

AVIATION COMPLEX AT BLUE AREA, ISLAMABAD

BILL NO. 5: HEATING VENTILATION & AIR CONDITIONING (HVAC) WORKS

BILL OF QUANTITIES

Item No.	Item Description	Unit	Qty	Unit Rate (Rs.)	Total Amount (Rs.)
(i)	(ii)	(iii)	(iv)	(v)	(vi)
HVAC Works					
Ref Specs: HVAC-SP, 9000					
HVAC-01	Supply, installation, testing & commissioning of Variable Speed/Frequency Drive Water Cooled Centrifugal Electric Type Chiller (CH) including performance testing at manufacturer's production facility, transportation, insurance, unloading, storage, lifting, placing, fixing at foundations, insulation complete in all respects as per specifications and drawings with all taxes and duties.				
a) CH-1		Each	4		
b) Essential Spare Parts for Chillers		Lot	1		
HVAC-02	Supply, installation, testing & commissioning of Dual Fuel Direct Fired Hot Water Generator (HWG) including including preshipment inspection at manufacturer's production facility, transportation, insurance, unloading, storage, lifting, placing at foundations, insulation complete in all respects as per specifications and drawings with all taxes and duties.				
a) HWG-1		Each	2		
b) Essential Spare Parts for Hot Water Generators		Lot	1		
HVAC-03	Supply, installation, testing & commissioning of Packaged Type Cross Flow Induced Draft Top Air Discharge Cooling Towers (CT) including preshipment inspection at manufacturer's production facility, transportation, insurance, unloading, storage, lifting, placing at foundation including all taxes and duties.				
a) CT-1		Each	4		
b) Essential Spare Parts for Cooling Towers		Lot	1		
HVAC-04	Supply, installation, testing & commissioning of Air Handling Units (AHU) with variable frequency/speed drives including preshipment inspection at manufacturer's production facility, transportation, insurance, un-loading, storage, lifting, placing at foundations complete in all respects as per specifications and drawings with all taxes and duties.				
a) AHU-1		Each	81		
b) AHU-2		Each	16		
c) AHU-3		Each	1		
d) AHU-4		Each	1		
e) Essential Spare Parts for Air Handling Units		Lot	1		
HVAC-05	Supply, installation, testing & commissioning of Fan Coil Units (FCU) thermostatic controllers etc. including preshipment inspection at manufacturer's production facility, transportation, insurance, un-loading, storage, lifting, hanging and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
a) FCU-1		Each	80		
b) FCU-2		Each	20		
c) FCU-3		Each	8		
d) FCU-4		Each	21		
e) FCU-5		Each	22		
f) FCU-6		Each	38		
g) FCU-7		Each	11		

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	h) FCU-8	Each	14		
	i) FCU-9	Each	17		
	j) FCU-10	Each	14		
	k) Essential Spare Parts for Fan Coil Units	Lot	1		
HVAC-06	Supply, installation, testing & commissioning of Chemical Feeders and Chemicals including transportation, un-loading and storage complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Chemical Feeder for Chilled & Hot Water System	Each	1		
	b) Chemical Dozing Pump & Storage Tank for Condenser Water System	Each	1		
	c) Chemicals for Condenser Water System & Cooling Towers	Lot	1		
	d) Chemicals for Chilled & Hot Water System	Lot	1		
HVAC-07	Supply, installation, testing & commissioning of Expansion Tank (ET) including unloading, transportation, insurance, storage, lifting, hanging, and insulation at the location complete in all respects as per specifications and drawings with all taxes and duties.				
	a) ET-01	Each	1		
HVAC-08	Supply, installation, testing & commissioning of Air Separator (AS) including unloading, transportation, insurance, storage, lifting, hanging, and insulation at the location complete in all respects as per specifications and drawings with all taxes and duties.				
	a) AS-01	Each	1		
HVAC-09	Supply, installation, testing & commissioning of End Suction Centrifugal Water Pumps with bronze impeller, stainless steel shaft, mechanical seal, variable frequency/speed drives as scheduled including performance testing at manufacturer's production facility, transportation, insurance, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) CHP-1	Each	4		
	b) CP-1	Each	4		
	c) CHSP-1	Each	2		
	d) CHSP-2	Each	2		
	e) CHSP-3	Each	2		
	f) CHSP-4	Each	2		
	g) CHSP-5	Each	2		
	h) OLP-1	Each	2		
	i) Essential Spare Parts for Pumps	Lot	1		
HVAC-10	Supply, installation, testing & commissioning of Ventilation Fans with variable frequency/speed drives as scheduled including transportation, insurance, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) EF-1	Each	17		
	b) EF-2	Each	51		
	c) EF-3	Each	1		
	d) EF-4	Each	2		
	e) EF-5	Each	17		
	f) EF-6	Each	51		

