

Subhead-7

Air Cooling System & Related Works

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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7.1

WINDOW TYPE AIR-COOLER

Supply, Installation, Testing & Commissioning window type air-cooler with remote control of following cooling capacity based on indoor temperature 27°-30°C DB / 19.5°-22°C WB and outdoor temperature 35°-40°C DB at high fan speed condition suitable for installation & operation in tropicalized country like Bangladesh & as per detailed specifications & standard as mentioned below : -

- (1). Type : Window type
- (2). Compressor : Hermitically sealed reciprocating / rotary compressor.
- (3). Refrigerant : Internationally accepted & recommended gas (CFC free)
- (4). Blower motor : Well Balanced propeller type direct driven centrifugal type blower fan for condenser & evaporator with regulator
- (5). Power supply : 200-250V, single phase, 50 Hz. AC supply
- (6). Condensing pipe : Made of copper.

- (7). EER Minimum 8.5 $EER = \frac{BTU/HR}{WATT}$

COP Minimum 2.5 (W/W)

- (8) Other features : (8.1). Fancy & adjustable air circular louver.
 (8.2) Removable & washable filter.
 (8.3) Thermostat control switch.
 (8.4) Fresh air intake arrangement .

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Standard : Major component shall be manufactured as per relevant international standard & code.

Documents : Manufacturing company shall have the following certificate.

(1). ISO-9001.

(2). CE Certification / UL Listing.

Warranty : The bidder should provide the guaranty of compressor for at least 2 years & free service with spares for 2 years from the date of commissioning & it should be obtained from the air cooler selling agency.

7.1.1 Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / TAIWAN / THAILAND / USA / EU countries accepted / approved by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.

7.1.1.1	17001 - 18000 BTU/HR capacity	Each	90,219.00	90,152.00	89,902.00	89,902.00
7.1.1.2	22501 - 24000 BTU/HR capacity	Each	106,170.00	106,104.00	105,854.00	105,854.00

7.1.2 Any brand manufactured or assembled in BANGLADESH / CHINA / VIETNAM / TURKEY accepted / approved by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.

7.1.2.1	17001 - 18000 BTU/HR capacity	Each	50,953.00	50,887.00	50,637.00	50,637.00
7.1.2.2	22501 - 24000 BTU/HR capacity	Each	59,543.00	59,476.00	59,226.00	59,226.00

7.2 SPLIT TYPE AIR-COOLER

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation, testing & commissioning of split type air-cooler with inverter comprising condensing and evaporating units having following cooling capacity based on indoor temperature 27°-30°C DB / 19.5°-22°C WB and outdoor temperature 35°-40°C DB at high fan speed condition suitable for installation & operation in tropicalized country like Bangladesh & as per detailed specifications & standard as mentioned below :

OUTDOOR UNIT / CONDENSING UNIT

- (1). Type : Compact weather proof outdoor type condensing unit
- (2). Compressor : Hermitically sealed reciprocating / rotary compressor.
- (3). Refrigerant : Internationally accepted & recommended and most commonly used gas (CFC free)
- (4). Blower motor : Well balanced type direct driven centrifugal type blower fan
- (5). Power supply :
 - (5.1). 200-250 V, single phase, 50 Hz. AC supply [up to 30000 BTU/HR]
 - (5.2). 380-440 V 3-phase, 50 Hz. AC supply [above 30000 BTU/HR]
- (6). Condensing pipe / coil : Made of copper
- 7). EER/COP :

For upto 60000 BTU/HR
EER should be minimum 9.23 (BTU/HR)/WATT
and COP Should be minimum 2.70 (W/W)

For above 60000 BTU/HR
EER should be minimum 10.5 (BTU/HR)/WATT
and COP should be minimum=3.08 (W/W)
- (8). Others features :
 - (8.1). Well balanced in all respect having interlock with the fan coil unit.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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(8.2). Compressor dully equipped with vibration isolator, thermostatic & overload controls, magnetic contactors and all other standard accessories complete.

(8.3). Refrigerant copper pipe [From outdoor to indoor unit] with thermal insulation, refrigerant charging arrangement etc.[Minm length 10 mtr.]

(8.4). Req'd. size PVC insulated & sheathed cable with ECC through water grade PVC pipe from outdoor to indoor unit.

(8.5) Sound level : maximum 65 dB(A) at 1 meter

INDOOR UNIT / FAN COIL UNIT

Features : (1). Direct expansion system fan coil unit with well balanced direct driven centrifugal type fan.

(2). Fancy & adjustable air circulating louver grill, removable & washable type filter .

(3). Condensing water drain out PVC flexible pipe with necessary insulation

(4). Thermostatic switch and remote control switch.

(5). Sound level : maximum 44 dB(A) at 1 meter

Standard : Major component shall be manufactured as per relevant international standard & code.

Documents : Manufacturing company shall have the following certificate :

(1). ISO-9001.

(2). CE Certification / UL Listing.

Warranty :

The bidder should provide the guaranty of compressor for at least 2 years & free service with spares for 2 years from the date of commissioning & it should be obtained from the air cooler selling agency.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.2.1	Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / TAIWAN / THAILAND / USA / EU countries accepted / approved by the engineer in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.					
7.2.1.1	Capacity : 12000 BTU/HR					
7.2.1.1.1	Wall mounted	Each	65,678.00	65,501.00	64,834.00	64,834.00
7.2.1.1.2	Wall mounted (Inverter Type)	Each	90,219.00	90,042.00	89,375.00	89,375.00
7.2.1.2	Capacity : 17000-18000 BTU/HR					
7.2.1.2.1	Wall mounted	Each	109,852.00	109,653.00	108,902.00	108,902.00
7.2.1.2.2	Wall mounted (Inverter Type)	Each	122,122.00	121,923.00	121,172.00	121,172.00
7.2.1.2.3	Wall mount (Heating and Cooling Both)	Each	144,209.00	144,010.00	143,259.00	143,259.00
7.2.1.3	Capacity : 22500-24000 BTU/HR					
7.2.1.3.1	Wall mounted	Each	122,122.00	121,923.00	121,172.00	121,172.00
7.2.1.3.2	Wall mounted (Inverter Type)	Each	134,392.00	134,194.00	133,443.00	133,443.00
7.2.1.3.3	Wall mount (Heating and Cooling Both)	Each	152,798.00	152,599.00	151,848.00	151,848.00
7.2.1.3.4	Cassette type	Each	170,222.00	170,024.00	169,273.00	169,273.00
7.2.1.3.5	Cassette type (Inverter Type)	Each	192,064.00	191,865.00	191,114.00	191,114.00
7.2.2.1	Capacity : 28000-30000 BTU/HR					
7.2.2.1.1	Wall mounted	Each	183,474.00	183,276.00	182,525.00	182,525.00
7.2.2.1.2	Wall mounted (Inverter Type)	Each	201,880.00	201,681.00	200,930.00	200,930.00
7.2.2.1.3	Cassette type	Each	188,383.00	188,140.00	187,222.00	187,222.00
7.2.2.1.4	Cassette type (Inverter Type)	Each	200,653.00	200,410.00	199,492.00	199,492.00
7.2.2.1.5	Ceiling suspended	Each	200,653.00	200,410.00	199,492.00	199,492.00
7.2.2.1.6	Ceiling suspended (Inverter Type)	Each	228,875.00	228,632.00	227,714.00	227,714.00
7.2.2.2	Capacity : 34000-36000 BTU/HR					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.2.2.2.1	Ceiling suspended	Each	221,513.00	221,314.00	220,563.00	220,563.00
7.2.2.2.2	Ceiling suspended (Inverter Type)	Each	233,783.00	233,585.00	232,834.00	232,834.00
7.2.2.2.3	Cassette type	Each	247,281.00	247,038.00	246,120.00	246,120.00
7.2.2.2.4	Cassette type (Inverter Type)	Each	268,141.00	267,898.00	266,980.00	266,980.00
7.2.2.2.5	Floor standing type	Each	242,224.00	241,981.00	241,063.00	241,063.00
7.2.2.2.6	Floor standing type (Inverter Type)	Each	290,228.00	289,985.00	289,067.00	289,067.00
7.2.2.3	Capacity : 46000-48000 BTU/HR					
7.2.2.3.1	Ceiling suspended	Each	253,416.00	253,173.00	252,255.00	252,255.00
7.2.2.3.2	Ceiling suspended (Inverter Type)	Each	277,957.00	277,714.00	276,796.00	276,796.00
7.2.2.3.3	Cassette type	Each	277,957.00	277,714.00	276,796.00	276,796.00
7.2.2.3.4	Cassette type (Inverter Type)	Each	296,363.00	296,120.00	295,202.00	295,202.00
7.2.2.3.5	Floor standing type	Each	289,464.00	289,221.00	288,304.00	288,304.00
7.2.2.3.6	Floor standing type (Inverter Type)	Each	351,580.00	351,337.00	350,419.00	350,419.00
7.2.2.4	Capacity : 58000-60000 BTU/HR					
7.2.2.4.1	Ceiling suspended	Each	305,703.00	305,460.00	304,542.00	304,542.00
7.2.2.4.2	Cassette type	Each	320,904.00	320,661.00	319,743.00	319,743.00
7.2.2.4.3	Floor standing type	Each	313,085.00	312,842.00	311,924.00	311,924.00
7.2.2.5	Capacity : 77000-80000 BTU/HR					
7.2.2.5.1	Floor standing type	Each	480,392.00	480,127.00	479,126.00	479,126.00
7.2.2.6	Capacity : 95000-98000 BTU/HR					
7.2.2.6.1	Floor Standing type	Each	658,075.00	657,810.00	656,808.00	656,808.00
7.2.2.7	Capacity: 116000-120000 BTU/HR					
7.2.2.7.1	Floor standing type	Each	684,107.00	683,775.00	682,524.00	682,524.00

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7.2.3	Any brand manufactured or assembled in BANGLADESH / CHINA / VIETNAM / TURKEY approved / accepted by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.					
7.2.3.1	Capacity : 12000 BTU/HR					
7.2.3.1.1	Wall mounted	Each	49,726.00	49,572.00	48,987.00	48,987.00
7.2.3.2	Capacity : 17000-18000 BTU/HR					
7.2.3.2.1	Wall mounted	Each	60,770.00	60,593.00	59,925.00	59,925.00
7.2.3.3	Capacity : 22500-24000 BTU/HR					
7.2.3.3.1	Wall mounted	Each	70,586.00	70,409.00	69,742.00	69,742.00
7.2.3.3.2	Cassette type	Each	120,895.00	120,718.00	120,051.00	120,051.00
7.2.3.4	Capacity : 34000-36000 BTU/HR					
7.2.3.4.1	Ceiling suspended	Each	154,025.00	153,804.00	152,970.00	152,970.00
7.2.3.4.2	Cassette type	Each	154,025.00	153,804.00	152,970.00	152,970.00
7.2.3.5	Capacity : 46000-48000 BTU/HR					
7.2.3.5.1	Ceiling suspended	Each	184,701.00	184,481.00	183,646.00	183,646.00
7.2.3.5.2	Cassette type	Each	184,701.00	184,481.00	183,646.00	183,646.00
7.2.3.6	Capacity : 58000-60000 BTU/HR					
7.2.3.6.1	Ceiling suspended	Each	203,107.00	202,886.00	202,052.00	202,052.00
7.2.3.6.2	Cassette type	Each	203,107.00	202,886.00	202,052.00	202,052.00
7.3	REFRIGERENT COPPER PIPES WITH THERMAL INSULATION					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply & installation of copper refrigerant pipe complete with all necessary pipe fitting such as bends, tees, reducers, sockets, gate valves etc. as per drawing and direction. The concealed pipe shall be covered with pvc pipe with nitrile rubber insulation having thickness 19 mm for VRF system and thickness 13 mm for split type unit and be installed with proper hangers supports, clamp as per site condition and complying standard. Pipe work shall be tested unto the recommendation and direction of Engineer-in-charge.

7.3.1	1/4" dia copper tube	Meter	344.00	344.00	344.00	344.00
7.3.2	3/8" dia copper tube	Meter	331.00	331.00	331.00	331.00
7.3.3	1/2" dia copper tube	Meter	521.00	521.00	521.00	521.00
7.3.4	5/8" dia copper tube	Meter	466.00	466.00	466.00	466.00
7.3.5	3/4" dia copper tube	Meter	638.00	638.00	638.00	638.00
7.3.6	1" dia copper tube	Meter	773.00	773.00	773.00	773.00
7.3.7	1-1/8" dia copper tube	Meter	1,092.00	1,092.00	1,092.00	1,092.00
7.3.8	1-1/4" dia copper tube	Meter	1,270.00	1,270.00	1,270.00	1,270.00
7.3.9	1-3/8" dia copper tube	Meter	1,436.00	1,436.00	1,436.00	1,436.00

7.4 REF NET / BRANCH JOINT

Supply & fixing of Y shaped RefNet Joint / T shaped Branched Joint made of pure copper with insulation pressure tolerance not less 450 psi copper thickness should be 2 mm. Y shaped RefNet joint / T shaped Branched Joint as per actual requirement of site and as per direction of the Engineer-in-charge.

Set	6,939.00	6,939.00	6,939.00	6,939.00
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7.5 DUCT INSULATION

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply and fixing of thermal insulation on non-exposed ducts with following thickness CFC / HCFC Free Closed Cell Class 'O' Nitrile Rubber Foam Insulation having density of 40-70 Kg/m³, thermal conductivity of 0.037 W/mK at 200°C Mean Temp, Water Vapour Diffusion Resistance (μ) \geq 7000 (without the vapour barrier) and with factory laminated aluminium foil of 12-18 micron thickness; to be applied using manufacturer's recommended rubber based adhesive. The Joints shall be sealed with 50-75mm wide self-adhesive tapes of Aluminium Foil with scrim complete as per specifications and as required.

7.5.1	13 mm	sqm	1,009.00	1,009.00	1,009.00	1,009.00
7.5.2	25 mm	sqm	1,550.00	1,550.00	1,550.00	1,550.00

7.6 SINGLE PACKAGE DUCTED TYPE AIR-COOLER

Supply, installation, testing and commissioning of air cooled single package ducted type air conditioner unit having cooling capacity based on indoor temperature 27°-30° C DB /19.5°-22° C WB and outdoor temperature 35°-40° C in/c hermetic compressor with crankcase heater, internal overload protection, high & low pressure cutout, anti recycling time guard etc. complete, the condenser fan shall be vertical discharge and axial flow type.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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The motor shall be three-phase with external overload suitable for 415±10%V, 50 Hz. AC supply out-door application. The evaporator fans shall be double inlet forward curved centrifugal type, statically & dynamically balanced, horizontal/bottom (convertible) discharge supply plenum coil section, filter section with filter, supply and return air plenum, wall mounted remote temperature and fan speed controller etc. Refrigerant will be internationally accepted & recommended and most commonly used gas (CFC free). COP should be minimum 3.08. (major components of the machine shall be in conformity with relevant international standards.)

Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / THAILAND / USA/ EU countries accepted / approved by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.

7.6.1	Capacity : 87000-90000 BTU/HR	Each	705,553.00	705,222.00	703,970.00	703,970.00
7.6.2	Capacity : 96000-100000 BTU/HR	Each	865,069.00	864,738.00	863,486.00	863,486.00
7.6.3	Capacity : 116000-120000 BTU/HR	Each	1,000,045.00	999,713.00	998,462.00	998,462.00

7.7 SPLIT DUCTED TYPE AIR-COOLER

Supply, installation, testing and commissioning of air cooled split ducted type air conditioner unit having cooling capacity based on indoor temperature 27⁰-30⁰C DB / 19.5⁰-22⁰C WB and outdoor temperature 35⁰-40⁰C including hermetic compressor with crankcase heater, internal overload protection, high & low pressure cutout, anti recycling time guard etc. complete, the condenser fan shall be vertical discharge and axial flow type.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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The motor shall be three-phase with external overload suitable for outdoor application. The evaporator fans coil shall be ceiling/floor standing double inlet forward curved centrifugal type, statically & dynamically balanced, horizontal discharge supply plenum coil section, filter section with filter, supply and return air plenum, wall mounted remote temperature and fan speed controller etc. Power supply shall be $415 \pm 10\%V$, 3-phase, 50 Hz. AC. Refrigerant will be internationally accepted & recommended and most commonly used gas (CFC free). COP should be minimum 3.08. (major components of the machine shall be in conformity with relevant international standards.)

Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / TAIWAN / THAILAND / USA / EU countries accepted / approved by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.

7.7.1	46000-48000 BTU/HR capacity	Each	300,627.00	300,296.00	299,044.00	299,044.00
7.7.2	57000-60000 BTU/HR capacity	Each	441,737.00	441,406.00	440,155.00	440,155.00
7.7.3	77000-80000 BTU/HR capacity	Each	600,027.00	599,695.00	598,444.00	598,444.00
7.7.4	95000-98000 BTU/HR capacity	Each	705,553.00	705,222.00	703,970.00	703,970.00
7.7.5	116000-120000 BTU/HR capacity	Each	806,171.00	805,840.00	804,588.00	804,588.00
7.8	VRF/VRV SYSTEM (OUTDOOR UNIT)					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, Installation, testing & commissioning of variable refrigerant flow (VRF)/ variable refrigerant volume (VRV) air-cooler comprising condensing units having following cooling capacity based on indoor temperature 27°-30°C DB / 19.5°-22°C WB and outdoor temperature 35°-40°C DB at high fan speed condition suitable for installation & operation in tropicalized country like Bangladesh including all mending good the damaged (all civil works) as per detailed specifications & standard in accordance with fulfillment of above specifications and having relevant certificates as mentioned below :

- (1) Type : Compact weather proof outdoor type condensing unit
- (2) Compressor : Dc inverter scroll compressor (only cooling)
- (3) Refrigerant : Refrigerant will be internationally accepted & recommended and most commonly used gas (CFC free).
- (4) Blower motor : Well balanced type direct driven centrifugal axial flow type vertical discharge type blower fan.
- (5) Power supply : 380-440V. three phase, 50 Hz AC supply
- (6) Condensing pipe / coil : Made of copper
- (7) Energy Efficiency Ratio (EER) : 10.6 (minimum)
- (8) Sound level : maximum 65 dB(A) at 1 meter

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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(9). Other features : (9.1). Well balanced in all respect having interlock with the fan coil unit.

(9.2). Compressor dully equipped with vibration isolator, thermostatic & overload controls, magnetic contactors and all other standard accessories complete.

(9.3). Refrigerant copper pipe (from outdoor to indoor unit) wit thermal insulation, refrigerant charging arrangement etc. (minimum length 10 metre)

(9.4). Reqd. size PVC insulated & sheathed cable with ECC through water grade PVC pipe from outdoor to indoor unit.

(10). Standard : Major component shall be manufactured as per relevant international standard & code from the same country of origin.

(11). Documents : Manufacturing company shall have the following certificate-

(11.1). ISO-9001.

(11.2). CE Certification / UL Listing.

7.8.1 Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / TAIWAN / THAILAND / USA / EU countries approved / accepted by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.

