tr> <tr> <td>iii. 3</td> <td>26000</td> <td>50</td> <td>15</td> <td>1</td> <td>No.</td> </tr> <tr> <td>iv. 4</td> <td>26000</td> <td>50</td> <td>15</td> <td>1</td> <td>No.</td> </tr> </tbody> </table>	S.N. of AHU	Air Qty CFM	SP(mm)	HP	Qty	Unit	i. 1	29000	50	20	1	No.	ii. 2	29000	50	20	1	No.	iii. 3	26000	50	15	1	No.	iv. 4	26000	50	15	1	No.				
S.N. of AHU	Air Qty CFM	SP(mm)	HP	Qty	Unit																														
i. 1	29000	50	20	1	No.																														
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iii. 3	26000	50	15	1	No.																														
iv. 4	26000	50	15	1	No.																														
8	<p>Pan Humidifier Supply, Installation, Testing and Commissioning of 22G stainless steel (SS) sheet pan humidifier as per specification and complete in all respect</p>	4	Nos.																																
9	<p>Motorised Valves Supply, Installation, Testing and Commissioning of Three way motorized valves as per specification and complete in all respect</p> <p>i. 4" (100mm) dia pipes for AHUs ii. 3" (80 mm) dia pipes for AHUs.</p>	2 2	Nos. Nos.																																
10	<p>Thermostat Supply, Installation, Testing and Commissioning of thermostats as per specification and complete in all respect</p>	4	Nos.																																
11	<p>a. Smoke Sensor Supply, installation, testing & commissioning of smoke detectors / sensors as per specification and complete in all respect</p> <p>b. Electric Actuator Electric actuator with necessary linkages as per specification and complete in all respect</p>	4 4	Nos. Nos.																																
Total Carried To Summary		Rs																																	

Sl.No.	Description	Qty	Unit	Rate	Amount
B	P i p i n g				
1	Chilled and Hot Water Piping				
a	MS Pipe : Providing and fixing in position the following MS class 'C' pipes as per specification and complete in all respect				
	5" (125 mm) dia MS pipes.	95	RM		
	4" (100 mm) dia MS pipes.	530	RM		
	3" (80 mm) dia MS pipes.	110	RM		
	3/4" (20 mm) dia MS pipes.	10	RM		
	1/2" (15 mm) dia MS pipes.	10	RM		
b	GI Pipe Providing and fixing in position the following GI class 'B' pipes as per specification and complete in all respect				
	1.50" (40 mm) dia GI pipe	40	RM		
2	Valves & Other Accessories :				
a.	Butterfly Valves Providing and fixing in position the following butterfly valves (Upto 200mm size with plate handle and 250 mm size and above with worm actuators.) as per specification and complete in all respect				
	5" (125 mm) dia valve	23	Nos.		
	4" (100 mm) dia valve	27	Nos.		
	3" (80 mm) dia valve	4	Nos.		
b.	Balancing Valves Providing and fixing in position the following balancing valves as per specification and complete in all respect				
	5" (125 mm) dia valves	7	Nos.		
	4" (100 mm) dia valves	9	Nos.		
	3" (80 mm) dia valves	2	Nos.		
c.	Ball Valves Providing and fixing in position the following Ball Valves as per specification and complete in all respect				
	1" (25 mm) dia valves	4	Nos.		
d.	Check Valves Providing and fixing in position the following dual plate check valves as per specification and complete in all respect				
	5" (125 mm) dia valves	2	Nos.		
	4" (100 mm) dia valves	2	Nos.		
e.	Auto Purge Valve Providing and fixing in position the following auto purge valves as per specification and complete in all respect				
	1/2" (12mm) dia pipe size	4	Nos.		