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	g) EF-7	Each	2		
	h) EF-8	Each	1		
	i) EF-9	Each	1		
	j) EF-10	Each	1		
	k) EF-11	Each	4		
	l) EF-12	Each	7		
	m) SF-1	Each	1		
	n) SF-2	Each	1		
	o) SF-3	Each	2		
	p) SF-4	Each	2		
	q) SF-5	Each	6		
	r) SF-6	Each	1		
	s) JF-1	Each	54		
	t) Essential Spare Parts for Fans	Lot	1		
HVAC-11	Supply, installation, testing & commissioning of Decorative Cooling/Heating High Ambient DC Inverter Type Direct Expansion Split Air Conditioners with precharged outdoor condensing Units including distributors, thermostats, expansion valves, hangers, controllers, spare parts etc. complete in all respects as per specifications and drawings with all taxes and duties.				
	a) FSU-IU-1/FSU-CU-1 (Minimum Unit Capacity = 24 MBH)	Each	12		
	b) FSU-IU-2/FSU-CU-2 (Minimum Unit Capacity = 96 MBH)	Each	4		
	c) Essential Spare Parts as specified in Technical Provisions	Lot	1		
HVAC-12	Supply, installation, testing & commissioning of Steel Tanks including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	Main Oil Storage Tank (MST-1) with complete accessories				
	a) including ultrasonic level sensor, essential accessories and supports.	Each	1		
	Day Oil Storage Tank (DT-1) with complete accessories including				
	b) ultrasonic level sensor, essential accessories and supports.	Each	1		
HVAC-13	Supply, installation, testing & commissioning of Filters (Code H) other than installed in filter boxes of Air Handling Units including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.	Sft	770		
HVAC-14	Supply, fabrication, testing, installation & commissioning of Galvanized Iron Sheet Metal Duct works including anchor bolts, studs, hangers, channels, supports, splitter dampers, bracings etc. complete in all respects as per specifications and drawings with all taxes and duties.				
	a) US Gauge 26	Sft	7293		
	b) US Gauge 24	Sft	160871		
	c) US Gauge 22	Sft	192757		
	d) US Gauge 20	Sft	157978		
	e) US Gauge 18	Sft	103683		

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(i)	(ii)	(iii)	(iv)	(v)	(vi)
HVAC-15	Supply, fabrication, testing, installation & commissioning of Volume Control Dampers including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Volume Dampers (VD)	Sft	3900		
	b) Motorized Volume Dampers (MVD)	Sft	4110		
HVAC-16	Supply, fabrication, installation, testing & commissioning of Galvanized Iron Sheet Metal Fire Dampers including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Fire Dampers (FD)	Sft	4930		
HVAC-17	Supply, fabrication, installation, testing & commissioning of pre assembled Flexible Duct Connectors with coated woven fabric, galvanized iron collars both by means of double lock seam on each side including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Flexible Duct Connectors (Rectangular)	Rft	6130		
	b) Duct Flexible Connection where duct crosses building joints(Construction Joints)	Lot	1		
HVAC-18	Supply, fabrication, installation, testing & commissioning of Breaching/Flue Stack including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Dia 16"	Sft	120		
	b) Dia 20"	Sft	1230		
HVAC-19	Supply, fabrication, installation, testing & commissioning of pipes & fittings including hangers, anchor bolts, rubber vibration mounts, transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Mild Steel (MS) Seamless Pipes & Fittings (ASTM A106, API 5L, Grade B, Schedule 40)				
	a-1) Dia 3/4"	Rft	3003		
	a-2) Dia 1"	Rft	825		
	a-3) Dia 1-1/4"	Rft	1386		
	a-4) Dia 1-1/2"	Rft	1430		
	a-5) Dia 2"	Rft	1562		
	a-6) Dia 2-1/2"	Rft	1980		
	a-7) Dia 3"	Rft	3522		
	a-8) Dia 4"	Rft	748		
	a-9) Dia 5"	Rft	422		
	a-10) Dia 6"	Rft	972		
	a-11) Dia 8"	Rft	3660		
	a-12) Dia 10"	Rft	739		
	a-13) Dia 12"	Rft	286		
	a-14) Dia 14"	Rft	400		
	a-15) Dia 16"	Rft	1025		
	a-16) Dia 18"	Rft	933		
	a-17) Dia 20"	Rft	55		
	b) Polypropylene Random Copolymer (PPRC) Pipes & Fittings (DIN 8077-8078, PN 20)				