7.8.1.1	Cooling capacity : 76000-80000 BTU/HR	Each	548,491.00	548,226.00	547,224.00	547,224.00
7.8.1.2	Cooling capacity : 94000-98000 BTU/HR	Each	554,626.00	554,361.00	553,360.00	553,360.00
7.8.1.3	Cooling capacity : 112000-116000 BTU/HR	Each	641,986.00	641,721.00	640,719.00	640,719.00
7.8.1.4	Cooling capacity : 132000-136000 BTU/HR	Each	701,872.00	701,607.00	700,605.00	700,605.00
7.8.1.5	Cooling capacity : 150000-154000 BTU/HR	Each	732,548.00	732,283.00	731,282.00	731,282.00
7.8.1.6	Cooling capacity : 200000-212000 BTU/HR	Each	1,165,696.00	1,165,144.00	1,163,058.00	1,163,058.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.8.2	Any brand manufactured or assembled in BANGLADESH / CHINA / VIETNAM / TURKEY approved / accepted by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.					
7.8.2.1	Cooling capacity : 76000-80000 BTU/HR	Each	547,141.00	546,876.00	545,875.00	545,875.00
7.8.2.2	Cooling capacity : 94000-98000 BTU/HR	Each	550,822.00	550,557.00	549,556.00	549,556.00
7.8.2.3	Cooling capacity : 112000-116000 BTU/HR	Each	559,411.00	559,146.00	558,145.00	558,145.00
7.8.2.4	Cooling capacity : 132000-136000 BTU/HR	Each	583,952.00	583,687.00	582,686.00	582,686.00
7.8.2.5	Cooling capacity : 150000-154000 BTU/HR	Each	596,223.00	595,958.00	594,957.00	594,957.00
7.8.2.6	Cooling capacity : 200000-212000 BTU/HR	Each	668,619.00	668,067.00	665,981.00	665,981.00

7.9 VRF/VRV FAN COIL UNIT (INDOOR UNIT)

Supply, installation, testing and commissioning of the following capacity based on indoor temperature 27°-30°C DB/ 19.5°-22°C WB and outdoor temperature 35°-40°C DB, ceiling mounting type, Variable Refrigerant Flow/ Variable Refrigerant Volume cassette unit consisting of thermo cabinet, dynamically balanced centrifugal blowers, fan motors, direct expansion type cooling coil, Insulated drain tray, electronic refrigerant flow control valve, room temperature sensor & cordless remote controller Infra red sensor, inbuilt condensate drain pump, necessary supports as per the specification and drawings. The unit shall operate when supplied with 230V±10%V, 1Ph-50Hz power. Suitable for installation & operation in tropicalized country like Bangladesh & as per detailed specifications & standard as mentioned below :

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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(1). Direct expansion system fan coil unit with well balanced direct driven centrifugal type fan.

(2). Fancy & adjustable air circulating louver grill, removable & washable type filter.

(3). Condensing water drain out PVC flexible pipe with necessary insulation.

(4). Thermostatic switch and remote control switch.

(5). Sound level (h): maximum 44 dB (A) at 1 meter

(6). Standard : Major component shall be manufactured as per relevant international standard & code.

7.9.1 **Any brand manufactured or assembled in JAPAN / MALAYSIA / SOUTH KOREA / TAIWAN / THAILAND / USA / EU countries accepted / approved by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.**

7.9.1.1 **Cooling capacity : 12,000 BTU/HR.**

7.9.1.1.1 Wall / ceiling mounted type/ducted type

7.9.1.1.2 Ceiling mounted cassette type

Each

55,217.00

55,151.00

54,901.00

54,901.00

Each

70,494.00

70,428.00

70,177.00

70,177.00

7.9.1.2 **Cooling capacity : 17,000-18,000 BTU/HR.**

7.9.1.2.1 Wall / ceiling mounted type/ducted type

7.9.1.2.2 Ceiling mounted cassette type

Each

61,383.00

61,317.00

61,067.00

61,067.00

Each

73,598.00

73,532.00

73,282.00

73,282.00

7.9.1.3 **Cooling capacity : 22,500-24,000 BTU/HR.**

7.9.1.3.1 Wall / ceiling mounted type/ducted type

7.9.1.3.2 Ceiling mounted cassette type

Each

63,273.00

63,206.00

62,956.00

62,956.00

Each

79,875.00

79,808.00

79,558.00

79,558.00

7.9.1.4 **Cooling capacity : 28,000-30,000 BTU/HR.**

7.9.1.4.1 Wall / ceiling mounted type/ducted type

Each

73,666.00

73,600.00

73,349.00

73,349.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.9.1.4.2	Celling mounted cassette type	Each	83,182.00	83,115.00	82,865.00	82,865.00
7.9.1.5	Cooling capacity : 34,000-36,000 BTU/HR.					
7.9.1.5.1	Wall / ceiling mounted type/ducted type	Each	83,991.00	83,925.00	83,675.00	83,675.00
7.9.1.5.2	Celling mounted cassette type	Each	91,415.00	91,349.00	91,099.00	91,099.00
7.9.1.6	Cooling capacity : 46,000-48,000 BTU/HR.					
7.9.1.6.1	Wall / ceiling mounted type/ducted type	Each	94,789.00	94,723.00	94,473.00	94,473.00
7.9.1.6.2	Celling mounted cassette type	Each	97,152.00	97,085.00	96,835.00	96,835.00
7.9.1.7	Cooling capacity : 58,000-60,000 BTU/HR.					
7.9.1.7.1	Wall / ceiling mounted type/ducted type	Each	150,927.00	150,861.00	150,610.00	150,610.00
7.9.2	Any brand manufactured or assembled in BANGLADESH / CHINA / VIETNAM / TURKEY approved / accepted by the Engineer-in-charge. in accordance with fulfillment of the above specifications and having relevant certificates as mentioned.					
7.9.2.1	Cooling capacity : 12,000 BTU/HR.					
7.9.2.1.1	Wall / ceiling mounted type/ducted type	Each	52,763.00	52,697.00	52,447.00	52,447.00
7.9.2.1.2	Celling mounted cassette type	Each	62,457.00	62,391.00	62,140.00	62,140.00
7.9.2.2	Cooling capacity : 17,000-18,000 BTU/HR.					
7.9.2.2.1	Wall / ceiling mounted type/ducted type	Each	58,898.00	58,832.00	58,582.00	58,582.00
7.9.2.2.2	Celling mounted cassette type	Each	64,911.00	64,845.00	64,594.00	64,594.00
7.9.2.3	Cooling capacity : 22,500-24,000 BTU/HR.					
7.9.2.3.1	Wall / ceiling mounted type/ducted type	Each	60,862.00	60,795.00	60,545.00	60,545.00
7.9.2.3.2	Celling mounted cassette type	Each	66,138.00	66,072.00	65,821.00	65,821.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.9.2.4	Cooling capacity : 28,000-30,000 BTU/HR.					
7.9.2.4.1	Wall / ceiling mounted type/ducted type	Each	66,997.00	66,931.00	66,680.00	66,680.00
7.9.2.4.2	Ceiling mounted cassette type	Each	67,365.00	67,299.00	67,048.00	67,048.00
7.9.2.5	Cooling capacity : 34,000-36,000 BTU/HR.					
7.9.2.5.1	Wall / ceiling mounted type/ducted type	Each	70,310.00	70,244.00	69,993.00	69,993.00
7.9.2.5.2	Ceiling mounted cassette type	Each	71,046.00	70,980.00	70,730.00	70,730.00
7.9.2.6	Cooling capacity : 46,000-48,000 BTU/HR.					
7.9.2.6.1	Wall / ceiling mounted type/ducted type	Each	71,537.00	71,471.00	71,220.00	71,220.00
7.9.2.6.2	Ceiling mounted cassette type	Each	72,273.00	72,207.00	71,957.00	71,957.00
7.9.2.7	Cooling capacity : 58,000-60,000 BTU/HR.					
7.9.2.7.1	Wall / ceiling mounted type/ducted type	Each	73,500.00	73,434.00	73,184.00	73,184.00
7.10	WATER COOLED CHILLERS: AHRI/EUROVENT CERTIFIED					
7.10.1	Centrifugal Oil Chiller with Factory Fitted VFD and HFO Refrigerant: Supply, installation, testing and commissioning of AHRI/EUROVENT Certified Centrifugal Water Chilling Units each complete with actual capacity mentioned below (as specified condition) compressor, motor, water cooled condenser, insulated chiller, flow switch at chiller and condenser, shell and tube type evaporator, condenser tube shall be made of copper, condenser fins shall be made of aluminium, vibration isolators, integral refrigerant piping and wiring, accessories as required and called for, automatic and safety controls mounted in central console panel and all mounted on a steel frame complete as per specifications.					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Motor shall be suitable for power input of $415 \pm 10\%V$, 50 cycles. 3 phase AC supply. Refrigerant will be Internationally accepted & recommended gas (CFC free with zero ozone depleting potential level). All Chillers shall be integrated with VFD drive. The VFD shall be with Water Cooled or Refrigerant Cooled. VFD Shall be with IEEE Active Harmonic Filter for having less than 5% Harmonic Distortion. Power consumption shall not be more than 0.60 KW/TR according to AHRI condition at full load. The performance of chiller shall be rated in accordance with AHRI/Euro Vent latest version standard:

The compressor shall be Semi hermetic/ open drive Centrifugal type. All equipment shall be installed as per international standard and instruction by the Engineer-in-charge. Vendor have to Submit Individual Chillers Part Load data at Constant Condenser and also at Condenser AHRI/Euro Vent Relief Condition. Also vendor have to submit combined Plant Part Load table at constant condenser for multiple chiller plant.

Chiller shall be BACnet IP compatible

Chilled water inlet/outlet Temp : $12 / 7$ deg. C

Condenser water inlet/outlet Temp : $32 / 38$ deg. C

(But it may vary according to location/temperature of particular region)

Max. pressure drop for Evaporator : 20 Ft of water

Starter : VFD

Country Of Origin, manufacturing and shipment:

USA/UK/EU/Japan

7.10.1.1	Cooling capacity: 285~315 TR, COP Minimum 5.8 (W/W)	Each	22,700,397.00	22,700,397.00	22,700,397.00	22,700,397.00
7.10.1.2	Cooling capacity: 380~420 TR, COP Minimum 6.3 (W/W)	Each	23,467,303.00	23,467,303.00	23,467,303.00	23,467,303.00
7.10.1.3	Cooling capacity: 475~525 TR, COP Minimum 6.3 (W/W)	Each	24,295,560.00	24,295,560.00	24,295,560.00	24,295,560.00
7.10.1.4	Cooling capacity: 570~630 TR, COP Minimum 6.3 (W/W)	Each	24,619,501.00	24,619,501.00	24,619,501.00	24,619,501.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.10.1.5	Cooling capacity: 670~730 TR, COP Minimum 6.3 (W/W)	Each	24,943,442.00	24,943,442.00	24,943,442.00	24,943,442.00
7.10.1.6	Cooling capacity: 770~830 TR, COP Minimum 6.3 (W/W)	Each	25,591,324.00	25,591,324.00	25,591,324.00	25,591,324.00
7.10.1.7	Cooling capacity: 870~930 TR, COP Minimum 6.3 (W/W)	Each	28,344,820.00	28,344,820.00	28,344,820.00	28,344,820.00
7.10.1.8	Cooling capacity: 970~1030 TR, COP Minimum 6.3 (W/W)	Each	29,964,524.00	29,964,524.00	29,964,524.00	29,964,524.00

7.10.2 Water Cooled VFD Fitted Dual Circuit Multiple Screw Compressor Chiller

Supply, installation, testing and commissioning of AHRI/EUROVENT Certified Water Cooled Horizontal Screw type Chiller having capacity of not less than below mentioned actual capacities at design condition with multiple independent refrigeration circuits with multiple compressors and inbuilt/ factory fitted VFDs, when condenser water entering at 32 deg C and leaving at 38 deg C .

The chilled water entering at 12 deg. C and leaving at 7 deg C. The unit shall use Internationally accepted & recommended gas (CFC free with zero ozone depleting potential level) as refrigerant.

The full load (100%) power consumption shall not be more than 0.6 kW/Ton at AHRI Condition and 0.7 kw/Ton at design Condition. The cooler shall have water side fouling factor of 0.000100 hr-sq ft-deg F/Btu and the condenser shall have water side fouling factor of 0.000250 hr-sq ft-deg F/ Btu. The water pressure drop in cooler and condenser shall not exceed 10 ft. WG.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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The unit shall be complete with microprocessor based control panel with option for remote control via BACnet. Evaporator shall be shell and tube type, condenser tube shall be made of copper, condenser fins shall be made of aluminium. The capacity control shall be fully automatic and based on chilled water inlet temperature. each unit shall be factory assembled, wired and tested. The supply power shall be 415+/-10% V, 50 Hz, 3 Ph power. The power for controls shall be 220v~250v/1ph/50Hz power. Units shall conform to detail technical specification & as per direction of Engineer-in-charge. The performance of chiller shall be rated in accordance with AHRI/Euro Vent latest version standard:

Chiller shall be BACnet IP compatible

Chilled water inlet/outlet Temp : 12 / 7 deg. C

Condenser water inlet/outlet Temp : 32 / 38 deg. C

(But it may vary according to location/temperature of particular region)

Max. pressure drop for Evaporator : 10 Ft of water

Pressure Vessel Code : ASME or PED

Refrigerant: Internationally accepted & recommended gas (CFC free)

Compressor type: Semi Hermatic Screw Type

Total No. of Compressor: Minimum 2 Nos

Starter : VFD

No. of Independent Refrigeration Circuits: 2 Nos

Country Of Origin, manufacturing and shipment:

USA/UK/EU/Japan

7.10.2.1	Cooling capacity: 90~110 TR, COP Minimum 4.7 (W/W)	Each	7,592,363.00	7,592,363.00	7,592,363.00	7,592,363.00
7.10.2.2	Cooling capacity: 135~165 TR, COP Minimum 4.7 (W/W)	Each	9,110,835.00	9,110,835.00	9,110,835.00	9,110,835.00
7.10.2.3	Cooling capacity: 180~220 TR, COP Minimum 5.4 (W/W)	Each	12,147,780.00	12,147,780.00	12,147,780.00	12,147,780.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.10.2.4	Cooling capacity: 285~315 TR, COP Minimum 5.4 (W/W)	Each	17,393,412.00	17,393,412.00	17,393,412.00	17,393,412.00
7.10.2.5	Cooling capacity: 380~420 TR, COP Minimum 5.4 (W/W)	Each	23,191,217.00	23,191,217.00	23,191,217.00	23,191,217.00
7.10.2.6	Cooling capacity: 475~525 TR, COP Minimum 5.75 (W/W)	Each	28,094,502.00	28,094,502.00	28,094,502.00	28,094,502.00
7.10.2.7	Cooling capacity: 570~630 TR, COP Minimum 5.75 (W/W)	Each	30,730,203.00	30,730,203.00	30,730,203.00	30,730,203.00
7.10.2.8	Cooling capacity: 670~730 TR, COP Minimum 5.75 (W/W)	Each	36,443,340.00	36,443,340.00	36,443,340.00	36,443,340.00
7.10.2.9	Cooling capacity: 770~830 TR, COP Minimum 5.75 (W/W)	Each	43,732,009.00	43,732,009.00	43,732,009.00	43,732,009.00
7.10.2.10	Cooling capacity: 870~930 TR, COP Minimum 5.75 (W/W)	Each	52,640,381.00	52,640,381.00	52,640,381.00	52,640,381.00

7.11 AIR COOLED SCREW CHILLERS : AHRI/EUROVENT CERTIFIED

Multiple Circuits Air Cooled Screw Chiller With VFD Starter :

Supply, installation, testing and commissioning of AHRI/EUROVENT Certified Screw compression type air-cooled water chiller having capacity as mentioned below and to cool water from 12.0°C to 7.0°C at condenser air entering temperature of 38°C. Water side fouling factor should not exceed 0.0001 sq.ft.-0F-hr/Btu. The unit shall have at least 02 (two) compressors with minimum two independent refrigerant circuits. The unit shall have evaporator, condenser, economizer, refrigerant filter, service valves, safety controls, electronic expansion valve, control switches, isolators, etc. all completed with necessary wiring, piping & factory tested.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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The compressor shall be direct driven semi-hermetic screw compressor, with capacity control slide valve, load/unload valve, rolling element bearings, evaporator shall be shell and tube type, condenser tube shall be made of copper, condenser fins shall be made of aluminium, differential pressure oil pump, oil heater, suction gas cooled hermetically sealed squirrel cage induction motor, etc. The unit control panel shall be microprocessor based factory installed and tested. The unit casing shall be weather proof. The performance of chiller shall be rated in accordance with AHRI/Euro Vent latest version standard. Refrigerant will be Internationally accepted & recommended gas (CFC free with zero ozone depleting potential level).

Chiller shall be BACnet IP compatible

Chilled Water Inlet Temp : 12.0 deg C

Chilled Water Outlet Temp : 7.0 deg C

Ambient Air Temp : 40 deg C

No. of Compressor : 2 Nos. (Minimum One at each Refrigeration Circuits)

No. of Independent Ref. Ckt : 2 No.

Starter : VFD

Power input source : 415+/-10% V, 50 Hz, 3 Ph

Country Of Origin, manufacturing and shipment:

USA/UK/EU/Japan

7.11.1	Cooling Capacity : 90~110 TR, COP Minimum 2.9 (W/W)	Each	7,937,470.00	7,937,470.00	7,937,470.00	7,937,470.00
7.11.2	Cooling Capacity : 115~135 TR, COP Minimum 2.9 (W/W)	Each	9,147,156.00	9,147,156.00	9,147,156.00	9,147,156.00
7.11.3	Cooling Capacity : 140~160 TR, COP Minimum 2.9 (W/W)	Each	9,524,964.00	9,524,964.00	9,524,964.00	9,524,964.00
7.11.4	Cooling Capacity : 165~185 TR, COP Minimum 3.05 (W/W)	Each	11,112,458.00	11,112,458.00	11,112,458.00	11,112,458.00
7.11.5	Cooling Capacity : 109~210 TR, COP Minimum 3.05 (W/W)	Each	12,699,952.00	12,699,952.00	12,699,952.00	12,699,952.00
7.11.6	Cooling Capacity : 240~260 TR, COP Minimum 3.05 (W/W)	Each	15,874,940.00	15,874,940.00	15,874,940.00	15,874,940.00
7.11.7	Cooling Capacity : 265~285 TR, COP Minimum 3.05 (W/W)	Each	16,703,198.00	16,703,198.00	16,703,198.00	16,703,198.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.11.8	Cooling Capacity : 290~310 TR, COP Minimum 3.05 (W/W)	Each	18,221,670.00	18,221,670.00	18,221,670.00	18,221,670.00
7.11.9	Cooling Capacity : 335~365 TR, COP Minimum 3.05 (W/W)	Each	21,258,615.00	21,258,615.00	21,258,615.00	21,258,615.00
7.11.10	Cooling Capacity : 385~415 TR, COP Minimum 3.05 (W/W)	Each	24,295,560.00	24,295,560.00	24,295,560.00	24,295,560.00

7.12 COOLING TOWER : OPEN TYPE:

Supply, installation, testing and commissioning of Vertical discharge, induced draft, cross-flow cooling tower suitable to handle water entering at 38°C and leaving at 32°C at a design ambient wet bulb temperature of 29°C.

The cold water basin and casing shall be constructed with fiberglass-reinforced polyester (FRP). Fasteners and all other associated hardware shall be constructed of 304 stainless steel.

All other metal component such as supports, grilles or tower supports shall be constructed of hot-dipped galvanized steel.