Sl.No.	Description	Qty	Unit	Rate	Amount
f.	Drain Valve Providing and fixing in position the following drain valves (gate valve) as per specification and complete in all respect 1.50" (40mm) dia pipe size	6	Nos.		
g.	Pressure Gauges Providing and fixing in position the industrial type pressure gauges with U-tube and gunmetal valves as per specification and complete in all respect	36	Nos.		
h.	Thermometer Providing and fixing in position the mercury-inglass industrial type thermometers as per specification and complete in all respect	28	Nos.		
j.	Y-Strainers Providing and fixing in position the following 'Y' strainers as per specification and complete in all respect 5" (125 mm) dia strainer 4" (100 mm) dia strainer 3" (80 mm) dia strainer	4 6 2	Nos. Nos. Nos.		
k.	Pot Strainer Providing and fixing in position the following pot strainers as per specification and complete in all respect 5" (125 mm) dia pipes 4" (100 mm) dia pipes	1 1	Nos. Nos.		
l.	Expansion Tank (Make-up Water Tank) Supply, Installation and Testing of an insulated roof mounted Chilled and hot water expansion tank as per specification and complete in all respect	2	Nos.		
m.	Mercury Manometer (portable Type) Supplying, Installation, Testing and commissioning of portable type manometer as per specification and complete in all respect	1	No.		
Total Carried To Summary			Rs		

Sl.No.	Description	Qty	Unit	Rate	Amount
C	Air Distribution				
1	GSS Duct Supply, fabrication, installation and testing of sheet metal ducts in accordance with the approved shop drawings and as required by the specifications of Sl.No.9.0 of Tender document and complete in all respect i. 24G (0.63 mm) thick galvanized sheet steel. ii. 22G (0.80 mm) thick galvanized sheet steel. iii. 20G (1.00 mm) thick galvanized sheet steel.	1090 895 265	SM SM SM		
2	Flexible Connection Supply, Fabrication, Installation and Testing of the Flexible connections as per specification and complete in all respect	16	SM		
3	GI Louver Damper Supply, Installation and Testing of GI Louver dampers as per specification and complete in all respect	15	SM		
4	Fire Dampers Supply, Installation, Testing and Commissioning of smoke sensed, solenoid valve actuated Fire dampers as per specification and complete in all respect	6	SM		
5	FA Grilles Supplying, Fixing, Testing & Commissioning of powder coated extruded aluminium section fresh air grill as per specification and complete in all respect	8	SM		
6	Supply Air Grilles Supplying & fixing of powder coated extruded aluminium section supply air grills as per specification and complete in all respect	Nil	SM		
7	Return Air Grilles Supplying & fixing of powder coated extruded aluminium section return air grills as per specification and complete in all respect	Nil	SM		
8	Supply Air Diffusers Supplying, Fixing, Testing Commissioning of supply air diffusers as per specification and complete in all respect	22	SM		
9	Return Air Diffusers Supplying, Fixing, Testing, Commissioning of return air diffusers as per specification and complete in all respect	28	SM		
	Total Carried To Summary		Rs		

Sl.No.	Description	Qty	Unit	Rate	Amount
D	Insulation				
1	Acoustic Lining (Duct) Supply, installation and testing of acoustic lining within supply and return air ducts as per the specifications of Sl.No.10.0 of Tender document and complete in all respect 1" (25 mm) thick acoustic lining with resin bonded glass wool slab or expanded polystyrene TF quality.	110	SM		
2	Duct Insulation Supplying and fixing on the outer surface of duct 12mm thick Chemically Cross Linked Closed Cell Polyethylene (FR Grade) insulation as per specification of Sl.No.10.0 of Tender document and complete in all respect	950	SM		
3	Insulation of Chilled Water / Condensate Drain pipe Supply, installation and testing of pre-moulded pipe sections/slab/roll of cross linked closed cell polyethylene (FR-XPE) of thickness specified below as per specification and complete in all respect a. Condensate Drain Pipe Pipe Dia (mm) Insulation Thickness(mm) 40 Ø 12	40	RM		
	b. CHW/Hot Water Pipe Pipe Dia (mm) Insulation Thickness(mm) i. 15 Ø 19 ii. 20 Ø 19 iii. 80 Ø 32 iv. 100 Ø 32 v. 125 Ø 32	10 10 110 530 95	RM RM RM RM RM		
Total Carried To Summary		Rs			