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(i)	(ii)	(iii)	(iv)	(v)	(vi)
	b-1) Dia 3/4"	Rft	350		
	b-2) Dia 1"	Rft	175		
	b-3) Dia 1-1/4"	Rft	125		
	b-4) Dia 1-1/2"	Rft	100		
	b-5) Dia 2"	Rft	75		
	b-6) Dia 2-1/2"	Rft	75		
	b-7) Dia 3"	Rft	75		
	c) Unplasticized Poly Vinyl Chloride (uPVC) Pipes & Fittings Class D and or Class E)				
	c-1) Dia 3/4"	Rft	350		
	c-2) Dia 1"	Rft	175		
	c-3) Dia 1-1/4"	Rft	125		
	c-4) Dia 1-1/2"	Rft	100		
	c-5) Dia 2"	Rft	75		
	c-6) Dia 3"	Rft	75		
	c-7) Dia 4"	Rft	50		
	c-8) Dia 6"	Rft	50		
HVAC-20	Supply, installation, testing & commissioning of Valves, Strainers and Specialties including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Gate Valve				
	a-1) Dia 3/4"	Each	296		
	a-2) Dia 1"	Each	134		
	a-3) Dia 1-1/2"	Each	132		
	a-4) Dia 2"	Each	495		
	a-5) Dia 2-1/2"	Each	13		
	a-6) Dia 3"	Each	111		
	a-7) Dia 4"	Each	6		
	a-8) Dia 5"	Each	18		
	a-9) Dia 6"	Each	6		
	a-10) Dia 8"	Each	40		
	a-11) Dia 10"	Each	18		
	a-12) Dia 12"	Each	20		
	a-13) Dia 14"	Each	6		
	a-14) Dia 16"	Each	4		
	a-15) Dia 18"	Each	3		
	b) Globe Valve				
	b-1) Dia 3/4"	Each	148		
	b-2) Dia 1"	Each	67		
	b-3) Dia 1-1/2"	Each	63		
	b-4) Dia 2"	Each	8		
	b-5) Dia 2-1/2"	Each	4		
	b-6) Dia 3"	Each	53		
	b-7) Dia 4"	Each	2		
	b-8) Dia 5"	Each	24		
	b-9) Dia 6"	Each	18		
	b-10) Dia 8"	Each	16		
	b-11) Dia 10"	Each	4		
	b-12) Dia 12"	Each	4		
	b-13) Dia 16"	Each	2		
	c) Pressure Reducing Valve				
	c-1) Dia 2"	Each	1		
	d) Pressure Relief Valve				
	d-1) Dia 2"	Each	1		
	e) Check Valve				

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(i)	(ii)	(iii)	(iv)	(v)	(vi)
e-1)	Dia 1-1/2"	Each	2		
e-2)	Dia 2"	Each	3		
e-3)	Dia 8"	Each	16		
e-4)	Dia 10"	Each	8		
e-5)	Dia 12"	Each	8		
e-6)	Dia 18"	Each	1		
f)	Balancing Valve				
f-1)	Dia 2"	Each	93		
f-2)	Dia 2-1/2"	Each	1		
f-3)	Dia 3"	Each	1		
f-4)	Dia 8"	Each	7		
f-5)	Dia 10"	Each	4		
f-6)	Dia 12"	Each	4		
g)	Drain Cock				
g-1)	Dia 1-1/2"	Each	62		
h)	Automatic Air Vent + Stop Cock				
h-1)	Dia 1"	Each	20		
i)	Strainer				
i-1)	Dia 3/4"	Each	148		
i-2)	Dia 1"	Each	55		
i-3)	Dia 1-1/2"	Each	65		
i-4)	Dia 2"	Each	93		
i-5)	Dia 2-1/2"	Each	1		
i-6)	Dia 3"	Each	1		
i-7)	Dia 8"	Each	10		
i-8)	Dia 10"	Each	10		
i-9)	Dia 14"	Each	4		
j)	Flexible Pipe Connector				
j-1)	Dia 1-1/2"	Each	4		
j-2)	Dia 8"	Each	20		
j-3)	Dia 10"	Each	8		
j-4)	Dia 12"	Each	4		
j-5)	Dia 14"	Each	4		
k)	Manual Air Vent				
k-1)	Dia 3/4"	Each	148		
k-2)	Dia 1"	Each	215		
l)	2 Way Control Valves				
l-1)	Dia 3/4"	Each	148		
l-2)	Dia 1"	Each	55		
l-3)	Dia 1-1/2"	Each	63		
HVAC-21 Supply, installation, testing & commissioning of insulation including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.					
a)	Indoor Supply/Return Air Duct Concealed to Vision	Sft	460812		
b)	Indoor Supply/Return Air Duct in AHU Rooms	Sft	24909		
c)	Indoor Supply/Return Air Duct Exposed to Vision & Outdoor	Sft	12454		
d)	Acoustic Liner on Supply Air Ducts and Sheet Metal Air Plenums	Sft	37530		
e)	Insulation for Breeching Flue Stacks	Sft	1350		
f)	Insulation for Indoor Chilled & Hot Water Pipes, Valves, Fittings & Accessories				
g-1)	Dia 3/4"	Rft	3003		
g-2)	Dia 1"	Rft	825		
g-3)	Dia 1-1/4"	Rft	1386		
g-4)	Dia 1-1/2"	Rft	1320		