The cooling tower shall be complete with fan, motor, belt-drive, hot water distribution system consisting of sprinkler arm and sprinkler head, PVC fill, fill grid, float operated make-up valve, access door, ladder, bleed of assembly, drip eliminator, etc

Speed of the fan shall not be more than 1450 rpm. Power supply shall be 415+/-10% V / 3Ph / 50Hz. Cooling tower noise shall not be more than 65 dBA.

Country Of Origin, manufacturing and shipment:
EU/Japan/Malaysia

7.12.1	125 TR; Flow Capacity : 375 US GPM	Set	690,215.00	690,215.00	690,215.00	690,215.00
7.12.2	150 TR; Flow Capacity : 450 US GPM	Set	828,258.00	828,258.00	828,258.00	828,258.00
7.12.3	175 TR; Flow Capacity : 525 US GPM	Set	966,301.00	966,301.00	966,301.00	966,301.00
7.12.4	200 TR; Flow Capacity : 600 US GPM	Set	1,104,344.00	1,104,344.00	1,104,344.00	1,104,344.00
7.12.5	250 TR; Flow Capacity : 750 US GPM	Set	1,380,430.00	1,380,430.00	1,380,430.00	1,380,430.00
7.12.6	300 TR; Flow Capacity : 900 US GPM	Set	1,538,719.00	1,538,719.00	1,538,719.00	1,538,719.00
7.12.7	350 TR; Flow Capacity : 1050 US GPM	Set	1,932,601.00	1,932,601.00	1,932,601.00	1,932,601.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.12.8	400 TR; Flow Capacity : 1200 US GPM	Set	2,208,687.00	2,208,687.00	2,208,687.00	2,208,687.00
7.12.9	450 TR; Flow Capacity : 1350 US GPM	Set	2,484,773.00	2,484,773.00	2,484,773.00	2,484,773.00
7.12.10	500 TR; Flow Capacity : 1500 US GPM	Set	2,760,859.00	2,760,859.00	2,760,859.00	2,760,859.00
7.12.11	550 TR; Flow Capacity : 1650 US GPM	Set	2,947,861.00	2,947,861.00	2,947,861.00	2,947,861.00
7.12.12	600 TR; Flow Capacity : 1800 US GPM	Set	3,045,044.00	3,045,044.00	3,045,044.00	3,045,044.00
7.12.13	650 TR; Flow Capacity : 1950 US GPM	Set	3,109,832.00	3,109,832.00	3,109,832.00	3,109,832.00
7.12.14	700 TR; Flow Capacity : 2100 US GPM	Set	3,433,773.00	3,433,773.00	3,433,773.00	3,433,773.00
7.12.15	750 TR; Flow Capacity : 2250 US GPM	Set	3,595,743.00	3,595,743.00	3,595,743.00	3,595,743.00
7.12.16	800 TR; Flow Capacity : 2400 US GPM	Set	3,968,275.00	3,968,275.00	3,968,275.00	3,968,275.00
7.12.17	900 TR; Flow Capacity : 2700 US GPM	Set	4,472,592.00	4,472,592.00	4,472,592.00	4,472,592.00
7.12.18	1000 TR; Flow Capacity : 3000 US GPM	Set	4,969,546.00	4,969,546.00	4,969,546.00	4,969,546.00
7.12.19	1100 TR; Flow Capacity : 3300 US GPM	Set	5,466,501.00	5,466,501.00	5,466,501.00	5,466,501.00
7.12.20	1200 TR; Flow Capacity : 3600 US GPM	Set	5,963,456.00	5,963,456.00	5,963,456.00	5,963,456.00
7.12.21	1300 TR; Flow Capacity : 3900 US GPM	Set	6,173,281.00	6,173,281.00	6,173,281.00	6,173,281.00
7.12.22	1400 TR; Flow Capacity : 4200 US GPM	Set	6,478,816.00	6,478,816.00	6,478,816.00	6,478,816.00
7.12.23	1500 TR; Flow Capacity : 4500 US GPM	Set	6,957,365.00	6,957,365.00	6,957,365.00	6,957,365.00
7.12.24	1600 TR; Flow Capacity : 4800 US GPM	Set	7,421,189.00	7,421,189.00	7,421,189.00	7,421,189.00
7.12.25	1800 TR; Flow Capacity : 5400 US GPM	Set	7,951,274.00	7,951,274.00	7,951,274.00	7,951,274.00
7.12.26	2000 TR; Flow Capacity : 6000 US GPM	Set	8,834,749.00	8,834,749.00	8,834,749.00	8,834,749.00
7.12.27	2200 TR; Flow Capacity : 6600 US GPM	Set	9,718,224.00	9,718,224.00	9,718,224.00	9,718,224.00
7.12.28	2400 TR; Flow Capacity : 7200 US GPM	Set	10,071,614.00	10,071,614.00	10,071,614.00	10,071,614.00
7.12.29	2500 TR; Flow Capacity : 7500 US GPM	Set	10,429,912.00	10,429,912.00	10,429,912.00	10,429,912.00
7.12.30	2800 TR; Flow Capacity : 8400 US GPM	Set	11,043,437.00	11,043,437.00	11,043,437.00	11,043,437.00
7.12.31	3000 TR; Flow Capacity : 9000 US GPM	Set	11,350,199.00	11,350,199.00	11,350,199.00	11,350,199.00

7.13 WATER PUMP SET INCLUDING ACCESSORIES

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation, testing and commissioning of End Suction Vertical Discharge/ Horizontal Split Case Centrifugal Pumps as per following capacities and specifications. each pump set shall be complete with integrally coupled electrical motor (suitable for VFD) of appropriate capacity, VFD, flexible coupling, spacer units, shaft cover, support base and all other standard components. The motor shall comply at least IE-3 efficiency standard. Efficiency not less than 87% according to IEC 6034-2-1:2014.

Temperature Class B, Insulation Class F at least IP 65.

The speed of the motor shall not exceed 1,500 rpm. The supply power shall be 415+/-10% V- 3Ph-50Hz. The unit shall conform to detail technical specification. each unit shall be complete with Inertia Block and Seismic Restraint type Vibration isolators.

(Country of Origin, Manufacture, Shipment : USA/ UK/ EU/ Japan/ Malaysia/Singapore)

7.13.1 **End Suction Vertical Discharge Centrifugal Pump :**

7.13.1.1	Water Flow Rate : 200 USGPM; Head : 10 m	Set	245,410.00	245,410.00	245,410.00	245,410.00
7.13.1.2	Water Flow Rate : 200 USGPM; Head : 15 m	Set	263,815.00	263,815.00	263,815.00	263,815.00
7.13.1.3	Water Flow Rate : 300 USGPM; Head : 20 m	Set	368,115.00	368,115.00	368,115.00	368,115.00
7.13.1.4	Water Flow Rate : 500 USGPM; Head : 25 m	Set	582,848.00	582,848.00	582,848.00	582,848.00
7.13.1.5	Water Flow Rate : 1000 USGPM; Head : 25 m	Set	797,582.00	797,582.00	797,582.00	797,582.00
7.13.1.6	Water Flow Rate : 1500 USGPM; Head : 30 m	Set	950,963.00	950,963.00	950,963.00	950,963.00
7.13.1.7	Water Flow Rate : 2000 USGPM; Head : 30 m	Set	1,098,208.00	1,098,208.00	1,098,208.00	1,098,208.00
7.13.1.8	Water Flow Rate : 2500 USGPM; Head : 35 m	Set	1,202,508.00	1,202,508.00	1,202,508.00	1,202,508.00
7.13.1.9	Water Flow Rate : 2500 USGPM; Head : 30 m	Set	1,165,696.00	1,165,696.00	1,165,696.00	1,165,696.00

7.13.2 **End Suction Vertical Discharge Centrifugal Pump / Horizontal Split Case Pump:**

7.13.2.1	Water Flow Rate : 3000 USGPM; Head : 40 m	Set	1,337,483.00	1,337,483.00	1,337,483.00	1,337,483.00
7.13.2.2	Water Flow Rate : 3000 USGPM; Head : 30 m	Set	1,288,401.00	1,288,401.00	1,288,401.00	1,288,401.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.13.2.3	Water Flow Rate : 3500 USGPM; Head : 35 m	Set	1,447,917.00	1,447,917.00	1,447,917.00	1,447,917.00
7.13.2.4	Water Flow Rate : 3500 USGPM; Head : 40 m	Set	1,503,134.00	1,503,134.00	1,503,134.00	1,503,134.00
7.13.2.5	Water Flow Rate : 4000 USGPM; Head : 35 m	Set	1,564,487.00	1,564,487.00	1,564,487.00	1,564,487.00
7.13.2.6	Water Flow Rate : 4000 USGPM; Head : 45 m	Set	1,638,110.00	1,638,110.00	1,638,110.00	1,638,110.00
7.13.2.7	Water Flow Rate : 4500 USGPM; Head : 35 m	Set	1,681,056.00	1,681,056.00	1,681,056.00	1,681,056.00
7.13.2.8	Water Flow Rate : 4500 USGPM; Head : 45 m	Set	1,779,220.00	1,779,220.00	1,779,220.00	1,779,220.00
7.13.2.9	Water Flow Rate : 5000 USGPM; Head : 40 m	Set	1,828,302.00	1,828,302.00	1,828,302.00	1,828,302.00
7.13.2.10	Water Flow Rate : 5000 USGPM; Head : 50 m	Set	1,920,331.00	1,920,331.00	1,920,331.00	1,920,331.00
7.13.2.11	Water Flow Rate : 5500 USGPM; Head : 40 m	Set	1,957,142.00	1,957,142.00	1,957,142.00	1,957,142.00
7.13.2.12	Water Flow Rate : 5500 USGPM; Head : 50 m	Set	2,055,306.00	2,055,306.00	2,055,306.00	2,055,306.00
7.13.2.13	Water Flow Rate : 6000 USGPM; Head : 50 m	Set	2,147,335.00	2,147,335.00	2,147,335.00	2,147,335.00

7.14 EXPANSION TANK (CLOSED TYPE) with Dynamic Pressurization System :

Supply and installation of closed type Expansion Tank having connection for pipes, feed water line, overflow line, drain line, make-up water pump(s) etc. complete in all respect. The tank shall be capable of withstanding 250 psig. The tank shall be insulated with 8mm thick PE insulation.

(Country of Origin, Manufacture : USA/ UK/ EU/ Japan/ Malaysia)

7.14.1	Capacity : 500 L	Each	613,524.00	613,524.00	613,524.00	613,524.00
7.14.2	Capacity : 1000 L	Each	797,582.00	797,582.00	797,582.00	797,582.00
7.14.3	Capacity : 1500 L	Each	920,286.00	920,286.00	920,286.00	920,286.00
7.14.4	Capacity : 2000 L	Each	1,012,315.00	1,012,315.00	1,012,315.00	1,012,315.00
7.14.5	Capacity : 2500 L	Each	1,073,667.00	1,073,667.00	1,073,667.00	1,073,667.00
7.14.6	Capacity : 3000 L	Each	1,141,155.00	1,141,155.00	1,141,155.00	1,141,155.00
7.14.7	Capacity : 3500 L	Each	1,184,102.00	1,184,102.00	1,184,102.00	1,184,102.00
7.14.8	Capacity : 4000 L	Each	1,220,913.00	1,220,913.00	1,220,913.00	1,220,913.00

7.15 WATER TREATMENT SYSTEM :

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply, installation, testing and commissioning of Chemical Pot Feeder complete with necessary chemicals for treatment of chilled water and condenser water in order to control growth of algae, bacteria, biological components and control of corrosion of pipe surfaces. The offer shall include all types of chemicals required for effective operation of the Air Conditioning Plant for a period of at least 2 (two) years. (Country of Origin, Manufacture, shipment : USA/ UK/ EU/ Japan/ Malaysia)					
7.15.1	Upto 500 TR System :					
7.15.1.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	920,286.00	920,286.00	920,286.00	920,286.00
7.15.1.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	1,472,458.00	1,472,458.00	1,472,458.00	1,472,458.00
7.15.2	501-1000 TR System :					
7.15.2.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	1,165,696.00	1,165,696.00	1,165,696.00	1,165,696.00
7.15.2.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	1,840,573.00	1,840,573.00	1,840,573.00	1,840,573.00
7.15.3	1001-1500 TR System :					
7.15.3.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	1,411,106.00	1,411,106.00	1,411,106.00	1,411,106.00
7.15.3.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	2,208,687.00	2,208,687.00	2,208,687.00	2,208,687.00
7.15.4	1501-2000 TR System :					
7.15.4.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	1,533,811.00	1,533,811.00	1,533,811.00	1,533,811.00
7.15.4.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	2,576,802.00	2,576,802.00	2,576,802.00	2,576,802.00
7.15.5	2001-2500 TR System :					
7.15.5.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	1,656,515.00	1,656,515.00	1,656,515.00	1,656,515.00
7.15.5.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	2,944,916.00	2,944,916.00	2,944,916.00	2,944,916.00
7.15.6	2501-3000 TR System :					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.15.6.1	Pot Feeder and chemicals for treatment of Chilled Water	Set	1,779,220.00	1,779,220.00	1,779,220.00	1,779,220.00
7.15.6.2	Pot Feeder and chemicals for treatment of Condenser Water	Set	3,435,736.00	3,435,736.00	3,435,736.00	3,435,736.00

7.16 CHILLED WATER FAN COIL UNIT (FCU)

7.16.1 DUCTED TYPE FAN COIL UNIT (FCU)

Supply, installation, testing and commissioning of Ceiling Mount Hideaway type Chilled Water Fan Coil Units having cooling capacities as mentioned below. each unit shall be complete with chilled water cooling coils, centrifugal fan, insulated condensate tray (extended over the length of valve connections), air filter (G3 Standard), thermostat, control cables, 3-speed control switch etc. complete in all respect. The unit shall be complete with microprocessor based control panel with option for remote control via BACnet. The unit shall operate when supplied with 230V \pm 10%V -1Ph-50Hz power. Chilled Water Inlet : 7 deg C and Outlet : 12 deg C. - Entering air temperature : DB 25.24 $^{\circ}$ C/WB 19.05 $^{\circ}$ C - Leaving Air temperature : DB 13.5 $^{\circ}$ C/WB 13.22 $^{\circ}$ C or as per Engineer-in-charge's design.

(Country of Origin, Manufacture : USA/ UK/ EU/ Japan/ Malaysia/ Thailand)

7.16.1.1	Total cooling capacity : 12,000 Btu/hr Sensible cooling capacity : 9,000 Btu/hr Air Flow : 400 cfm Sound Level: Maximum 46 dB ESP : 0.25" WG	Each	43,560.00	43,560.00	43,560.00	43,560.00
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7.16.1.2	Total cooling capacity : 18,000 Btu/hr Sensible cooling capacity : 13,500 Btu/hr Air Flow : 600 cfm Sound Level: Maximum 50 dB					
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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	ESP : 0.25" WG	Each	46,321.00	46,321.00	46,321.00	46,321.00
7.16.1.3	Total cooling capacity : 24,000 Btu/hr Sensible cooling capacity : 18,000 Btu/hr Air Flow : 800 cfm Sound Level: Maximum 50 dB ESP : 0.30" WG	Each	49,082.00	49,082.00	49,082.00	49,082.00
7.16.1.4	Total cooling capacity : 30,000 Btu/hr Sensible cooling capacity : 22,500 Btu/hr Air Flow : 1,000 cfm Sound Level: Maximum 50 dB ESP : 0.30" WG	Each	55,831.00	55,831.00	55,831.00	55,831.00
7.16.1.5	Total cooling capacity : 36,000 Btu/hr Sensible cooling capacity : 27,000 Btu/hr Air Flow : 1,200 cfm Sound Level: Maximum 51 dB ESP : 0.30" WG	Each	61,352.00	61,352.00	61,352.00	61,352.00
7.16.1.6	Total cooling capacity : 42,000 Btu/hr Sensible cooling capacity : 31,500 Btu/hr Air Flow : 1,400 cfm Sound Level: Maximum 52 dB ESP : 0.30" WG	Each	66,874.00	66,874.00	66,874.00	66,874.00
7.16.1.7	Total cooling capacity : 48,000 Btu/hr Sensible cooling capacity : 36,000 Btu/hr Air Flow : 1,600 cfm Sound Level: Maximum 54 dB ESP : 0.30" WG	Each	73,623.00	73,623.00	73,623.00	73,623.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.16.1.8	Total cooling capacity : 60,000 Btu/hr Sensible cooling capacity : 45,000 Btu/hr Air Flow : 2,000 cfm Sound Level: Maximum 54 dB ESP : 0.50" WG	Each	85,893.00	85,893.00	85,893.00	85,893.00
7.16.1.9	Total cooling capacity : 72,000 Btu/hr Sensible cooling capacity : 54,000 Btu/hr Air Flow : 2,400 cfm Sound Level: Maximum 62 dB ESP : 0.50" WG	Each	98,777.00	98,777.00	98,777.00	98,777.00
7.16.2	CHILLED WATER CASSETTE TYPE FAN COIL UNIT (FCU) Supply, installation, testing and commissioning of Ceiling Mount Hideaway type Chilled Water Fan Coil Units having cooling capacities as mentioned below. each unit shall be complete with chilled water cooling coils, centrifugal fan, insulated condensate tray (extended over the length of valve connections), air filter (G3 Standard), thermostat, control cables, 3-speed control switch etc. complete in all respect. The unit shall operate when supplied with 230V±10%V -1Ph-50Hz power. Chilled Water Inlet : 7 deg C and Outlet : 12 deg C. - Entering air temperature : DB 25.24° C/WB 19.05° C - Leaving Air temperature : DB 13.5° C/WB 13.22 °C or as per Engineer-in-charge's design. (Country of Origin, Manufacture : USA/ UK/ EU/ Japan/ Malaysia/ Thailand)					
7.16.2.1	Total cooling capacity : 12,000 Btu/hr Sensible cooling capacity : 9,000 Btu/hr Air Flow : 400 cfm	Each	55,217.00	55,217.00	55,217.00	55,217.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.16.2.2	Total cooling capacity : 18,000 Btu/hr Sensible cooling capacity : 13,500 Btu/hr Air Flow : 600 cfm	Each	61,352.00	61,352.00	61,352.00	61,352.00
7.16.2.3	Total cooling capacity : 24,000 Btu/hr Sensible cooling capacity : 18,000 Btu/hr Air Flow : 800 cfm	Each	68,715.00	68,715.00	68,715.00	68,715.00
7.16.2.4	Total cooling capacity : 30,000 Btu/hr Sensible cooling capacity : 22,500 Btu/hr Air Flow : 1,000 cfm	Each	76,077.00	76,077.00	76,077.00	76,077.00
7.16.2.5	Total cooling capacity : 36,000 Btu/hr Sensible cooling capacity : 27,000 Btu/hr Air Flow : 1,200 cfm	Each	84,666.00	84,666.00	84,666.00	84,666.00
7.16.2.6	Total cooling capacity : 42,000 Btu/hr Sensible cooling capacity : 31,500 Btu/hr Air Flow : 1,400 cfm	Each	92,029.00	92,029.00	92,029.00	92,029.00
7.17	Chilled Water Air Handling Unit (AHU):					








Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Chilled water air-handling unit shall be floor/ceiling mountable, horizon/vertical, double skin, draw through type having capacities as mentioned below. The AHU shall be constructed with thermal-Break profile and panel thickness shall not be less than 50 mm. Outer skins made of pre-painted galvanized steel sheet 0.6 mm thickness and Inner skins made of galvanized steel sheet 0.6mm thickness or stainless steel based on application. The unit performance shall be certified under EUROVENT / AHRI CERTIFICATION programme for air-handling units. each unit shall be complete with centrifugal/plug fan(s) with motor, air-diffuser, cooling coil(s), washable filter(s), drain pan, vibration isolator, mixing box, return, bypass and fresh air volume control damper, flexible connector, flexible electrical wiring, inspection light. view panel, etc. Fan(s) shall be of belt / direct driven type and shall be selected at higher efficiency and acceptable sound level to achieve standard noise level in conditioned space.