Sl.No.	Description	Qty	Unit	Rate	Amount
E	Cables, Cable Trays and Earthing :				
1.0	XLPE Cables Supplying and laying of following 1100 volt grade PVC insulated sheathed aluminium conductor armoured XLPE FRLS cables / copper cables as per specification of Sl.No.12.0 of Tender document and complete in all respect				
i	PVC Cables				
	a. 3.5 x 400 sq.mm armoured aluminium conductor cable.	Nil	QR		
	b. 3.5 x 240 sq.mm armoured aluminium conductor cable.	290	RM		
	c. 3.5 x 185 sq.mm armoured aluminium conductor cable.	Nil	QR		
	d. 3.5 x 95 sq.mm armoured aluminium conductor cable.	30	RM		
	e. 3.5 x 16 sq.mm armoured aluminium conductor cable.	660	RM		
2.0	Cable Trays (Perforated) Supplying, fabricating, fixing cable trays of GI slotted sheets as per specification and complete in all respect				
	a. 40 x 150 x 40 x 2 mm	25	RM		
	b. 40 x 200 x 40 x 2 mm	30	RM		
	c. 40 x 300 x 40 x 2 mm	50	RM		
	d. 40 x 450 x 40 x 2 mm	30	RM		
	e. 40 x 600 x 40 x 2 mm	20	RM		
3.0	Earthing				
	i. Providing earthing stations	4	Nos.		
	ii. Supplying and fixing of following bare GI wire & tapes as per specification of Sl.No.12.0 of Tender document and complete in all respect				
	a. 25 mm x 6 mm thick GI tape.	110	RM		
	b. 50 mm x 6 mm thick GI tape.	75	RM		
	c. 10 SWG GI wire	50	RM		
	d. 8 SWG GI wire.	250	RM		
	e. 6 SWG GI wire.	50	RM		
	iii. Supply and laying of class 'A' GI pipe				
	a. 50 mm (2") dia	90	RM		
	b. 80 mm (3") dia	25	RM		
Total Carried To Summary		Rs			

Sl.No.	Description	Qty	Unit	Rate	Amount
F.	Associated Civil Works				
1.0	Foundation (Cast-In-Situ) as per specification of Sl.No.15.0 of Tender document				
i.	RCC foundation as per specification and complete in all respect	16	CUM		
ii.	PCC foundation as per specification and complete in all respect	8	CUM		
Total Carried To Summary		Rs			
G	Under-deck Insulation: Under Deck Insulation of Providing and fixing under deck insulation to the roof as per specification of Sl.No.10.0 of Tender document and complete in all respect	3200	SM		
Total Carried To Summary		Rs			
H.	Metallic False Ceiling : Supply and installation / fixing of nonperforated metal ceiling system as per specification of Sl.No.15.0 of Tender document and complete in all respect	3200	SM		
Total Carried To Summary		Rs			
I	Air conditioning for Office Area				
1.0	Supply of Multi Split Type Airconditioner with Scroll / Rotary Compressor, 3 TR x 1 No. Condensing unit and 1.5 TR x 2 nos. evaporating Units.	13	Nos.		
2.0	Installation, testing and commissioning of 3 TR Multi Split type Air conditioning unit	13	Nos.		
3.0	Supply, Installation, testing and commissioning of insulated liquid and suction copper refrigerant piping	130	RMT		
4.0	Providing and fixing M.S. structural support for condensing unit	13	Nos.		
5.0	Providing and fixing Complete electrical interconnecting cabling from Indoor units to outdoor units	130	RMT		
6.0	Providing, fixing and testing of PVC drain piping with fittings and supports				
	a. 25 mm dia pipe.	50	RMT		
	b. 30 mm dia pipe.	110	RMT		
7.0	Refrigerent Gas Charging(Top up).	13	Nos.		
Total Carried To Summary		Rs			

Summary of Costs

Sl.No.	Description	Amount (Rs)
A	Equipment	
B	Piping	
C	Air Distribution	
D	Insulation	
E	Cables & Earthing	
F	Associated Civil Work	
G	Underdeck Insulation	
H	Metallic False Ceiling	
I	Air conditioning for Office Area	
Grand Total		

