

## Lebanese University Campus - Hadath

**1.3.1.1 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-B-1)	15 T.R	1	Constant Air Volume AHU with Supply air flow 3200 lps, External Static pressure 270 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-2)	20.5 T.R	1	Constant Air Volume AHU with Supply air flow 4000 lps, External Static pressure 270 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-3)	15.5 T.R	1	Constant Air Volume AHU with Supply air flow 3330 lps, External Static pressure 315 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-4)	14 T.R	1	Constant Air Volume AHU with Supply air flow 2385 lps, External Static pressure 356 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-5)	13 T.R	1	Variable Air Volume AHU with Supply air flow 2100 lps, External Static pressure 569.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-5A)	13 T.R	1	Variable Air Volume AHU with Supply air flow 2100 lps, External Static pressure 569.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-6)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2520 lps, External Static pressure 357.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-6A)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2520 lps, External Static pressure 357.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-7)	17 T.R	1	Constant Air Volume AHU with Supply air flow 2680 lps, External Static pressure 350 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-8)	9 T.R	4	Constant Air Volume AHU with Supply air flow 880 lps, External Static pressure 100.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-9)	17 T.R	1	Constant Air Volume AHU with Supply air flow 1650 lps, External Static pressure 159.8 Pa, with 2 coils (heating / cooling)	✓

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**1.3.1.1 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Air Handling Unit (AHU-B-10)	17 T.R	3	Constant Air Volume AHU with Supply air flow 1700 lps, External Static pressure 166.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-11)	21 T.R	1	Variable Air Volume AHU with Supply air flow 3805 lps, External Static pressure 331.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-12)	11 T.R	1	Constant Air Volume AHU with Supply air flow 1530 lps, External Static pressure 140.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-13)	23 T.R	1	Variable Air Volume AHU with Supply air flow 5215 lps, External Static pressure 526.1 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-14)	15 T.R	5	Constant Air Volume AHU with Supply air flow 2820 lps, External Static pressure 258.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-15)	16 T.R	3	Constant Air Volume AHU with Supply air flow 2640 lps, External Static pressure 237 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-16)	14 T.R	2	Constant Air Volume AHU with Supply air flow 2340 lps, External Static pressure 263.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-17)	15 T.R	2	Constant Air Volume AHU with Supply air flow 2340 lps, External Static pressure 174.4 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-18)	14 T.R	5	Constant Air Volume AHU with Supply air flow 2280 lps, External Static pressure 264 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-19)	15 T.R	1	Constant Air Volume AHU with Supply air flow 2340 lps, External Static pressure 182.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-20)	16 T.R	1	Constant Air Volume AHU with Supply air flow 2363 lps, External Static pressure 244.1 Pa, with 2 coils (heating / cooling)	✓

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**1.3.1.1 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Air Handling Unit (AHU-B-21)	15 T.R	4	Constant Air Volume AHU with Supply air flow 2360 lps, External Static pressure 208.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-22)	16 T.R	2	Constant Air Volume AHU with Supply air flow 2305 lps, External Static pressure 226.8 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-23)	11.5 T.R	1	Constant Air Volume AHU with Supply air flow 2472 lps, External Static pressure 199.1 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-24)	11.7 T.R	5	Constant Air Volume AHU with Supply air flow 2310 lps, External Static pressure 243.3 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-25)	12 T.R	3	Constant Air Volume AHU with Supply air flow 2418 lps, External Static pressure 208.1 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-26)	12.7 T.R	1	Constant Air Volume AHU with Supply air flow 2472 lps, External Static pressure 221.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-27)	12 T.R	2	Constant Air Volume AHU with Supply air flow 2365 lps, External Static pressure 242.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-28)	12 T.R	2	Constant Air Volume AHU with Supply air flow 2472 lps, External Static pressure 283.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-29)	12 T.R	1	Constant Air Volume AHU with Supply air flow 2478 lps, External Static pressure 264.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-30)		1	Variable Air Volume AHU with Supply air flow 3870 lps, External Static pressure 586.6 Pa, with 2 coils (heating / cooling)	✓

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Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Air Handling Unit (AHU-B-31)	23.5 T.R	1	Variable Air Volume AHU with Supply air flow 3345 lps, External Static pressure 476.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-32)	26 T.R	1	Variable Air Volume AHU with Supply air flow 4380 lps, External Static pressure 578.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-33)	15 T.R	2	Constant Air Volume AHU with Supply air flow 1290 lps, External Static pressure 184.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-34)		1	Constant Air Volume AHU with Supply air flow 5260 lps, External Static pressure 233 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-35)	23 T.R	1	Constant Air Volume AHU with Supply air flow 4812 lps, External Static pressure 395 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-B-36)	20 T.R	1	Constant Air Volume AHU with Supply air flow 3670 lps, External Static pressure 740.5 Pa, with 2 coils (heating / cooling)	✓
	Fan Coil Unit (FCU-B-1)	1 T.R	57	Floor type FCU, 194 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-B-3)	1 T.R	8	Floor type FCU, 235 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-B-5)	1 T.R	12	Floor type FCU, 175 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-B-7)	1 T.R	16	Floor type FCU, 145 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-B-8L)	1.5 T.R	2	Horizontal concealed type FCU, 371 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-B-8R)	1.5 T.R	2	Horizontal concealed type FCU, 371 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓

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**1.3.1.1 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Split Unit	12000 BTU/hr	1	York portable	✓
	Split Unit	24000 BTU/hr	3	York decorative wall type pump mode HLHA24FSA	✓
	Split Unit	28000 BTU/hr	4	York decorative wall type pump mode HLHA30FSA	✓
	Split Unit	30000 BTU/hr	3	MITSUBISHI	✓
	Split Unit	42000 BTU/hr	1	YORK ceiling decorative heat pump model MCH45/BOH45	✓
	Split Unit	48000 BTU/hr	1	MIDEA	✓
Ventilation	Dehumidifier	10L./day	2	Clima smart	✓
	Dehumidifier	500 W	2	Woods CO 2.4 A	✓

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## 1.3.1.1 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-B-01)	530 Lps @ 147.7 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-03)	1120 Lps @ 111.6 Pa	1	Roof extractor type fan	✓
	Fan (F-B-04)	1210 Lps @ 165.4 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-05)	1350 Lps @ 122.8 Pa	1	Roof extractor type fan	✓
	Fan (F-B-06)	1320 Lps @ 140 Pa	1	Roof extractor type fan	✓
	Fan (F-B-07)	1560 Lps @ 139.2 Pa	1	Roof extractor type fan	✓
	Fan (F-B-09)	360 Lps @ 85.2 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-10)	335 Lps @ 72.1 Pa	1	Roof extractor type fan	✓
	Fan (F-B-11)	210 Lps @ 70.7 Pa	1	Roof extractor type fan	✓
	Fan (F-B-12)	125 Lps @ 72.3 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-15)	550 Lps @ 155 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-15A)	310 Lps @ 80.2 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-16)	110 Lps @ 78.5 Pa	2	In line Centrifugal Fan	✓
	Fan (F-B-17)	320 Lps @ 76 Pa	1	In line Centrifugal Fan	✓
	Fan (F-B-18)	1700 Lps @ 130 Pa	1	In line Centrifugal fire rated fan	✓
	Fan (F-B-19)	1700 Lps @ 130 Pa	3	In line Centrifugal fire rated fan	✓
	Fan (F-B-20)	1320 Lps @ 195 Pa	1	In line Centrifugal fire rated fan	✓
	Fan (F-B-20A)	1290 Lps @ 198 Pa	1	In line Centrifugal fire rated fan	✓
	Fan (F-B-21)	1000 Lps @ 105.5 Pa	2	Centrifugal fan	✓
	Fan (F-B-22)	2827 Lps @ 184.6 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-23)	2840 Lps @ 197.3 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-24)	920 Lps @ 178.6 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-25)	1100 Lps @ 190 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-26)	2236 Lps @ 257.2 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-27)	580 Lps @ 107.7 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-28)	265 Lps @ 90.8 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-29)	268 Lps @ 30 Pa	1	Propeller	✓

## Lebanese University Campus - Hadath

**1.3.1.1 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Fine Arts (Bldg. B) - O &amp; M Ref:1.5.1 - Set 2 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-B-30)	300 Lps @ 125.3 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-32)	48 Lps @ 58 Pa	1	Roof extractor type fan	✓
	Fan (F-B-33)	200 Lps @ 55 Pa	1	In Line Centrifugal fan	✓
	Fan (F-B-34)	120 Lps @ 83.4 Pa	1	In Line Centrifugal fan	✓
Cooling	End Suction Pumps (P-B-1)	51.67 Lps @ 32.24 m	3	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-B-2)	16.5 Lps @ 26.8 m Head	3	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-B-3)	17.58 Lps @ 10.14 m	3	Circulators for Heat exchanger	✓
	Expansion Tank (EX-B-1)	1000 Lps	2	Expansion tank for heating system	✓
	Heat Exchanger (HEX-B-3)	611.75 Kw	3	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
Piping System & Insulation	Black Steel			16mm to 160mm DN	✓
	Galvanized Steel			16mm to 50mm DN	✓
	Fiber Glass insulation			15mm to 50 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure				✓
	GSD-Low Pressure				✓
	Fiber Glass insulation			Blanket type/40 mm thick	✓
	VAV-3	475-660 Lps		With Thermostat	✓
	VAV-4	665-1040 Lps		With Thermostat	✓
	VAV-5	045-1320 Lps		With Thermostat	✓
Valves	Gate Valves				✓
	Balancing Valves				✓
	3 Way Valves				✓
	Globe Valves				✓

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**1.3.1.1 - Work Parcel 1 - List of Plumbing Equipment**