Motor shall be totally enclosed, squirrel cage induction type and insulation shall be of class F, IP55 Fan discharge velocity shall not be more than 1700 ft/min. Power supply shall be 415±10%V/3Ph/50Hz. Chilled water enters the coil at 7°C and leaves at 12°C. Cooling coil shall not be less than 4 row depth with 10 fins per inch. Face velocity shall not be more than 450 ft/min. Water pressure drop inside coil shall not more than 10 ft. of W.G. The arrangement of fan, coils, mixing, bypass, filters, etc. shall be as shown in AHU schematic drawings. Fan ESP given is excluding pressure drop of coils, filters, dampers within & attached to the unit.

Layout : Mixing Box with Two Dampers + Washable G4 Filter + Minimum 4 Row Cooling Coil + Fan:

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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(Country of Origin, Manufacture : USA/ UK/ EU/ Japan/ Malaysia/ Thailand)

7.17.1	Air Flow Rate : 3000 cfm; Minimum : 7.5 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C ESP : 300 Pa.	Each	496,955.00	496,955.00	496,955.00	496,955.00
7.17.2	Air Flow Rate : 4000 cfm; Minimum : 10 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C ESP : 350 Pa.	Each	662,606.00	662,606.00	662,606.00	662,606.00
7.17.3	Air Flow Rate : 5000 cfm; Minimum : 13 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C ESP : 500 Pa.	Each	828,258.00	828,258.00	828,258.00	828,258.00
7.17.4	Air Flow Rate : 6000 cfm; Minimum : 15 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C ESP : 500 Pa.	Each	993,909.00	993,909.00	993,909.00	993,909.00
7.17.5	Air Flow Rate : 7000 cfm; Minimum : 18 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C ESP : 600 Pa.	Each	1,082,257.00	1,082,257.00	1,082,257.00	1,082,257.00
7.17.6	Air Flow Rate : 8000 cfm; Minimum : 20 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB13.22 C					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	ESP : 600 Pa.	Each	1,148,517.00	1,148,517.00	1,148,517.00	1,148,517.00
7.17.7	Air Flow Rate : 9000 cfm; Minimum : 23 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 600 Pa.	Each	1,292,082.00	1,292,082.00	1,292,082.00	1,292,082.00
7.17.8	Air Flow Rate : 10000 cfm; Minimum : 25 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 600 Pa.	Each	1,435,647.00	1,435,647.00	1,435,647.00	1,435,647.00
7.17.9	Air Flow Rate : 12000 cfm; Minimum : 30 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 1000 Pa.	Each	1,722,776.00	1,722,776.00	1,722,776.00	1,722,776.00
7.17.10	Air Flow Rate : 16000 cfm; Minimum : 40 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 1000 Pa.	Each	2,297,035.00	2,297,035.00	2,297,035.00	2,297,035.00
7.17.11	Air Flow Rate : 20000 cfm; Minimum : 50 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 1000 Pa.	Each	2,871,293.00	2,871,293.00	2,871,293.00	2,871,293.00
7.17.12	Air Flow Rate : 32000 cfm; Minimum : 80 TR, Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C - Leaving Air temperature : DB 13.5 C/WB 13.22 C ESP : 2000 Pa.	Each	3,850,478.00	3,850,478.00	3,850,478.00	3,850,478.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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7.17.13 **Air Flow Rate : 40000 cfm; Minimum : 100 TR,**

Cooling Coil : - Entering air temperature : DB 25.24 C/WB 19.05 C -
Leaving Air temperature : DB 13.5 C/WB 13.22 C
ESP : 2000 Pa.

Each 4,659,103.00 4,659,103.00 4,659,103.00 4,659,103.00

7.18 **VALVES AND OTHER PIPE FITTINGS, METERING & MEASUREMENT DEVICES**

7.18.1 **WATER VALVES**

Supply, installation, testing and commissioning of steel/ cast iron Water Valves of different sizes for use in chilled water and condenser water pipe lines. The valves shall be flanged type for sizes upto and above Ø 2". Valve sizes below Ø 2" shall be threaded type. The unit shall conform to the detail technical specification and shall be complete with all standard fittings and accessories.

Country of Origin: USA/UK/ EU/Japan

Country of Manufacture : Malaysia/China

7.18.1.1 **Butterfly Valves**

BFV-CI body, DI disc , multi flange connection, EPDM seat

7.18.1.1.1 Ø 24"	Each	58,898.00	58,898.00	58,898.00	58,898.00
7.18.1.1.2 Ø 20"	Each	49,082.00	49,082.00	49,082.00	49,082.00
7.18.1.1.3 Ø 18"	Each	44,174.00	44,174.00	44,174.00	44,174.00
7.18.1.1.4 Ø 16"	Each	39,266.00	39,266.00	39,266.00	39,266.00
7.18.1.1.5 Ø 14"	Each	34,357.00	34,357.00	34,357.00	34,357.00
7.18.1.1.6 Ø 12"	Each	29,449.00	29,449.00	29,449.00	29,449.00
7.18.1.1.7 Ø 10"	Each	24,541.00	24,541.00	24,541.00	24,541.00
7.18.1.1.8 Ø 8"	Each	16,197.00	16,197.00	16,197.00	16,197.00
7.18.1.1.9 Ø 6"	Each	10,528.00	10,528.00	10,528.00	10,528.00
7.18.1.1.10 Ø 4"	Each	9,718.00	9,718.00	9,718.00	9,718.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.18.1.2	Motorized Butterfly Valves					
7.18.1.2.1	Ø 18"	Each	245,410.00	245,410.00	245,410.00	245,410.00
7.18.1.2.2	Ø 16"	Each	220,869.00	220,869.00	220,869.00	220,869.00
7.18.1.2.3	Ø 14"	Each	196,328.00	196,328.00	196,328.00	196,328.00
7.18.1.2.4	Ø 12"	Each	171,787.00	171,787.00	171,787.00	171,787.00
7.18.1.2.5	Ø 10"	Each	147,246.00	147,246.00	147,246.00	147,246.00
7.18.1.2.6	Ø 8"	Each	122,705.00	122,705.00	122,705.00	122,705.00
7.18.1.2.7	Ø 6"	Each	110,434.00	110,434.00	110,434.00	110,434.00
7.18.1.2.8	Ø 4"	Each	98,164.00	98,164.00	98,164.00	98,164.00
7.18.1.3	Gate Valves					
	Bronze gate valve. NRS Class 150 (Shell 350 PSIG, Seat 225 PSIG), BSPT connection					
7.18.1.3.1	Ø 3"	Each	14,577.00	14,577.00	14,577.00	14,577.00
7.18.1.3.2	Ø 2.5"	Each	12,148.00	12,148.00	12,148.00	12,148.00
7.18.1.3.3	Ø 2"	Each	6,135.00	6,135.00	6,135.00	6,135.00
7.18.1.3.4	Ø 1.5"	Each	4,859.00	4,859.00	4,859.00	4,859.00
7.18.1.3.5	Ø 1.25"	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.18.1.3.6	Ø 1"	Each	2,454.00	2,454.00	2,454.00	2,454.00
7.18.1.3.7	Ø 3/4"	Each	1,841.00	1,841.00	1,841.00	1,841.00
7.18.1.4	Check Valves					
	D swing check valve, DI body, PN16 flange					
7.18.1.4.1	Ø 18"	Each	66,261.00	66,261.00	66,261.00	66,261.00
7.18.1.4.2	Ø 16"	Each	58,898.00	58,898.00	58,898.00	58,898.00
7.18.1.4.3	Ø 14"	Each	51,536.00	51,536.00	51,536.00	51,536.00
7.18.1.4.4	Ø 12"	Each	44,174.00	44,174.00	44,174.00	44,174.00
7.18.1.4.5	Ø 10"	Each	36,811.00	36,811.00	36,811.00	36,811.00
7.18.1.4.6	Ø 8"	Each	29,449.00	29,449.00	29,449.00	29,449.00
7.18.1.4.7	Ø 6"	Each	22,087.00	22,087.00	22,087.00	22,087.00
7.18.1.4.8	Ø 4"	Each	14,725.00	14,725.00	14,725.00	14,725.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.18.1.5	Ball Valves					
7.18.1.5.1	Ø 1"	Each	2,209.00	2,209.00	2,209.00	2,209.00
7.18.1.5.2	Ø 0.75"	Each	1,718.00	1,718.00	1,718.00	1,718.00
7.18.1.6	Other Types					
7.18.1.6.1	Ø 0.5" Automatic Vent Valve	Each	4,049.00	4,049.00	4,049.00	4,049.00
7.18.1.6.2	Ø 0.5" Drain Cock	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.18.2	BALANCING VALVES					
	Supply, installation, testing and commissioning of STAD or Bell & Gosset type Balancing Valves complete with all accessories and components for balancing and recording of flow rates of chilled water and condenser water flow through pipes. Units shall conform to detail technical specification.					
	Country of Origin: USA/UK/ EU/Japan					
	Country of Manufacture : Malaysia/China					
7.18.2.1	Ø 12"	Each	294,492.00	294,492.00	294,492.00	294,492.00
7.18.2.2	Ø 10"	Each	245,410.00	245,410.00	245,410.00	245,410.00
7.18.2.3	Ø 8"	Each	220,869.00	220,869.00	220,869.00	220,869.00
7.18.2.4	Ø 6"	Each	196,328.00	196,328.00	196,328.00	196,328.00
7.18.2.5	Ø 4"	Each	72,887.00	72,887.00	72,887.00	72,887.00
7.18.2.6	Ø 3"	Each	64,788.00	64,788.00	64,788.00	64,788.00
7.18.2.7	Ø 2.5"	Each	40,493.00	40,493.00	40,493.00	40,493.00
7.18.2.8	Ø 1.5"	Each	38,873.00	38,873.00	38,873.00	38,873.00
7.18.3	PRESSURE INDEPENDENT BALANCING AND CONTROL VALVES (PIBCV)					

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation, testing and commissioning of Pressure Independent Balancing and Control Valves (PIBCV) as per following sizes including supply of all necessary hardware and consumables. The unit shall conform to detail technical specification.

Country of Origin, Manufacture, Shipment: USA/UK/ EU/Japan

7.18.3.1	Ø 4"	Each	129,576.00	129,576.00	129,576.00	129,576.00
7.18.3.2	Ø 3"	Each	113,379.00	113,379.00	113,379.00	113,379.00
7.18.3.3	Ø 2.5"	Each	105,281.00	105,281.00	105,281.00	105,281.00
7.18.3.4	Ø 2"	Each	48,591.00	48,591.00	48,591.00	48,591.00
7.18.3.5	Ø 1.5"	Each	45,352.00	45,352.00	45,352.00	45,352.00
7.18.3.6	Ø 1.25"	Each	43,732.00	43,732.00	43,732.00	43,732.00
7.18.3.7	Ø 1"	Each	14,577.00	14,577.00	14,577.00	14,577.00
7.18.3.8	Ø 0.75"	Each	9,718.00	9,718.00	9,718.00	9,718.00

7.18.4 Y-STRAINER

Supply, installation, testing and commissioning of Y-Strainers as per following sizes and shall be complete as per technical specification.

Country of Origin: USA/UK/ EU/Japan

Country of Manufacture : Malaysia/China

7.18.4.1	Ø 14"	Each	83,439.00	83,439.00	83,439.00	83,439.00
7.18.4.2	Ø 12"	Each	72,396.00	72,396.00	72,396.00	72,396.00
7.18.4.3	Ø 4"	Each	24,541.00	24,541.00	24,541.00	24,541.00
7.18.4.4	Ø 3"	Each	17,792.00	17,792.00	17,792.00	17,792.00
7.18.4.5	Ø 2.5"	Each	11,473.00	11,473.00	11,473.00	11,473.00
7.18.4.6	Ø 2"	Each	7,914.00	7,914.00	7,914.00	7,914.00
7.18.4.7	Ø 1.5"	Each	5,460.00	5,460.00	5,460.00	5,460.00
7.18.4.8	Ø 1.25"	Each	3,657.00	3,657.00	3,657.00	3,657.00
7.18.4.9	Ø 1"	Each	2,638.00	2,638.00	2,638.00	2,638.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.18.4.10	Ø 0.75"	Each	2,184.00	2,184.00	2,184.00	2,184.00

7.18.5 FLEXIBLE PIPE CONNECTOR

Supply, installation, testing and commissioning of Flexible Pipe Connector as per following sizes and shall be complete as per technical specification.

Country of Origin: USA/UK/ EU/Japan

Country of Manufacture : Malaysia/China

7.18.5.1	Ø 14"	Each	67,463.00	67,463.00	67,463.00	67,463.00
7.18.5.2	Ø 12"	Each	55,033.00	55,033.00	55,033.00	55,033.00
7.18.5.3	Ø 10"	Each	42,677.00	42,677.00	42,677.00	42,677.00
7.18.5.4	Ø 8"	Each	29,155.00	29,155.00	29,155.00	29,155.00
7.18.5.5	Ø 6"	Each	23,927.00	23,927.00	23,927.00	23,927.00
7.18.5.6	Ø 4"	Each	18,013.00	18,013.00	18,013.00	18,013.00
7.18.5.7	Ø 3"	Each	14,087.00	14,087.00	14,087.00	14,087.00
7.18.5.8	Ø 2.5"	Each	10,859.00	10,859.00	10,859.00	10,859.00
7.18.5.9	Ø 2"	Each	7,976.00	7,976.00	7,976.00	7,976.00
7.18.5.10	Ø 1.5"	Each	6,381.00	6,381.00	6,381.00	6,381.00
7.18.5.11	Ø 1.25"	Each	4,663.00	4,663.00	4,663.00	4,663.00
7.18.5.12	Ø 1"	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.18.5.13	Ø 0.75"	Each	3,068.00	3,068.00	3,068.00	3,068.00

7.18.6 METERING DEVICES

Supply, installation, testing and commissioning of following Metering Devices as per detail technical specification.

Country of Origin: USA/UK/ EU/Japan

Country of Manufacture : Malaysia/China

7.18.6.1	Pipe Thermometers (scale casing, aluminium, anodized material, stem length brass material, BSP connection (straight type) (Ranges: 0 ~ 65°C)	Each	3,927.00	3,927.00	3,927.00	3,927.00
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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.18.6.2	Pressure Gauges (minimum 4" Dial, 3/8" BSP bottom connection) (Ranges: 0 ~ 2,000 kPa)	Each	4,908.00	4,908.00	4,908.00	4,908.00

7.18.7 AIR SEPARATOR

Supply, installation, testing and commissioning of Air Separator as per following capacities. The unit shall conform to detail technical specification.

These Air separators should create a low velocity vortex that separates and removes entrained air from fluids circulating in closed, heating and chilled water systems with 304 stainless steel strainer to collect unwanted system debris. Should eliminates 99% of Entrained Air During First Pass. Working Pressures 100~300 PSIG. Max. Operating Temperature: 350° F

Country of Origin, Manufacture: USA/UK/ EU/Japan

7.18.7.1	Capacity : 500 US Gpm	Set	583,093.00	583,093.00	583,093.00	583,093.00
7.18.7.2	Capacity : 1000 US Gpm	Set	809,852.00	809,852.00	809,852.00	809,852.00
7.18.7.3	Capacity : 1500 US Gpm	Set	890,837.00	890,837.00	890,837.00	890,837.00
7.18.7.4	Capacity : 2000 US Gpm	Set	1,165,696.00	1,165,696.00	1,165,696.00	1,165,696.00
7.18.7.5	Capacity : 2500 US Gpm	Set	1,328,157.00	1,328,157.00	1,328,157.00	1,328,157.00
7.18.7.6	Capacity : 3000 US Gpm	Set	1,490,128.00	1,490,128.00	1,490,128.00	1,490,128.00
7.18.7.7	Capacity : 3500 US Gpm	Set	1,700,689.00	1,700,689.00	1,700,689.00	1,700,689.00
7.18.7.8	Capacity : 4000 US Gpm	Set	1,943,645.00	1,943,645.00	1,943,645.00	1,943,645.00
7.18.7.9	Capacity : 4500 US Gpm	Set	2,267,586.00	2,267,586.00	2,267,586.00	2,267,586.00

7.19 LOUVER, DIFFUSER & GRILLE

Supply, installation, testing & commissioning of Louver, Diffuser, Damper & Grille with complete all necessary accessories and fittings, Fixing for commissioning of the equipment as follows technical specification, drawing and time to time site instruction by the Engineer-in-charge.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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All Louver/Grill shall be constructed with extruded aluminium with powder coat paint finish complete with face margin and fixing accessories. Neck velocity shall not be more than 500 ft/min at a pressure drop of 0.08 inch WC.