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(i)	(ii)	(iii)	(iv)	(v)	(vi)
g-5) Dia 2"		Rft	1320		
g-6) Dia 2-1/2"		Rft	1980		
g-7) Dia 3"		Rft	3346		
g-8) Dia 4"		Rft	528		
g-9) Dia 5"		Rft	422		
g-10) Dia 6"		Rft	739		
g-11) Dia 8"		Rft	1102		
	Insulation for CPR/Outdoor Chilled & Hot Water Piping, Fittings, Accessories & Valves including transportation, unloading, h) storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
h-1) Dia 1-1/2"		Rft	110		
h-2) Dia 8"		Rft	2492		
h-3) Dia 10"		Rft	739		
h-4) Dia 14"		Rft	330		
h-5) Dia 18"		Rft	244		
	Insulation for cooling Coil Condensate Drain Piping including Fittings, Accessories & Valves including transportation, i) unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
i-1) Dia 3/4"		Rft	2925		
i-2) Dia 1"		Rft	1375		
i-3) Dia 1-1/4"		Rft	980		
i-4) Dia 1-1/2"		Rft	1225		
i-5) Dia 2"		Rft	1980		
i-6) Dia 2-1/2"		Rft	25		
i-7) Dia 3"		Rft	50		
i-8) Dia 4"		Rft	15		
	Insulation for Central Plant Room Equipment including transportation, unloading, storage, lifting, and fixing at locations j) complete in all respects as per specifications and drawings with all taxes and duties.				
j-1) Insulation for Expansion Tanks		Lot	1		
j-2) Insulation for Air Separators		Lot	1		
j-3) Insulation for Pumps		Lot	1		
j-4) Insulation for Hot Water Generators		Lot	1		
j-5) Insulation for Chillers		Lot	1		
HVAC-22	Supply, installation, testing & commissioning of complete electrical equipment, material, controls and accessories including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
a)	Apparatus Control Panels (ACP)	Lot	1		
b)	Motor Control Center (MCC)	Lot	1		
c)	Actuators for Fire & Motorized Dampers	Lot	1		
d)	All electrical/control works as specified except MCC and ACP mentioned under item (a) & (b) here above including entire HVAC equipment, power/control wiring works etc.	Lot	1		

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HVAC-23	Supply, installation, testing & commissioning of Gas Pipes, Fittings, Valves, Regulators & Accessories including anchor bolts, studs, hangers, supports, channels, rubber vibration mounts etc. including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.	Lot	1		
HVAC-24	Supply, installation, testing & commissioning of Oil Pipes, Fittings, Valves, Regulators & Accessories including anchor bolts, studs, hangers, supports, channels, rubber vibration mounts etc. including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.	Lot	1		
HVAC-25	Supply, installation, testing & commissioning of Air Inlets & Outlets including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Code A: Supply Air Diffuser Square Face Rectangular Neck	Sft	5560		
	b) Code B: Return Air Diffuser Square Face Rectangular Neck	Sft	5560		
	c) Code C: Supply Air Grill Side Wall Double Deflection Adjustable	Sft	2600		
	d) Code D: Return Air Grill Side Wall Double Deflection Adjustable Bars	Sft	1910		
	e) Code E: Exhaust Air Sand Trap Anti Vermin Bird Mesh Louvers	Sft	1310		
	f) Code F: Fresh Air Sand Trap Anti Vermin Bird Mesh Louvers	Sft	1220		
	g) Code G: Jet Flow Ceiling Supply Air Diffuser Eye Ball Round Neck	Each	20		
HVAC-26	Supply, installation, testing & commissioning of instruments and gauges including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.				
	a) Pipeline Pressure Gauges including stop cock & siphon	Each	252		
	b) Pipeline Thermometers including wells	Each	218		
	c) Oil Filters (Dia 2")	Each	1		
HVAC-27	Painting & Identification	Lot	1		
HVAC-28	Relevant civil works required to complete the system including, equipment foundations, drain channels, cutting, patching, repairing, boxing, sealing, plastering, painting etc. including transportation, unloading, storage, lifting, and fixing at locations complete in all respects as per specifications and drawings with all taxes and duties.	Lot	1		
HVAC-29	Startup, Testing, Adjustment, Balancing & Commissioning of overall HVAC system.	Lot	1		
				Total Cost (Rs.)	