Country of Manufacture : Malaysia/China

7.19.1 Exhaust Air Louver:

7.19.1		Each	1,963.00	1,963.00	1,963.00	1,963.00
7.19.1.1	250 x 200 mm	Each	3,534.00	3,534.00	3,534.00	3,534.00
7.19.1.2	450 x 200 mm	Each	3,976.00	3,976.00	3,976.00	3,976.00
7.19.1.3	450 x 250 mm	Each	4,771.00	4,771.00	4,771.00	4,771.00
7.19.1.4	450 x 300 mm	Each	3,976.00	3,976.00	3,976.00	3,976.00
7.19.1.5	500 x 200 mm	Each	5,654.00	5,654.00	5,654.00	5,654.00
7.19.1.6	600 x 300 mm	Each	5,743.00	5,743.00	5,743.00	5,743.00
7.19.1.7	650 x 250 mm	Each	7,539.00	7,539.00	7,539.00	7,539.00
7.19.1.8	800 x 300 mm	Each	5,340.00	5,340.00	5,340.00	5,340.00
7.19.1.9	850 x 200 mm	Each	9,345.00	9,345.00	9,345.00	9,345.00
7.19.1.10	850 x 350 mm	Each	11,176.00	11,176.00	11,176.00	11,176.00
7.19.1.11	900 x 400 mm	Each	10,366.00	10,366.00	10,366.00	10,366.00
7.19.1.12	950 x 350 mm	Each	7,539.00	7,539.00	7,539.00	7,539.00
7.19.1.13	1200 x 200 mm	Each	12,796.00	12,796.00	12,796.00	12,796.00
7.19.1.14	1200 x 350 mm	Each	13,694.00	13,694.00	13,694.00	13,694.00
7.19.1.15	1200 x 400 mm	Each	12,958.00	12,958.00	12,958.00	12,958.00
7.19.1.16	1550 x 250 mm	Each	22,264.00	22,264.00	22,264.00	22,264.00
7.19.1.17	2100 x 450 mm	Each				

7.19.2 Fresh Air Louver :

7.19.2.1	400 x 200 mm	Each	3,141.00	3,141.00	3,141.00	3,141.00
7.19.2.2	400 x 250 mm	Each	3,927.00	3,927.00	3,927.00	3,927.00
7.19.2.3	450 x 200 mm	Each	3,534.00	3,534.00	3,534.00	3,534.00
7.19.2.4	450 x 250 mm	Each	3,976.00	3,976.00	3,976.00	3,976.00
7.19.2.5	750 x 350 mm	Each	8,422.00	8,422.00	8,422.00	8,422.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.19.2.6	850 x 350 mm	Each	9,345.00	9,345.00	9,345.00	9,345.00
7.19.2.7	900 x 350 mm	Each	9,880.00	9,880.00	9,880.00	9,880.00
7.19.2.8	900 x 400 mm	Each	11,176.00	11,176.00	11,176.00	11,176.00
7.19.2.9	1200 x 350 mm	Each	12,796.00	12,796.00	12,796.00	12,796.00
7.19.2.10	1200 x 400 mm	Each	13,694.00	13,694.00	13,694.00	13,694.00
7.19.2.11	1500 x 550 mm	Each	19,436.00	19,436.00	19,436.00	19,436.00
7.19.2.12	1600 x 600 mm	Each	22,617.00	22,617.00	22,617.00	22,617.00
7.19.2.13	1650 x 550 mm	Each	21,380.00	21,380.00	21,380.00	21,380.00
7.19.2.14	1700 x 600 mm	Each	24,031.00	24,031.00	24,031.00	24,031.00
7.19.2.15	2200 x 800 mm	Each	41,464.00	41,464.00	41,464.00	41,464.00
7.19.3	Exhaust Air Grill :					
7.19.3.1	300 x 250 mm	Each	2,945.00	2,945.00	2,945.00	2,945.00
7.19.3.2	450 x 200 mm	Each	3,333.00	3,333.00	3,333.00	3,333.00
7.19.3.3	750 x 500 mm	Each	6,155.00	6,155.00	6,155.00	6,155.00
7.19.3.4	800 x 300 mm	Each	7,539.00	7,539.00	7,539.00	7,539.00
7.19.3.5	900 x 350 mm	Each	10,994.00	10,994.00	10,994.00	10,994.00
7.19.3.6	900 x 1400 mm	Each	19,274.00	19,274.00	19,274.00	19,274.00
7.19.3.7	1150 x 1150 mm	Each	19,598.00	19,598.00	19,598.00	19,598.00
7.19.3.8	1200 x 900 mm	Each	16,035.00	16,035.00	16,035.00	16,035.00
7.19.3.9	1350 x 450 mm	Each	12,751.00	12,751.00	12,751.00	12,751.00
7.19.3.10	1600 x 650 mm	Each	15,387.00	15,387.00	15,387.00	15,387.00
7.19.3.11	2000 x 850 mm	Each	25,267.00	25,267.00	25,267.00	25,267.00
7.19.3.12	1850 x 900 mm	Each	24,781.00	24,781.00	24,781.00	24,781.00
7.19.3.13	3000 x 900 mm	Each	40,007.00	40,007.00	40,007.00	40,007.00
7.19.3.14	3000 x 2000 mm	Each	88,922.00	88,922.00	88,922.00	88,922.00
7.19.4	Fresh Air Grill :					
7.19.4.1	150 x 150 mm	Each	1,325.00	1,325.00	1,325.00	1,325.00
7.19.4.2	250 x 100 mm	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.19.4.3	300 x 150 mm	Each	1,767.00	1,767.00	1,767.00	1,767.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.19.4.4	300 x 200 mm	Each	2,356.00	2,356.00	2,356.00	2,356.00
7.19.4.5	350 x 200 mm	Each	2,749.00	2,749.00	2,749.00	2,749.00
7.19.4.6	400 x 200 mm	Each	3,141.00	3,141.00	3,141.00	3,141.00
7.19.4.7	450 x 200 mm	Each	3,333.00	3,333.00	3,333.00	3,333.00
7.19.4.8	450 x 250 mm	Each	3,495.00	3,495.00	3,495.00	3,495.00
7.19.4.9	600 x 200 mm	Each	3,819.00	3,819.00	3,819.00	3,819.00
7.19.4.10	700 x 700 mm	Each	7,775.00	7,775.00	7,775.00	7,775.00
7.19.4.11	800 x 300 mm	Each	3,887.00	3,887.00	3,887.00	3,887.00
7.19.4.12	1200 x 400 mm	Each	7,127.00	7,127.00	7,127.00	7,127.00
7.19.4.13	1200 x 900 mm	Each	16,035.00	16,035.00	16,035.00	16,035.00
7.19.4.14	1350 x 500 mm	Each	10,042.00	10,042.00	10,042.00	10,042.00
7.19.4.15	1400 x 500 mm	Each	10,366.00	10,366.00	10,366.00	10,366.00
7.19.4.16	1500 x 500 mm	Each	11,176.00	11,176.00	11,176.00	11,176.00
7.19.4.17	1500 x 550 mm	Each	12,310.00	12,310.00	12,310.00	12,310.00
7.19.4.18	1600 x 550 mm	Each	13,120.00	13,120.00	13,120.00	13,120.00
7.19.4.19	1600 x 600 mm	Each	14,253.00	14,253.00	14,253.00	14,253.00
7.19.4.20	1650 x 500 mm	Each	12,310.00	12,310.00	12,310.00	12,310.00
7.19.4.21	1900 x 1000 mm	Each	28,183.00	28,183.00	28,183.00	28,183.00
7.19.5	Return Air Grill :					
7.19.5.1	1200 x 1100 mm	Each	11,338.00	11,338.00	11,338.00	11,338.00
7.19.5.2	1200 x 400 mm	Each	13,694.00	13,694.00	13,694.00	13,694.00
7.19.5.3	1200 x 1200 mm	Each	28,271.00	28,271.00	28,271.00	28,271.00
7.19.6	Supply Air Grill :					
7.19.6.1	250x200 mm	Each	1,963.00	1,963.00	1,963.00	1,963.00
7.19.6.2	450x250 mm	Each	4,417.00	4,417.00	4,417.00	4,417.00
7.19.6.3	600x300 mm	Each	5,654.00	5,654.00	5,654.00	5,654.00
7.19.6.4	800x300 mm	Each	7,539.00	7,539.00	7,539.00	7,539.00
7.19.6.5	900x250 mm	Each	8,835.00	8,835.00	8,835.00	8,835.00
7.19.6.6	1200x150 mm	Each	7,068.00	7,068.00	7,068.00	7,068.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.19.7	Air Diffuser With Damper :					
7.19.7.1	150x150 mm	Each	2,268.00	2,268.00	2,268.00	2,268.00
7.19.7.2	200x200 mm	Each	2,753.00	2,753.00	2,753.00	2,753.00
7.19.7.3	250x250 mm	Each	3,239.00	3,239.00	3,239.00	3,239.00
7.19.7.4	300x300 mm	Each	4,211.00	4,211.00	4,211.00	4,211.00
7.19.7.5	350x350 mm	Each	5,183.00	5,183.00	5,183.00	5,183.00
7.19.7.6	400x400 mm	Each	6,135.00	6,135.00	6,135.00	6,135.00
7.19.8	Air Round Diffuser :					
7.19.8.1	Dia 400 mm	Each	5,522.00	5,522.00	5,522.00	5,522.00
7.19.8.2	Dia 350 mm	Each	4,908.00	4,908.00	4,908.00	4,908.00
7.19.8.3	Dia 300 mm	Each	4,295.00	4,295.00	4,295.00	4,295.00
7.19.8.4	Dia 250 mm	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.19.9	Air Round Jet Diffuser :					
	The jet nozzle diffuser is made of high quality aluminium sheet. The jet can be adjusted as per direction.					
7.19.9.1	Dia 400 mm	Each	8,624.00	8,624.00	8,624.00	8,624.00
7.19.9.2	Dia 350 mm	Each	7,397.00	7,397.00	7,397.00	7,397.00
7.19.9.3	Dia 300 mm	Each	6,783.00	6,783.00	6,783.00	6,783.00
7.19.9.4	Dia 250 mm	Each	6,170.00	6,170.00	6,170.00	6,170.00
7.19.10	Mechanical Constant Volume Box (CAV):					
7.19.10.1	200X100 mm	Each	12,270.00	12,270.00	12,270.00	12,270.00
7.19.10.2	200X150 mm	Each	13,537.00	13,537.00	13,537.00	13,537.00
7.19.10.3	250X200 mm	Each	14,764.00	14,764.00	14,764.00	14,764.00
7.19.10.4	250X250 mm	Each	15,991.00	15,991.00	15,991.00	15,991.00
7.19.10.5	300X200 mm	Each	16,801.00	16,801.00	16,801.00	16,801.00
7.19.10.6	300X250 mm	Each	18,028.00	18,028.00	18,028.00	18,028.00
7.19.10.7	400X150 mm	Each	19,137.00	19,137.00	19,137.00	19,137.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.19.10.8	400X200 mm	Each	20,364.00	20,364.00	20,364.00	20,364.00
7.19.10.9	400X250 mm	Each	22,818.00	22,818.00	22,818.00	22,818.00
7.19.10.10	500X250 mm	Each	26,239.00	26,239.00	26,239.00	26,239.00
7.19.11	Supply of Linear Slot Diffuser					
7.19.11.1	Size 2 x 20mm, 1.2 m Long	Each	4,535.00	4,535.00	4,535.00	4,535.00
7.19.11.2	Size 2 x 20mm, 1.5 m Long	Each	5,507.00	5,507.00	5,507.00	5,507.00
7.19.11.3	Size 2 x 20mm, 2.0 m Long	Each	6,803.00	6,803.00	6,803.00	6,803.00
7.19.11.4	Size 3 x 20mm, 2.0 m Long	Each	8,422.00	8,422.00	8,422.00	8,422.00
7.19.12	Liner Grill : Made of extruded aluminium Fixed blades at 0 degree, 15 degree, 30 degree rigid, heavy gauge extruded frames with reinforced mitred and welded corners. Standard finish white, other finishes are available as per design. Surface mounting or concealed mounting construction is of a fixed core.					
7.19.12.1	1200x150 mm	Each	8,908.00	8,908.00	8,908.00	8,908.00
7.19.12.2	1200x250 mm	Each	10,204.00	10,204.00	10,204.00	10,204.00
7.20	DAMPER					
7.20.1	Fire Damper Supply, installation, testing & commissioning of 1.5 Hours fire rating damper 20 GA .Interlocking steel blades UL listed fusible link (165°F standard)roll formed steel frame 20GA. Negator stainless steel closer spring. Country of Origin: USA/UK/ EU/Japan Country of Manufacture : Malaysia/India					
7.20.1.1	300 x 150 mm	Each	25,228.00	25,228.00	25,228.00	25,228.00
7.20.1.2	550 x 250 mm	Each	30,087.00	30,087.00	30,087.00	30,087.00
7.20.1.3	700 x 300 mm	Each	33,327.00	33,327.00	33,327.00	33,327.00
7.20.1.4	700 x 350 mm	Each	34,136.00	34,136.00	34,136.00	34,136.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.20.1.5	950 x 450 mm	Each	39,805.00	39,805.00	39,805.00	39,805.00
7.20.1.6	1000 x 450 mm	Each	41,425.00	41,425.00	41,425.00	41,425.00

7.20.2 Volume control Damper :

Supply and installation of opposed blade type volume control damper constructed with 18 BWG sheet steel painted with two coats of synthetic black paint.

The damper shall have adjustable locking arrangement with worm gear operable from outside duct work and shall be flanged end type suitable to mount on flanged end duct work. Volume control dampers shall be as per layout drawings and direction of Engineer-in-Charge.

7.20.2.1	200 x 150 mm	Each	1,178.00	1,178.00	1,178.00	1,178.00
7.20.2.2	250 x 150 mm	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.20.2.3	300 x 150 mm	Each	1,767.00	1,767.00	1,767.00	1,767.00
7.20.2.4	300 x 200 mm	Each	2,356.00	2,356.00	2,356.00	2,356.00
7.20.2.5	350 x 150 mm	Each	2,061.00	2,061.00	2,061.00	2,061.00
7.20.2.6	350 x 200 mm	Each	2,749.00	2,749.00	2,749.00	2,749.00
7.20.2.7	400 x 200 mm	Each	3,141.00	3,141.00	3,141.00	3,141.00
7.20.2.8	500 x 250 mm	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.20.2.9	650 x 250 mm	Each	4,785.00	4,785.00	4,785.00	4,785.00
7.20.2.10	700 x 350 mm	Each	5,772.00	5,772.00	5,772.00	5,772.00
7.20.2.11	800 x 350 mm	Each	6,597.00	6,597.00	6,597.00	6,597.00
7.20.2.12	900 x 350 mm	Each	6,803.00	6,803.00	6,803.00	6,803.00
7.20.2.13	950 x 450 mm	Each	8,393.00	8,393.00	8,393.00	8,393.00
7.20.2.14	1000 x 250 mm	Each	5,890.00	5,890.00	5,890.00	5,890.00
7.20.2.15	1000 x 450 mm	Each	7,068.00	7,068.00	7,068.00	7,068.00
7.20.2.16	1000 x 1250 mm	Each	19,633.00	19,633.00	19,633.00	19,633.00
7.20.2.17	1200 x 300 mm	Each	7,068.00	7,068.00	7,068.00	7,068.00
7.20.2.18	1200 x 450 mm	Each	10,602.00	10,602.00	10,602.00	10,602.00
7.20.2.19	1200 x 750 mm	Each	14,136.00	14,136.00	14,136.00	14,136.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.20.2.20	1300 x 300 mm	Each	7,657.00	7,657.00	7,657.00	7,657.00
7.20.2.21	1300 x 500 mm	Each	10,209.00	10,209.00	10,209.00	10,209.00
7.20.2.22	1450 x 550 mm	Each	12,526.00	12,526.00	12,526.00	12,526.00
7.20.2.23	1600 x 800 mm	Each	20,104.00	20,104.00	20,104.00	20,104.00
7.20.2.24	2050 x 1100 mm	Each	35,418.00	35,418.00	35,418.00	35,418.00
7.20.3	Non Return Damper :					
7.20.3.1	700 x 350 mm	Each	4,295.00	4,295.00	4,295.00	4,295.00
7.20.3.2	850 x 400 mm	Each	5,215.00	5,215.00	5,215.00	5,215.00
7.20.3.3	900 x 500 mm	Each	5,522.00	5,522.00	5,522.00	5,522.00
7.20.3.4	1000 x 1000 mm	Each	6,135.00	6,135.00	6,135.00	6,135.00
7.20.3.5	1200 x 500 mm	Each	7,362.00	7,362.00	7,362.00	7,362.00
7.20.3.6	1250 x 900 mm	Each	7,976.00	7,976.00	7,976.00	7,976.00
7.20.3.7	1400 x 500 mm	Each	8,589.00	8,589.00	8,589.00	8,589.00
7.20.3.8	1450 x 800 mm	Each	9,203.00	9,203.00	9,203.00	9,203.00
7.20.3.9	1500 x 750 mm	Each	10,430.00	10,430.00	10,430.00	10,430.00
7.20.3.10	1600 x 600 mm	Each	11,043.00	11,043.00	11,043.00	11,043.00
7.20.3.11	1650 x 650 mm	Each	11,657.00	11,657.00	11,657.00	11,657.00
7.20.3.12	1700 x 700 mm	Each	12,270.00	12,270.00	12,270.00	12,270.00
7.20.3.13	1750 x 600 mm	Each	13,498.00	13,498.00	13,498.00	13,498.00

7.21 VENTILATION FAN

Supply, installation, testing & commissioning of Fan including non return damper with all necessary accessories and fittings, Fixing for commissioning of the equipment including all electrical & Civil works as follows technical specification, drawing and time to time site instruction from Engineer-in-charge.

Country of Origin: USA/UK/ EU/Japan

Country of Manufacture : Malaysia

7.21.1 **Exhaust Ventilation Fan (Wall Type):** Fan shall be propeller/axial type

[Handwritten signatures and initials in blue and black ink are present below the text, including a large signature on the left and several smaller ones on the right.]

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.21.1.1	Capacity : 50 cfm, ESP 30 Pa	Each	7,362.00	7,362.00	7,362.00	7,362.00
7.21.1.2	Capacity : 100 cfm, ESP 30 Pa	Each	9,203.00	9,203.00	9,203.00	9,203.00
7.21.1.3	Capacity : 200 cfm, ESP 30 Pa	Each	11,043.00	11,043.00	11,043.00	11,043.00
7.21.1.4	Capacity : 250 cfm, ESP 30 Pa	Each	12,270.00	12,270.00	12,270.00	12,270.00
7.21.1.5	Capacity : 300 cfm, ESP 30 Pa	Each	14,725.00	14,725.00	14,725.00	14,725.00
7.21.1.6	Capacity : 350 cfm, ESP 30 Pa	Each	18,406.00	18,406.00	18,406.00	18,406.00
7.21.1.7	Capacity : 400 cfm, ESP 30 Pa	Each	20,860.00	20,860.00	20,860.00	20,860.00
7.21.1.8	Capacity : 450 cfm, ESP 30 Pa	Each	23,314.00	23,314.00	23,314.00	23,314.00
7.21.1.9	Capacity : 550 cfm, ESP 30 Pa	Each	25,768.00	25,768.00	25,768.00	25,768.00
7.21.1.10	Capacity : 600 cfm, ESP 30 Pa	Each	29,449.00	29,449.00	29,449.00	29,449.00
7.21.1.11	Capacity : 750 cfm, ESP 50 Pa	Each	36,811.00	36,811.00	36,811.00	36,811.00
7.21.1.12	Capacity : 800 cfm, ESP 50 Pa	Each	49,082.00	49,082.00	49,082.00	49,082.00
7.21.1.13	Capacity : 1000 cfm, ESP 50 Pa	Each	52,154.00	52,154.00	52,154.00	52,154.00
7.21.1.14	Capacity : 1100 cfm, ESP 50 Pa	Each	52,154.00	52,154.00	52,154.00	52,154.00
7.21.1.15	Capacity : 1200 cfm, ESP 50 Pa	Each	37,253.00	37,253.00	37,253.00	37,253.00
7.21.1.16	Capacity : 1400 cfm, ESP 50 Pa	Each	45,352.00	45,352.00	45,352.00	45,352.00
7.21.1.17	Capacity : 1700 cfm, ESP 50 Pa	Each	57,622.00	57,622.00	57,622.00	57,622.00
7.21.2	Exhaust Ventilation Fan (Duct Type): Fan shall be centrifugal duct type					
7.21.2.1	Capacity : 200 cfm, ESP 100 Pa	Each	12,270.00	12,270.00	12,270.00	12,270.00
7.21.2.2	Capacity : 300 cfm, ESP 100 Pa	Each	18,406.00	18,406.00	18,406.00	18,406.00
7.21.2.3	Capacity : 350 cfm, ESP 100 Pa	Each	21,473.00	21,473.00	21,473.00	21,473.00
7.21.2.4	Capacity : 400 cfm, ESP 100 Pa	Each	24,541.00	24,541.00	24,541.00	24,541.00
7.21.2.5	Capacity : 600 cfm, ESP 200 Pa	Each	36,811.00	36,811.00	36,811.00	36,811.00
7.21.2.6	Capacity : 650 cfm, ESP 200 Pa	Each	39,879.00	39,879.00	39,879.00	39,879.00
7.21.2.7	Capacity : 700 cfm, ESP 200 Pa	Each	42,947.00	42,947.00	42,947.00	42,947.00
7.21.2.8	Capacity : 750 cfm, ESP 200 Pa	Each	46,014.00	46,014.00	46,014.00	46,014.00
7.21.2.9	Capacity : 1000 cfm, ESP 300 Pa	Each	61,352.00	61,352.00	61,352.00	61,352.00
7.21.2.10	Capacity : 1200 cfm, ESP 500 Pa	Each	73,623.00	73,623.00	73,623.00	73,623.00
7.21.2.11	Capacity : 1500 cfm, ESP 500 Pa	Each	92,029.00	92,029.00	92,029.00	92,029.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.21.2.12	Capacity : 2000 cfm, ESP 500 Pa	Each	122,705.00	122,705.00	122,705.00	122,705.00
7.21.2.13	Capacity : 3000 cfm, ESP 500 Pa	Each	184,057.00	184,057.00	184,057.00	184,057.00
7.21.2.14	Capacity : 4000 cfm, ESP 500 Pa	Each	245,410.00	245,410.00	245,410.00	245,410.00
7.21.2.15	Capacity : 5000 cfm, ESP 500 Pa	Each	306,762.00	306,762.00	306,762.00	306,762.00
7.21.2.16	Capacity : 6000 cfm, ESP 500 Pa	Each	368,115.00	368,115.00	368,115.00	368,115.00
7.21.2.17	Capacity : 8000 cfm, ESP 500 Pa	Each	429,467.00	429,467.00	429,467.00	429,467.00
7.21.2.18	Capacity : 12000 cfm, ESP 500 Pa	Each	490,819.00	490,819.00	490,819.00	490,819.00
7.21.2.19	Capacity : 20000 cfm, ESP 500 Pa	Each	582,848.00	582,848.00	582,848.00	582,848.00
7.21.2.20	Capacity : 25000 cfm, ESP 500 Pa	Each	705,553.00	705,553.00	705,553.00	705,553.00

7.21.3 Fresh Air Ventilation Fan (Duct Type):

Supply, installation, testing & commissioning of Fan with DOL system including non return damper with all necessary accessories and fittings, Fixing for commissioning of the equipment including all electrical & Civil works as follows technical specification, drawing and time to time site instruction from Engineer-in-charge.

7.21.3.1	Capacity : 7000 cfm, ESP 100 Pa	Each	153,381.00	153,381.00	153,381.00	153,381.00
7.21.3.2	Capacity : 11000 cfm, ESP 100 Pa	Each	227,004.00	227,004.00	227,004.00	227,004.00
7.21.3.3	Capacity : 11000 cfm, ESP 500 Pa(Normal mode); 19,000 cfm @ 500 ESP(Emergency mode)	Each	306,762.00	306,762.00	306,762.00	306,762.00
7.21.3.4	Capacity : 18000 cfm, ESP 100 Pa	Each	337,438.00	337,438.00	337,438.00	337,438.00
7.21.3.5	Capacity : 22000 cfm, ESP 500 Pa (Normal mode); 38,000 cfm @ 500 ESP(Emergency mode)	Each	429,467.00	429,467.00	429,467.00	429,467.00

7.21.4 Jet Fan :

[Handwritten signatures and marks are present below the Jet Fan section, including a large signature on the left, a checkmark, and several other initials and marks.]

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation, testing & commissioning of Fan with VFD system including with all necessary accessories and fittings, Fixing for commissioning of the equipment including all electrical & Civil works as follows technical specification, drawing and time to time site instruction from Engineer-in-charge.

7.21.4.1	Capacity : 2000 cfm, ESP 300 Pa	Each	153,381.00	153,381.00	153,381.00	153,381.00
7.21.4.2	Capacity : 4000 cfm, ESP 300 Pa	Each	227,004.00	227,004.00	227,004.00	227,004.00

7.22 PIPE & ACCESSORIES

7.22.1 PRE-INSULATED PIPES

Supply, installation, testing and commissioning of Pre-Insulated Black Steel Pipes for all the chilled water piping system including cutting, edges preparation, welding, hanging etc. complete in all respect. The pipe shall be 40 Schedule Black Steel pipe and the insulation material shall be fibre glass/ polystyrene/ polyurethane of appropriate thickness and jacketed with galvanized steel.

Area where two pipe ends are to be joined and elbows, tees, reducers etc. shall be insulated by pre-formed fibre glass/ polyurethane insulation material and then jacketed. Pipe hanger/ isolator boxes with spring isolators, hanger rods, steel supports, all other materials and consumable in this connection shall be supplied by the Contractor under this head. The work shall be as per technical specification and sample approved by the Engineer-in-charge. .

Country of Origin, Manufacture: Malaysia/South Korea

7.22.1.1	Ø 24"	Ft	13,760.00	13,760.00	13,760.00	13,760.00
7.22.1.2	Ø 20"	Ft	12,030.00	12,030.00	12,030.00	12,030.00
7.22.1.3	Ø 18"	Ft	10,728.00	10,728.00	10,728.00	10,728.00
7.22.1.4	Ø 16"	Ft	9,497.00	9,497.00	9,497.00	9,497.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.22.1.5	Ø 14"	Ft	8,329.00	8,329.00	8,329.00	8,329.00
7.22.1.6	Ø 12"	Ft	6,842.00	6,842.00	6,842.00	6,842.00
7.22.1.7	Ø 10"	Ft	5,562.00	5,562.00	5,562.00	5,562.00
7.22.1.8	Ø 8"	Ft	4,908.00	4,908.00	4,908.00	4,908.00
7.22.1.9	Ø 6"	Ft	4,520.00	4,520.00	4,520.00	4,520.00
7.22.1.10	Ø 5"	Ft	3,681.00	3,681.00	3,681.00	3,681.00
7.22.1.11	Ø 4"	Ft	3,068.00	3,068.00	3,068.00	3,068.00
7.22.1.12	Ø 3"	Ft	2,437.00	2,437.00	2,437.00	2,437.00
7.22.1.13	Ø 2.5"	Ft	2,111.00	2,111.00	2,111.00	2,111.00
7.22.1.14	Ø 2"	Ft	1,218.00	1,218.00	1,218.00	1,218.00
7.22.1.15	Ø 1.5"	Ft	871.00	871.00	871.00	871.00
7.22.1.16	Ø 1.25"	Ft	751.00	751.00	751.00	751.00
7.22.1.17	Ø 1"	Ft	722.00	722.00	722.00	722.00
7.22.1.18	Ø 0.75"	Ft	692.00	692.00	692.00	692.00

[Above pipe prices shall include prices of adequate quantities of pipe accessories, viz. pipe elbows, tees, reducers etc.]

7.22.2 BLACK STEEL PIPES

Supply, installation, testing and commissioning of 40 Schedule Black Steel pipes for all the condenser water piping system including cutting, edge preparation, welding, hanging etc. complete in all respect. Pipe hanger/isolator boxes with spring isolators, hanger rods, steel supports, anchors, all other materials and consumable in this connection shall be supplied by the Contractor under this head. The work shall be as per technical specification and sample approved by the Engineer-in-charge.

7.22.2.1	Ø 24" thickness minimum 17.5 mm	Ft	10,917.00	10,917.00	10,917.00	10,917.00
7.22.2.2	Ø 20" thickness minimum 15 mm	Ft	8,537.00	8,537.00	8,537.00	8,537.00
7.22.2.3	Ø 18" thickness minimum 14.2 mm	Ft	7,608.00	7,608.00	7,608.00	7,608.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.22.2.4	Ø 16" thickness minimum 12.7 mm	Ft	6,388.00	6,388.00	6,388.00	6,388.00
7.22.2.5	Ø 14" thickness minimum 11.2mm	Ft	5,471.00	5,471.00	5,471.00	5,471.00
7.22.2.6	Ø 12" thickness minimum 10.4 mm	Ft	4,295.00	4,295.00	4,295.00	4,295.00
7.22.2.7	Ø 10" thickness minimum 9.4 mm	Ft	3,681.00	3,681.00	3,681.00	3,681.00
7.22.2.8	Ø 8" thickness minimum 8.13 mm	Ft	3,334.00	3,334.00	3,334.00	3,334.00
7.22.2.9	Ø 6" thickness minimum 7.11 mm	Ft	2,963.00	2,963.00	2,963.00	2,963.00
7.22.2.10	Ø 5" thickness minimum 6.6 mm	Ft	2,700.00	2,700.00	2,700.00	2,700.00
7.22.2.11	Ø 4" thickness minimum 6.1 mm	Ft	2,147.00	2,147.00	2,147.00	2,147.00
7.22.2.12	Ø 3" thickness minimum 5.59 mm	Ft	1,778.00	1,778.00	1,778.00	1,778.00
7.22.2.13	Ø 2.5" thickness minimum 5.08 mm	Ft	1,185.00	1,185.00	1,185.00	1,185.00
7.22.2.14	Ø 2" thickness minimum 3.81 mm	Ft	741.00	741.00	741.00	741.00
7.22.2.15	Ø 1.5" thickness minimum 3.81 mm	Ft	622.00	622.00	622.00	622.00
7.22.2.16	Ø 1.25" thickness minimum 3.56 mm	Ft	540.00	540.00	540.00	540.00
7.22.2.17	Ø 1" thickness minimum 3.3 mm	Ft	491.00	491.00	491.00	491.00

[Above pipe prices shall include prices of adequate quantities of pipe accessories, viz. pipe elbows, tees, reducers etc.]

7.22.3 uPVC PIPES

Supply, installation and testing of water grade uPVC pipes of the following sizes including supply and installation of PVC sockets, elbows, tees, traps, hangers, unions and all other consumable etc. complete in all respect. The work shall be complete as per instruction of Engineer-in-charge. and samples shall be approved by the Engineer-in-Charge.

7.22.3.1	Ø 4"	Ft	152.00	152.00	152.00	152.00
7.22.3.2	Ø 3"	Ft	98.00	98.00	98.00	98.00
7.22.3.3	Ø 2.5"	Ft	88.00	88.00	88.00	88.00

7.22.4 GALVANIZED IRON PIPES

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation and testing of GI pipes of the following sizes as per drawing including supply and installation of GI sockets, elbows, tees, traps, hangers, unions and all other consumable etc. complete in all respect. The work shall be complete as per instruction of Engineer-in-charge. and samples shall be approved by the Engineer-in-Charge.

7.22.4.1	Ø 24"	Ft	24,516.00	24,516.00	24,516.00	24,516.00
7.22.4.2	Ø 20"	Ft	20,676.00	20,676.00	20,676.00	20,676.00
7.22.4.3	Ø 18"	Ft	18,136.00	18,136.00	18,136.00	18,136.00
7.22.4.4	Ø 16"	Ft	15,633.00	15,633.00	15,633.00	15,633.00
7.22.4.5	Ø 14"	Ft	13,473.00	13,473.00	13,473.00	13,473.00
7.22.4.6	Ø 12"	Ft	11,041.00	11,041.00	11,041.00	11,041.00
7.22.4.7	Ø 10"	Ft	8,896.00	8,896.00	8,896.00	8,896.00
7.22.4.8	Ø 8"	Ft	6,546.00	6,546.00	6,546.00	6,546.00
7.22.4.9	Ø 6"	Ft	4,636.00	4,636.00	4,636.00	4,636.00
7.22.4.10	Ø 4"	Ft	3,430.00	3,430.00	3,430.00	3,430.00
7.22.4.11	Ø 3"	Ft	2,203.00	2,203.00	2,203.00	2,203.00
7.22.4.12	Ø 2.5"	Ft	1,701.00	1,701.00	1,701.00	1,701.00
7.22.4.13	Ø 2"	Ft	1,324.00	1,324.00	1,324.00	1,324.00
7.22.4.14	Ø 1.5"	Ft	1,060.00	1,060.00	1,060.00	1,060.00
7.22.4.15	Ø 1"	Ft	660.00	660.00	660.00	660.00
7.22.4.16	Ø 0.75"	Ft	487.00	487.00	487.00	487.00

7.22.5 STEEL PIPE UNION

Supply and installation of steel pipe union including supply of all materials and consumables.

7.22.5.1	Ø 4"	Each	2,448.00	2,448.00	2,448.00	2,448.00
7.22.5.2	Ø 3"	Each	1,657.00	1,657.00	1,657.00	1,657.00
7.22.5.3	Ø 2.5"	Each	1,534.00	1,534.00	1,534.00	1,534.00
7.22.5.4	Ø 2"	Each	982.00	982.00	982.00	982.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.22.5.5	Ø 1.5"	Each	614.00	614.00	614.00	614.00
7.22.5.6	Ø 1.25"	Each	491.00	491.00	491.00	491.00
7.22.5.7	Ø 1"	Each	307.00	307.00	307.00	307.00
7.22.5.8	Ø 0.75"	Each	245.00	245.00	245.00	245.00
7.22.6	U-TRAPS					
	Supply, installation and testing of U-traps in the condensate drain pipe of the FCUs including supply of all materials and consumables. The U-traps shall be made from PVC/ Galvanized iron/ copper material.					
7.22.6.1	Ø 2.5"	Each	442.00	442.00	442.00	442.00
7.22.6.2	Ø 2"	Each	368.00	368.00	368.00	368.00
7.22.6.3	Ø 1.5"	Each	221.00	221.00	221.00	221.00
7.22.6.4	Ø 1.25"	Each	147.00	147.00	147.00	147.00
7.22.6.5	Ø 1"	Each	118.00	118.00	118.00	118.00
7.22.6.6	Ø 0.75"	Each	74.00	74.00	74.00	74.00
7.23	PIPE INSULATION					
7.23.1	Pipe Insulation for Chilled Water Pipe:					
	Supply and installation of insulation on pipe surfaces as per drawing, technical specifications and instructions of Engineer-in-charge. Nitrile Rubber, Class O, Minimum 32 Kg/m ³ density. Insulation thickness minimum 50 mm.					
	Country of Manufacture: Malaysia/India					
7.23.1.1	Ø 24"	Ft	2,945.00	2,945.00	2,945.00	2,945.00
7.23.1.2	Ø 20"	Ft	2,454.00	2,454.00	2,454.00	2,454.00
7.23.1.3	Ø 18"	Ft	2,209.00	2,209.00	2,209.00	2,209.00
7.23.1.4	Ø 16"	Ft	1,963.00	1,963.00	1,963.00	1,963.00
7.23.1.5	Ø 14"	Ft	1,718.00	1,718.00	1,718.00	1,718.00
7.23.1.6	Ø 12"	Ft	1,472.00	1,472.00	1,472.00	1,472.00
7.23.1.7	Ø 10"	Ft	1,227.00	1,227.00	1,227.00	1,227.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.23.1.8	Ø 8"	Ft	982.00	982.00	982.00	982.00
7.23.1.9	Ø 6"	Ft	736.00	736.00	736.00	736.00
7.23.1.10	Ø 4"	Ft	491.00	491.00	491.00	491.00
7.23.1.11	Ø 3"	Ft	368.00	368.00	368.00	368.00
7.23.1.12	Ø 2"	Ft	245.00	245.00	245.00	245.00
7.23.1.13	Ø 1.5"	Ft	184.00	184.00	184.00	184.00

7.23.2 PIPE INSULATION (CONDENSATE DRAIN PIPING)

Supply and installation of insulation on pipe surfaces as per drawing, technical specifications and instructions of Engineer-in-charge.

The insulation shall be 0.75" thick close-cell cross-linked polyethylene/ elastomeric type and shall be complete with adhesive backed with peel-off paper.

7.23.2.1	Ø 4"	Ft	274.00	274.00	274.00	274.00
7.23.2.2	Ø 3"	Ft	215.00	215.00	215.00	215.00
7.23.2.3	Ø 2.5"	Ft	178.00	178.00	178.00	178.00
7.23.2.4	Ø 2"	Ft	125.00	125.00	125.00	125.00
7.23.2.5	Ø 1.5"	Ft	107.00	107.00	107.00	107.00
7.23.2.6	Ø 1"	Ft	88.00	88.00	88.00	88.00
7.23.2.7	Ø 0.75"	Ft	71.00	71.00	71.00	71.00

7.24 DUCT WITH ACCESSORIES

7.24.1 METAL DUCTING

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply, installation and testing of metal ducts of different sizes as per drawing and detail technical specification including supply of duct hanger/ isolator boxes, hanger rods, steel supports, all other materials and consumables. Duct materials and construction shall be complete as per detail specification and SMACNA standards. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.

7.24.1.1	Ducts made of 24 SWG GP Sheets	Sq.Ft	196.00	196.00	196.00	196.00
7.24.1.2	Ducts made of 22 SWG GP Sheets	Sq.Ft	221.00	221.00	221.00	221.00
7.24.1.3	Ducts made of 20 SWG GP Sheets	Sq.Ft	258.00	258.00	258.00	258.00
7.24.1.4	Ducts made of 18 SWG GP Sheets	Sq.Ft	307.00	307.00	307.00	307.00

7.24.2 FLEXIBLE ROUND DUCT

Country of Manufacture: Malaysia

7.24.2.1	Ø 16"	Ft	757.00	757.00	757.00	757.00
7.24.2.2	Ø 14"	Ft	729.00	729.00	729.00	729.00
7.24.2.3	Ø 12"	Ft	571.00	571.00	571.00	571.00
7.24.2.4	Ø 10"	Ft	437.00	437.00	437.00	437.00

7.24.3 ACOUSTIC LINING

Supply and installation of Acoustic Duct Liner inside the duct surface according to the drawing and detail technical specification including supply of all materials and consumables. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.

Country of Manufacture: Malaysia/India

7.24.3.1	1" thick Acoustic duct liner.	Ft	189.00	189.00	189.00	189.00
7.24.3.2	1/2" thick Acoustic duct liner.	Ft	91.00	91.00	91.00	91.00

7.24.4 SPLITTER DAMPER

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	Supply and installation of Splitter Damper as per drawing and detail technical specification including supply of all materials and consumables. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.	Each	736.00	736.00	736.00	736.00
7.24.5	MANUAL VOLUME CONTROL DAMPER Supply and installation of Opposed Blade type Manual Volume Control Damper as per technical specification including supply of all materials and consumables. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.	Each	1,796.00	1,796.00	1,796.00	1,796.00
7.24.6	FLEXIBLE DUCT JOINT/ CONNECTION Supply and installation of flexible ducts to make connection between equipments viz. FCU, AHU, FA-AHU, HRU-FA/AHU, EAF and Ducts as per drawing and detail technical specification including supply of all materials and consumables. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.	Each	1,841.00	1,841.00	1,841.00	1,841.00
7.24.7	FRESH/ EXHAUST AIR LOUVER Supply and installation of Fresh Air Louver constructed of extruded aluminium/ galvanized steel sheet, complete with bird/ rodent screen. The work shall be complete as per instruction of Engineer-in-charge. and sample shall be approved by the Engineer-in-Charge.	Each	2,270.00	2,270.00	2,270.00	2,270.00

7.25 **DUCT INSULATION**

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply and installation of insulation on the outside surface of metal ducts as per drawing and detail technical specification including supply of all materials and consumables. The work shall be complete as per instruction of Engineer-in-charge. and samples shall be approved by the Engineer-in-Charge.

The insulation shall be fire retardant Close cell Nitrile Rubber class O. It shall be adhesive backed with peel-off paper. The insulation shall have a maximum allowable 'K' value of 0.04 W/m°C, with Self Adhesive and Alu Foil Outside. Density: 50 kg/m³, Thermal conductivity: 0.0362W/m.k.

Country of Manufacture: Malaysia/China/India

7.25.1	Insulation shall be 0.75" thick	Sq.Ft	101.00	101.00	101.00	101.00
7.25.2	Insulation shall be 1.0" thick	Sq.Ft	133.00	133.00	133.00	133.00

7.26 Chilled Water Thermostat for FCU

7.26.1 Network Type Thermostat for Chilled Water FCU (BMS)

Supply, installation, testing and commissioning of modulating type (BMS facilitating) with communication system. Three multifunctioning input.. Display of current room temperature on set point is °C. (Network type) brand- SIEMENS, Oventrop, Honeywell, Belimo or equivalent.as per sample accepted /approved by the Engineer-in-charge.

Each

25,768.00	25,768.00	25,768.00	25,768.00
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Country of Origin, Manufacture: USA/UK/EU/CANADA

7.26.2 Digital Room Thermostat for Room Chilled Water FCU

Supply of The thermostat shall Control 2 way chilled water valve, 3 speed fan switch, space temperature indication, space temperature set point adjustment, as Wired Controller With some IR Remote, transformer etc.

Each

9,203.00	9,203.00	9,203.00	9,203.00
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Country of Origin, Manufacture: Malaysia/Thailand

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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7.27 **HEPA FILTER**7.27.1 **Price With holding frame / Housing -For each Grade****Gel sealed mini pleat pleat H14 grade HEPA filter**

Supply & installation of GEL SEAL TYPE MINI PLEAT HEPA Filter of 0.3micron filtration @ Class H-14

Filter MPPS efficiency : 99.995 % / PAO efficiency : 99.999 % as per EN1822.

Filter Construction:

Media: Micro Glass Fiber media

Separators: Thermoplastic separators with cold resin bond

Frame: Anodised Aluminium extrusion Box cell with silicon gel from inside at periphery for sealing with hosing. (Silicon Gel shall be White colour and Food graded type)

Faceguard : Expanded metal, powder coated white (RAL 9010) on both sides of filter.

Initial Pressure Drop: 25mm of Wg.

HEPA Housing box for Gel sealed mini pleat HEPA filter

Supply, installation & commisioning of Housing Box for following sizes of Gel type HEPA filter assembly.

Housing BOX Construction:

BOX Construction: Minimum 2.2mm thick of extruded Aluminium anodised construction with knife edges at periphery for sealing the filter.

Filter loading : Bottom side (From Inside the room)

Ports: each housing shall have PAO charging port, upstream/downstream concentration port and Differential Pressure port.

Supply Air entry : TOP entry

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Damper construction: Low leakage type extruded Aluminium constructed Damper at top of BOX.

Damper Operation: Top operated from service floor

BOX Housing Fixing : 8 Nos Clits required with fastner to fixed on Walkable Flase Ceiling.

Perforated sheet : 18G S.S 304 sheet with SS chain, perforation shall be Capsule type and not less than 70% of perforation area.

Accessories: After loading filter from bottom Aluminium patti required to hold filter.

Country of Origin, Manufacture: China

7.27.1.1	610 MM x 610 MM x 117 MM - 550 CFM @ IPD of 25mm of WC	Each	111,661.00	111,595.00	111,345.00	111,345.00
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7.27.1.2	450 MM x 450 MM x 117 MM - 300 CFM @ IPD of 25mm of WC	Each	93,256.00	93,189.00	92,939.00	92,939.00
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7.27.2 Price Without holding frame/ Housing- For each Grade

7.27.2.1	610 MM x 610 MM x 117 MM - 550 CFM @ IPD of 25mm of WC	Each	40,493.00	40,493.00	40,493.00	40,493.00
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7.27.2.2	450 MM x 450 MM x 117 MM - 300 CFM @ IPD of 25mm of WC	Each	35,584.00	35,584.00	35,584.00	35,584.00
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7.28 ULPA FILTER

7.28.1 Price With holding frame / Housing -For each Grade

Gel sealed mini pleat pleat U17 grade ULPA filter

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Supply & installation of GEL SEAL TYPE MINI PLEAT ULPA Filter of 0.3micron filtration @ Class H-14
Filter MPPS efficiency : 99.9995 % / PAO efficiency : 99.999 % as per EN1822.

Filter Construction:

Media: Micro Glass Fiber media

Separators: Thermoplastic separators with cold resin bond

Frame: Anodised Aluminium extrusion Box cell with silicon gel from inside at periphery for sealing with hosing. (Silicon Gel shall be White colour and Food graded type)

Faceguard : Expanded metal, powder coated white (RAL 9010) on both sides of filter.

Initial Pressure Drop: 27mm of Wg.

ULPA Housing box for Gel sealed mini pleat ULPA filter

Supply, installation & commisioning of Housing Box for following sizes of Gel type ULPA filter assembly.

Housing BOX Construction:

BOX Construction: Minmum 2.2mm thick of extruded Aluminium anodised construction with knife edges at periphery for sealing the filter.

Filter loading : Bottom side (From Inside the room)

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Ports: each housing shall have PAO charging port, upstream/downstream concentration port and Differential Pressure port.

Supply Air entry : TOP entry

Damper construction: Low leakage type extruded Aluminium constructed Damper at top of BOX.

Damper Operation: Top operated from service floor

BOX Housing Fixing : 8 Nos Clits required with fastener to fixed on Walkable False Ceiling.

Perforated sheet : 18G S.S 304 sheet with SS chain, perforation shall be Capsule type and not less than 70% of perforation area.

Accessories: After loading filter from bottom Aluminium patti required to hold filter.

Country of Origin, Manufacture: China

7.28.1.1	610 MM x 610 MM x 100 MM - 550 CFM @ IPD of 27mm of WC	Each	128,840.00	128,840.00	128,840.00	128,840.00
7.28.1.2	450 MM x 450 MM x 100 MM - 300 CFM @ IPD of 27mm of WC	Each	110,434.00	110,434.00	110,434.00	110,434.00
7.28.2	Price Without holding frame/ Housing- For each Grade					
7.28.2.1	610 MM x 610 MM x 100 MM - 550 CFM @ IPD of 27mm of WC	Each	55,217.00	55,217.00	55,217.00	55,217.00
7.28.2.2	450 MM x 450 MM x 100 MM - 300 CFM @ IPD of 27mm of WC	Each	49,082.00	49,082.00	49,082.00	49,082.00

7.29 OPERATION AND MAINTANANCE OF CENTRAL AIR- CONDITIONING SYSTEM

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
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Thorough maintenance, servicing, operation and minor repairing including necessary replacement of defective minor spare parts (departmentally supplied) if any, as per detailed daily, weekly, monthly, half yearly and yearly as per following work schedule for smooth functioning of the following capacity air-conditioning & ventilation system as per standard Engineer-in-charge. practice and maintenance manual of the manufacturer and direction of the Engineer-in-charge.

7.29.1	Up to 150 RT AC system (In a single plant house)	Per Month	92,029.00	92,029.00	92,029.00	92,029.00
7.29.2	151 - 300 RT AC system (In a single plant house)	Per Month	184,057.00	184,057.00	184,057.00	184,057.00
7.29.3	301 - 450 RT AC system (In a single plant house)	Per Month	247,231.00	247,231.00	247,231.00	247,231.00
7.29.4	451 - 1000 RT AC system (In a single plant house)	Per Month	306,762.00	306,762.00	306,762.00	306,762.00
7.29.5	1001 - 1500 RT AC system (In a single plant house)	Per Month	380,385.00	380,385.00	380,385.00	380,385.00
7.29.6	1501 - 2500 RT AC system (In a single plant house)	Per Month	466,278.00	466,278.00	466,278.00	466,278.00

Note:-

For daily, weekly, monthly, quarterly & annual maintenance follow " Book of Specification and Code of Practice (Public Works Department)" (Page: 407 - 409).

7.30**AIR COOLER REPAIRING**

7.30.1

Replacement of the existing damaged / burnt out / unserviceable compressor by new compressor of following capacity with over load and all other standard safety control suitable for 220 / 240 volt, 50 Hz. single phase as per sample accepted / approved by the Engineer-in-charge.

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.30.1.1	With reciprocating hermetically sealed type compressor					
7.30.1.1.1	12000-13800 BTU/HR	Each	22,087.00	22,087.00	22,087.00	22,087.00
7.30.1.1.2	18000-21000 BTU/HR	Each	23,907.00	23,907.00	23,907.00	23,907.00
7.30.1.1.3	23700-25000 BTU/HR	Each	26,042.00	26,042.00	26,042.00	26,042.00
7.30.1.2	With rotary compressor					
7.30.1.2.1	12000-13800 BTU/HR	Each	19,633.00	19,633.00	19,633.00	19,633.00
7.30.1.2.2	18000-21000 BTU/HR	Each	26,611.00	26,611.00	26,611.00	26,611.00
7.30.1.2.3	23700-25000 BTU/HR	Each	27,607.00	27,607.00	27,607.00	27,607.00
7.30.2	Replacement of the existing damaged / burnt out / unserviceable compressor by new compressor (reciprocating hermetically sealed type) of following capacity with over load and all other standard safety control suitable for 400 / 415 volt, 50 Hz. three phase as per sample approved by the Engineer-in-charge.					
7.30.2.1	35500-38500 BTU/HR	Each	49,266.00	49,266.00	49,266.00	49,266.00
7.30.2.2	39000-48000 BTU/HR	Each	57,700.00	57,700.00	57,700.00	57,700.00
7.30.2.3	60000-61500 BTU/HR	Each	65,054.00	65,054.00	65,054.00	65,054.00
7.30.2.4	78000 BTU/HR	Each	77,272.00	77,272.00	77,272.00	77,272.00
7.30.2.5	96000 BTU/HR	Each	116,570.00	116,570.00	116,570.00	116,570.00
7.30.2.6	120000 BTU/HR	Each	153,381.00	153,381.00	153,381.00	153,381.00
7.30.3	Servicing of air-cooler machine of following capacity by skilled technician with high pressure blower air sodium hydro-oxide solution including cleaning, greasing etc. complete with dismantling the same including both way carrying and re-fixing / testing commissioning etc.					
7.30.3.1	18000 - 24000 BTU/HR window type air-cooler	Each	809.00	809.00	809.00	809.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.30.3.2	36000 - 48000 BTU/HR split type air-cooler	Each	1,400.00	1,400.00	1,400.00	1,400.00
7.30.3.3	60000 BTU/HR and above split type air-cooler	Each	1,830.00	1,830.00	1,830.00	1,830.00
7.30.4	Replacement of existing damaged / unserviceable magnetic switch for fan motor, 380-415 volt, 50 Hz. by new one by S & F all necessary accessories as required.	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.30.5	Labour charge for refrigerant charging after repair of leakage (if required) including de-hydrating & purging etc. complete with testing commissioning by skilled technician as per direction of Engineer-in-charge.					
7.30.5.1	Up to 2 ton	Each	590.00	590.00	590.00	590.00
7.30.5.2	Above 2 ton	Each	1,255.00	1,255.00	1,255.00	1,255.00
7.30.6	Replacing the existing damaged / out of order potential relay / contact relay 220V, 50 Hz. single phase by new one as per sample accepted / approved by the Engineer-in-charge. in Charge.	Each	812.00	812.00	812.00	812.00
7.30.7	Replacing the existing damaged / unserviceable over load protector for refrigerator 220V, 50Hz. by new one for safety control of compressor.(made in JAPAN / USA / EU).	Each	517.00	517.00	517.00	517.00
7.30.8	Replacing the existing damaged / unserviceable compressor oil as required.	Per Litre	871.00	871.00	871.00	871.00
7.30.9	Replacing the existing damaged / unserviceable selector switch 220/240V, 50 Hz. single phase by new one as per sample accepted approved by the Engineer-in-charge.	Each	1,255.00	1,255.00	1,255.00	1,255.00

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.30.10	Replacing the existing damaged/unserviceable thermostat control switch for room air-cooler machine 220/240V, 50 Hz. single phase by new one as per sample accepted / approved by the Engineer-in-charge.	Each	798.00	798.00	798.00	798.00
7.30.11	Replacing the existing damaged / unserviceable strainer of air-cooler by new one & as per sample accepted / approved by the Engineer-in-charge.	Each	266.00	266.00	266.00	266.00
7.30.12	Replacing the existing damaged / unserviceable 35 MFD capacitor of room air-cooler by new one.	Each	675.00	675.00	675.00	675.00
7.30.13	Replacing the existing damaged/unserviceable 45 MFD capacitor of room air-cooler by new one.	Each	768.00	768.00	768.00	768.00
7.30.14	Rewinding of the existing damaged / unserviceable blower-fan motor of room air-cooler by required sizes super enameled copper wire in/c varnishing, heating, testing etc.	Each	2,952.00	2,952.00	2,952.00	2,952.00
7.30.15	Making bush made of gun-metal in/c cutting and finishing as per existing sample by lathe machine etc. complete as required.	Each	664.00	664.00	664.00	664.00
7.31	SPARE PARTS OF AIR-COOLER (same brand as the main product and accepted / approved by the Engineer-in-charge.)					
7.31.1	R-500 refrigerant	Kg	1,497.00	1,497.00	1,497.00	1,497.00
7.31.2	R-22 refrigeration	Kg	798.00	798.00	798.00	798.00
7.31.3	R-407/410a refrigeration	Kg	988.00	988.00	988.00	988.00
7.31.4	R-134a refrigeration	Kg	923.00	923.00	923.00	923.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.31.5	R-470/32 refrigeration	Kg	1,227.00	1,227.00	1,227.00	1,227.00
7.31.6	Selector switch (window A/C)	Each	982.00	982.00	982.00	982.00
7.31.7	Thermostat switch (window A/C)	Each	736.00	736.00	736.00	736.00
7.31.8	Potential switch refrigeration	Each	614.00	614.00	614.00	614.00
7.31.9	A/C over load protector	Each	368.00	368.00	368.00	368.00
7.31.10	Strainer AC	Each	123.00	123.00	123.00	123.00
7.31.11	25-35 MFD capacitor	Each	429.00	429.00	429.00	429.00
7.31.12	40-50 MFD capacitor	Each	491.00	491.00	491.00	491.00
7.31.13	3.5-5 MFD Capacitor	Each	184.00	184.00	184.00	184.00
7.31.14	Moving motor for window AC	Each	1,227.00	1,227.00	1,227.00	1,227.00
7.31.15	Moving motor for split type AC	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.31.16	Fan blade for window AC	Each	3,068.00	3,068.00	3,068.00	3,068.00
7.31.17	Fan blade for split AC outdoor	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.31.18	Split AC indoor runner outdoor	Each	4,908.00	4,908.00	4,908.00	4,908.00
7.31.19	Window AC fan motor	Each	4,908.00	4,908.00	4,908.00	4,908.00
7.31.20	Split AC fan motor	Each	4,295.00	4,295.00	4,295.00	4,295.00
7.31.21	Window AC blower runner	Each	2,454.00	2,454.00	2,454.00	2,454.00
7.31.22	Window AC front cover	Each	4,908.00	4,908.00	4,908.00	4,908.00
7.31.23	Split AC PC board	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.31.24	Split AC casadrayer	Each	2,454.00	2,454.00	2,454.00	2,454.00
7.31.25	Window AC selector / thermostat nob.	Each	307.00	307.00	307.00	307.00
7.31.26	Magnetic contactor 380-440V (45-60A)	Each	1,841.00	1,841.00	1,841.00	1,841.00
7.31.27	Magnetic contactor 220-240V 50Hz.	Each	1,472.00	1,472.00	1,472.00	1,472.00
7.31.28	Split A/C electric connector (32A)	Each	307.00	307.00	307.00	307.00
7.31.29	Window AC cooling / heating condenser	Each	4,785.00	4,785.00	4,785.00	4,785.00

7.32 COPPER TUBE INSULATION

Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
	(Without profit, overhead expenses and VAT)					
7.32.1	1/4", 3/8", 1/2" dia copper tube insulation	Meter	123.00	123.00	123.00	123.00
7.32.2	5/8", 1" dia copper tube insulation	Meter	147.00	147.00	147.00	147.00
7.33	COMPRESSOR OIL					
	(Without profit, overhead expenses and VAT)					
7.33.1	Compressor oil for window A/C compressor	Per Litre	982.00	982.00	982.00	982.00
7.33.2	Compressor oil for central A/C	Per Litre	3,068.00	3,068.00	3,068.00	3,068.00
7.34	REMOTE CONTROL (General or equivalent)					
	(Without profit, overhead expenses and VAT)					
7.34.1	For split type AC	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.34.2	For window type AC	Each	3,681.00	3,681.00	3,681.00	3,681.00
7.35	CHEMICAL FOR CENTRAL AC					
	(Without profit, overhead expenses and VAT)					
7.35.1	NALCO 7311 liquid	Per Kg	1,104.00	1,104.00	1,104.00	1,104.00
7.35.2	NALCO 7330 liquid	Per Kg	1,258.00	1,258.00	1,258.00	1,258.00
7.35.3	NALCO 90 liquid	Per Kg	957.00	957.00	957.00	957.00
7.35.4	K-11 liquid	Per Kg	761.00	761.00	761.00	761.00
7.35.5	B-21 liquid	Per Kg	736.00	736.00	736.00	736.00
7.35.6	K-16 liquid	Per Kg	712.00	712.00	712.00	712.00
7.36	DISMANTLING, RE-LOCATION AND RE-INSTALLATION OF AC					
	(Without Pipe)					
7.36.1	Window Type	Per Job	3,681.00	3,615.00	3,365.00	3,365.00

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Item No.	Description of Items	Unit	Unit Rate in Dhaka & Mymensingh Zone (Tk)	Unit Rate in Chattogram & Sylhet Zone (Tk)	Unit Rate in Khulna, Barishal & Gopalganj (Tk)	Unit Rate in Rajshahi & Rangpur (Tk)
7.36.2	Split Type 12000 BTU/hr	Per Job	8,589.00	8,435.00	7,851.00	7,851.00
7.36.3	Split Type 18000-30000 BTU/hr	Per Job	9,816.00	9,640.00	8,972.00	8,972.00
7.36.4	Split Type Above 30000 BTU/hr /Single Package/Split Ducted Type	Per Job	14,725.00	14,460.00	13,458.00	13,458.00

THUMB RULE FOR AIR CONDITIONING LOAD CALCULATION

The average air-conditioning load (for places other than auditorium, cinema halls, conference Hall etc.

(b) Can be estimated on the basis of floor area: i.e. 1 Refrigeration Ton for 150 sq. feet area, but it may vary for different design condition. This thumb rule is applicable for spaces with insulated roof or intermediate floors with occupancy = 6sq. Meter per person, power & lighting level = 20 watts per sq. meter and external glazing area of 15% of floor area (For 10 feet height).

(c) For auditorium, cinema halls or large public places, the thumb rule is to use 1 RT for 5 persons or 1 RT per 11 sqm of floor area having standard height of 12 feet.

Note:

i) Due to location of the room & partition wall, location of the window towards the direction of the sunlight, incase of glass wall above thumb rule may vary case to case.

ii) A/C with HEPA/ULPA filter shall be used in OT, ICU, CCU and recovery rooms of a Hospital.

iii) Adequate positive Air flow as per BNBC shall be maintained in OT, ICU, CCU and Recovery Rooms of a Hospital. Incase of COVID-19 ward/OT/ICU/CCU, follow WHO guidelines.

REFRIGERATION & AIR CONDITIONING UNITS

1 Btu = 778 ft-lb = 1054.8 joules = 252 Calories = 0.252 K cal

1 Horsepower = 33000 ft-lb/min = 746 watts = 2545.6 BTU/HR

1 ton of Refrigeration (1 RT) 12000 BTU/HR

1 ft/Sec = 0.305 m/Sec

1 m/Sec = 3.28 ft/Sec

1 cu ft/min (CFM) = 7481 gal (us)/min = 28.32 litres/min

Internationally accepted norms for comfortable airconditioning are as follows:

Temperature : $24 \pm 1^\circ\text{C}$

Relative humidity : Less than 50%

Air flow : 50m/minute

Direction of air flow : From top or from front.

Fresh air requirement : in no case the outdoor air quantity shall be lower than 2.5 l/s per person.

Dust, fume, smoke, odour and bacteria

Control should be incorporated

Table 7.1 Inside Design Condition of Some Application for Summer

SI. No	Use Category of Space	Indoor Design Conditions	
		Dry Bulb Temperature	Relative Humidity (%)
1	Restaurants, Cafeteria and Dining Hall	23~26	55~60
2	Kitchens	28~31	---
3	Office buildings	23~26	55~60
4	Bank/Insurance/ Commercial building	23~26	45~55
5	Departmental stores	23~26	50~60
6	Hotel guest rooms	23~26	50~60
7	Ball room/ meeting room	23~26	50~60
8	Class rooms	23~26	50~60
9	Auditoriums	23~26	50~60
10	Recovery rooms	24~26	45~55
11	Patient rooms	24~26	45~55
12	Operation theatres	17~27	45~55

13	Delivery room	20~23	45~55
14	ICU/CCU	20~23	30~60
15	New born Intensive care	22.5~25.5	30~60
16	Treatment room	23~25	30~60
17	Trauma room	17~27	45~55
18	Endoscopy/Bronchoscopy	20~23	30~60
19	X-ray (diagnostic & treatment)	25.5~27	40~50
20	X- ray (surgery/critical area and catherization)	21~24	30~60
21	Laboratory (diagnostics)	22.5~24.5	30~60
22	Art Galleries/ Museums	17~22	40~55
23	Libraries	20~22	45~55
24	Radio studio/Television rooms	23~26	45~55
25	Telephone terminal rooms	22~26	40~50
26	Airport terminal/bus terminal	23~26	50~60

Table 7.2: Outside Design Conditions for Different Stations

Station	Cooling DB/MWB						Evaporation, WB/MDB						Range of DB
	0.40%		1%		2%		0.40%		1%		2%		
	DB	MWB	DB	MWB	DB	MWB	DB	MWB	DB	MWB	DB	MWB	
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>
Barisal	35.5	28.5	34.5	28.5	34.0	28.0	30.0	33.0	29.5	33.0	29.0	32.0	5.0
Bogra	36.5	28.5	35.5	28.5	34.5	28.0	31.5	33.5	30.0	33.0	29.0	33.0	5.5
Chandpur	35.5	28.5	34.5	28.5	34.0	28.0	29.5	33.0	29.5	33.0	29.0	32.5	5.0
Chittagong	34.0	28.5	33.5	28.5	33.0	28.0	29.5	32.5	29.0	32.5	28.5	32.0	4.5
Comilla	35.0	27.5	34.5	27.5	34.0	27.5	29.0	33.0	28.5	32.5	28.0	32.0	5.5
Cox'Bazar	34.0	27.5	33.5	27.5	33.0	27.5	29.0	31.0	29.0	30.0	29.0	30.0	5.0
Dhaka	35.55	27.5	35.0	27.0	34.5	27.0	29.0	33.0	28.5	29.0	28.5	29.0	5.0
Dinajpur	36.0	28.5	35.0	28.0	34.5	28.0	30.0	32.5	29.0	33.0	29.0	33.0	5.5
Faridpur	36.5	28.5	35.5	28.0	34.5	28.0	29.5	33.0	29.0	33.0	29.0	33.0	5.0
Ishurdi	37.5	27.0	36.5	27.0	35.5	28.0	30.0	34.5	29.0	33.5	29.0	33.5	6.0
Jessore	38.0	28.5	37.0	28.5	36.0	28.0	30.0	35.0	30.0	35.0	29.5	34.0	6.5
Kulna	36.5	29.0	36.0	28.0	35.5	28.0	30.0	34.0	30.0	34.0	29.5	33.5	5.0
Mongla	37.0	31.0	36.0	30.5	35.0	30.0	33.0	34.0	32.5	34.0	32.0	33.5	5.0
Mymensingh	35.0	28.0	34.0	28.0	33.5	27.5	29.5	33.0	29.0	32.5	28.5	32.0	4.5
Patuakhali	35.5	28.5	35.0	28.5	34.5	28.5	30.0	33.0	30.0	33.0	29.5	32.5	5.0
Rajshahi	35.5	29.0	34.5	28.5	34.0	29.0	31.5	33.0	31.0	32.5	30.0	31.5	5.0
Rangamati	35.5	26.0	34.5	27.0	34.0	27.5	28.5	33.5	28.0	32.5	28.0	32.5	6.0
Rangpur	35.5	28.5	34.5	28.0	34.0	28.0	29.5	30.5	29.5	30.0	29.5	30.0	5.0
Sylhet	35.5	27.0	34.5	27.0	34.0	26.5	28.5	32.5	28.0	32.5	28.0	32.5	5.5
Tangail	36.0	27.5	35.5	27.5	34.5	27.5	29.0	33.5	28.5	33.0	28.5	33.0	5.5

Handwritten signatures and initials are present below the table, including names like "Rajshahi", "Rangamati", "Rangpur", "Sylhet", and "Tangail".

Table 7.3: Minimum Performance of Air Conditioner and Chillers

Equipment Class and Size Category	Minimum COP	Minimum IPLV	Test Standard
Unitary air cooled air conditioner			
>19 and <40 kW (>5.4 and <11 tons)	3.08		ARI 210/240
>40 and <70 kW (>11 to <20 tons)	3.08		ARI 340/360
>70 kW (>20 tons)	2.93	2.99	ARI 340/360
Unitary water cooled air conditioner			
<19 kW (<5.4 tons)	4.1		ARI 210/240
>19 and <40 kW (>5.4 and <11 tons)	4.1		ARI 210/240
>40 kW (>11 tons)	3.22	3.02	ARI 210/240
Air Cooled Chiller, electrically operated			
<530 kW (<150 tons)	2.9	3.16	ARI 550/590
>530kW (>150 tons)	3.05	3.32	ARI 550/590
Centrifugal water Cooled Chiller, electrically operated			
<530 kW (<150 tons)	5.8	6.09	ARI 550/590
>530 and <1050 kW (>150 and <300 tons)	5.8	6.17	ARI 550/590
>=1050 kW (>300 tons)	6.3	6.61	ARI 550/590
Reciprocating compressor, water cooled chiller, electrically operated			
All Capacities	4.2	5.05	ARI 550/590
Rotary screw and scroll compressor, water cooled chiller, electrically operated			
<530 kW (<150 tons)	4.7	5.49	ARI 550/590
>530 and <1050 kW (>150 and <300 tons)	5.4	6.17	ARI 550/590
>=1050 kW (>300 tons)	5.75	6.43	ARI 550/590

TERMS AND CONDITIONS OF CHILLER TYPE AIR-CONDITIONING SYSTEM (Part and parcel of tender document)

- 1 The bidder shall submit the technical proposal of CHILLER TYPE AIR-CONDITIONING items with sealed & signed by manufacturing company on their Letterhead pad and main catalogue (marked) including mentioning brand, model & country of origin of the proposed items like Chiller, Cooling Tower, AHU, FCU, Pump etc.
- 2 The bidder shall submit a certificate issued by manufacturing Company stating the time span of Chiller manufacturing experience of the manufacturer. The certificate must be authenticated by chamber of commerce/Ministry of Commerce/Ministry of foreign Affairs of Chiller manufacturing Company. The bidder shall submit the detail address of the factory, telephone no., website address, e-mail address and company profile of the lift manufacturing company.
- 3 The proposed HVAC manufacturing company shall have their own testing facilities and R&D (Research and development) wing/centre, related document to be submitted with tender.

- 4 The bidder shall submit a certificate by manufacturing company stating that minimum 500 Nos. of the proposed brand of CHILLER have been used in minimum 10 (ten) countries of the world including the manufacturing country for equal to or more than ten years. The certificate must be authenticated by Chamber of Commerce/ Ministry of Commerce/ Ministry of Foreign Affairs of the Chiller manufacturing company.
- 5 The bidder shall submit AHRI/ Eurovent Certificate of the proposed brand (not older than 5 years), ISO certificates for management, occupational health and safety standard certificates, Environmental safety certificates obtained by Chiller manufacturer shall be submitted by Tenderer.
- 6 Each bidder must be the Sole agent /Representative / Distributor of the proposed brand Chiller in the tender and the bidder must submit its all valid supporting documents issued by original manufacturing company. Manufacturer's certificate stating that the bidder has sufficient trained and experienced manpower to install, testing and commissioning of the CHILLER TYPE AIR-CONDITIONING SYSTEM as per ANSI/ASHRAE/IES Standard 90.1 standard, relevant code and conformities.
- 7 The bidder shall have B, C class contractor license provided by the electric licensing board. After completion of the work, the bidder and the manufacturing company shall provide the certification about installation, testing and commissioning of the Chiller System and as built drawing of total Chiller System.
- 8 The bidder shall give the assurance from the manufacturing company to supply of spare parts of Chiller for minimum 20 years and this assurance must be authenticated by the Chamber of Commerce/ Ministry of Commerce/ Ministry of foreign affairs of the concerned manufacturing company.
- 9 The block diagram & automation system of the complete Chiller system of the proposed project including all control system, power components, on manufacturer's letterhead pad must be submitted with the contract.
- 10 The bidder shall submit a work program to complete the HVAC equipment supply and installation, testing and commissioning work and a statement that before opening LC, they shall get selection of HVAC items from Procuring entity prior to manufacturing.
- 11 The successful bidder must submit the detail packing list with sealed and signed by the Chiller, Cooling Tower, AHU, FCU, Pump etc. manufacturing company to the concerned Executive Engineer minimum 15 days before shipment and HVAC equipment shall be listed packet wise in detail. That packing list must comply the items described in the agreement and as per selection. The manufacturing company must certify that all parts/items are supplied in the packing list. The name of the project and LC no. shall be marked clearly in the packets. Equipment of one contract cannot be packetized together with other equipment/ other contracts.

- 12 Before shipment, Factory Acceptance Test (performance test of safety devices of Chiller and Quality assurance tests of the products as per standards) shall have to be carried out by the manufacturer in presence of nominated engineers of PWD at the Chiller manufacturing factory premises. One engineer will be nominated for one Chiller (having plant Cooling Capacity: 100 TR Minimum) and One engineer will be nominated for one Cooling tower (having plant Cooling Capacity: 300 TR Minimum) and. For two Chiller in a single tender minimum one engineer will accomplish this inspection and testing. For more than two Chillers in a single tender, the number of nominated engineers will be increased by one per two Chillers. All cost related to engineers' travel, food, accommodation, etc. will be borne by awarded organization/Manufacturer. The expenditure for this will be incorporated by the bidder at the time of participation. For special reasons if inspection is not performed by the engineers of the PWD, taking prior approval of the procuring entity quality assurance tests will be carried out by Internationally accepted inspection agencies (home and abroad).
- 13 Post landing inspection for imported Chiller, Cooling Tower, AHU, FCU, Pump(s) shall be done by representatives of Procuring Entity according to the packing list and the expenditure for it will be carried out by Contractor/ Supplier. After post landing inspection from the port, the imported equipment shall be reached directly to the project site according to the condition of the contract.
- 14 The bidder shall certify that all given certificates/ documents/ drawings are complete and correct. If any error is found, the contract will be cancelled and the bidder will be disqualified from future participation of any contract.

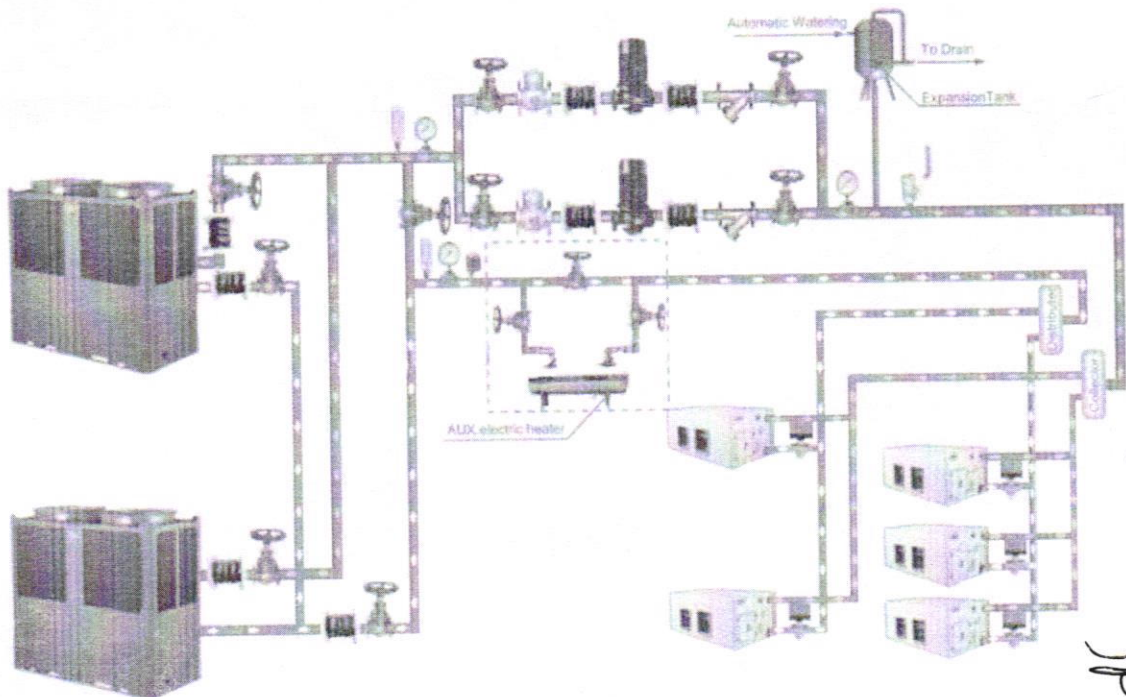


Figure 7.1: Typical diagram of Air Cooled chiller air conditioning systems

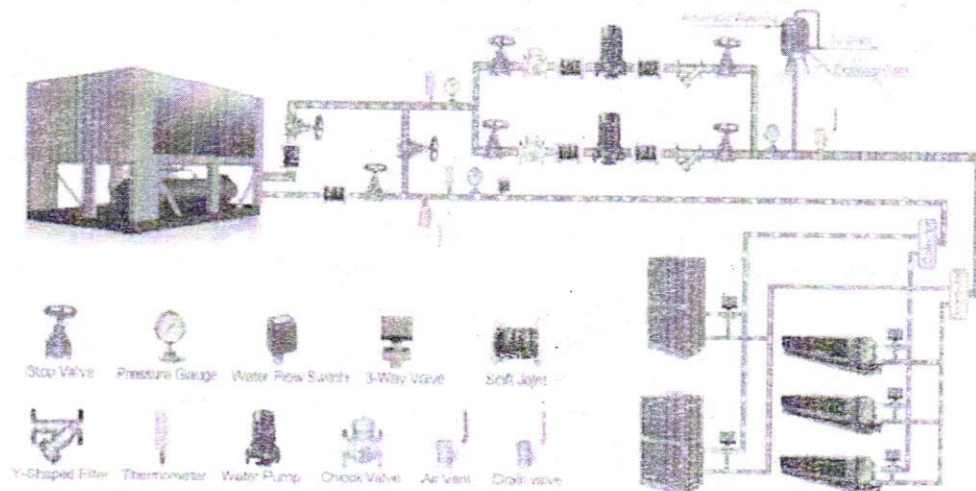


Figure 7.2: Different components of Central Air Conditioning systems

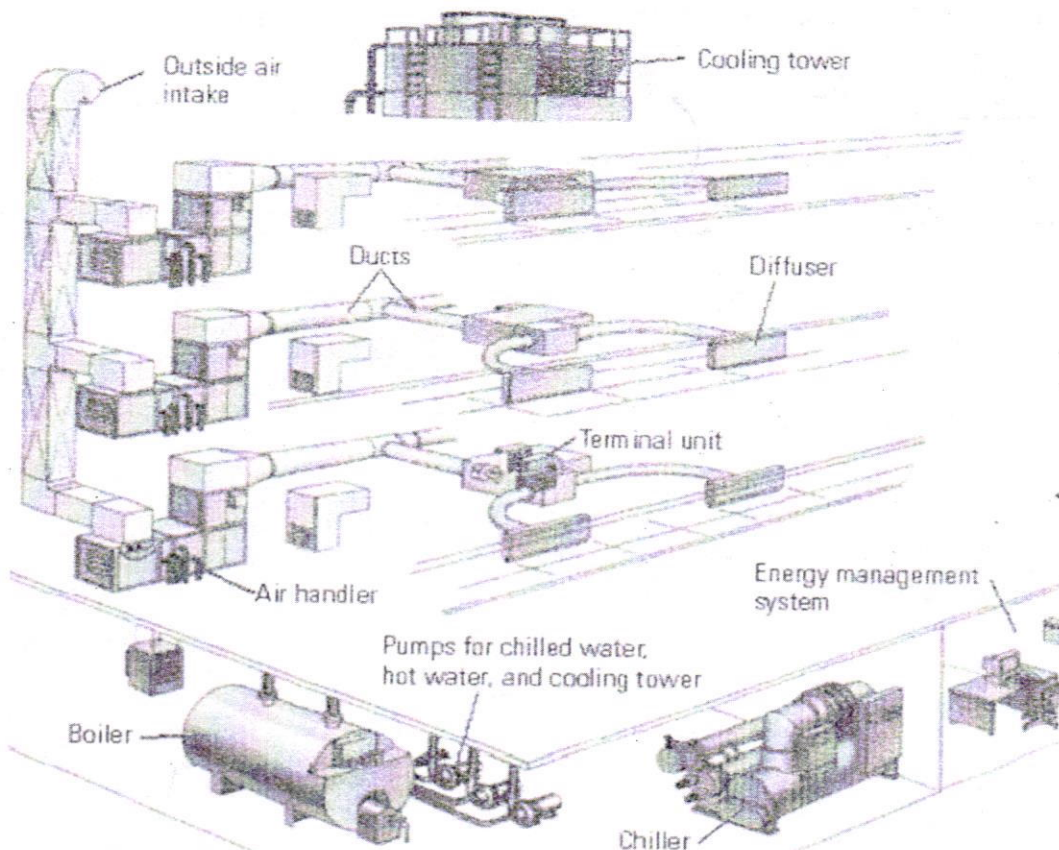


Figure 7.3: Typical diagram of Water Cooled chiller air conditioning systems

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