Faculty Of Fine Arts (Bldg. B) - O & M Ref:1.5.1 - Set2 / Div1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Soft Water	Water Softener (WS-B-1)	1 lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 72 L	✓
Domestic Hot Water	Electric Water Heater (EWH-B-1)	200 Lps	1	3 KW Electric water heater	✓
	Electric Water Heater (EWH-B-2)	200 Lps	1	3 KW Electric water heater	✓
Drainage	Pump (P-B-51)	1.26 Lps @ 8 m Head	2	Submersible	✓
	Pump (P-B-52)	1.26 Lps @ 8 m Head	2	Submersible	✓
	Pump (P-B-53)	1.26 Lps @ 8 m Head	2	Submersible	✓
	Pump (P-B-54)	1.26 Lps @ 8 m Head	2	Submersible	✓
	Pump (P-B-55)	11.3 Lps @ 15 m Head	2	Submersible	✓
Piping System & Insulation	PVC			16mm to 110mm DN	✓
	Copper			15 mm DN	✓
	Cast Iron			75mm to 100mm DN	✓
	Galvanized Steel			20mm to 100mm DN	✓
	HDPE			50mm to 315mm DN	✓
	BSP			25mm to 80mm DN	✓
Valves	Ball Valves			15mm to 40mm	✓
	Gate Valves			50 mm	✓
Sanitary Fixtures & Accessories	Drinking Fountain				✓
	Lavatory Mixer LAV-1				✓
	Lavatory Tap LAV-2				✓
	Lavatory Mixer LAV-3				✓
	Sink Tap				✓
	Mop Sink Tap				✓
	Bib Cock Perineal Hose				✓
	Angle Valves/Flexibles				✓
	WC Flush Valves				✓
	Urinal Flush Valves				✓
	Flush Tanks				✓
	Water Hammer Arrestor				✓
	Hand Dryers				✓
	Liquid Soap Dispensers				✓
	Paper Towel Dispenser				✓



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**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-D-1)	30 T.R	1	Variable Air Volume AHU with Supply air flow 3200 lps, External Static pressure 270 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-2)	33 T.R	1	Variable Air Volume AHU with Supply air flow 6638 lps, External Static pressure 541 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-3)	24 T.R	1	Variable Air Volume AHU with Supply air flow 5900 lps, External Static pressure 514.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-4)	30 T.R	1	Variable Air Volume AHU with Supply air flow 6325 lps, External Static pressure 488.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-5)	19 T.R	1	Variable Air Volume AHU with Supply air flow 3900 lps, External Static pressure 702.4 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-6)	32 T.R	1	Variable Air Volume AHU with Supply air flow 6495 lps, External Static pressure 560.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-7)	35 T.R	1	Variable Air Volume AHU with Supply air flow 3720 lps, External Static pressure 456.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-8)	35 T.R	1	Variable Air Volume AHU with Supply air flow 3720 lps, External Static pressure 466.2 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-9)	35 T.R	1	Variable Air Volume AHU with Supply air flow 3720 lps, External Static pressure 529.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-10)	35 T.R	1	Variable Air Volume AHU with Supply air flow 3720 lps, External Static pressure 506.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-11)	22 T.R	1	Variable Air Volume AHU with Supply air flow 3964 lps, External Static pressure 538.5 Pa, with 2 coils (heating / cooling)	✓

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**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-D-12)	22 T.R	1	Variable Air Volume AHU with Supply air flow 3964 lps, External Static pressure 538.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-13)	34 T.R	1	Variable Air Volume AHU with Supply air flow 3900 lps, External Static pressure 418.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-14)	28 T.R	1	Constant Air Volume AHU with Supply air flow 4435 lps, External Static pressure 440.4 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-15)	27 T.R	1	Constant Air Volume AHU with Supply air flow 4330 lps, External Static pressure 444.4 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-16)	33 T.R	1	Constant Air Volume AHU with Supply air flow 5700 lps, External Static pressure 422.1 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-17)	43 T.R	1	Motorized damper, constant Air Volume AHU with Supply air flow 3424 lps with External Static pressure 221.3 Pa, with 2 coils (heating / cooling) & electrical reheat of 9 Kw	✓
	Air Handling Unit (AHU-D-18)	42 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 244.5 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓
	Air Handling Unit (AHU-D-19)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 244.5 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓
	Air Handling Unit (AHU-D-20)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 276.1 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓

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**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Air Handling Unit (AHU-D-21)	40 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 235.8 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓
	Air Handling Unit (AHU-D-22)	40 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 272.2 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓
	Air Handling Unit (AHU-D-23)	41.5 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 301.9 Pa, with 2 coils (heating / cooling) & electrical reheat of 8 Kw	✓
	Air Handling Unit (AHU-D-24)	42 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 250.7 Pa, with 2 coils (heating / cooling) & electrical reheat of 10 Kw	✓
	Air Handling Unit (AHU-D-25)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 256.3 Pa, with 2 coils (heating / cooling) & electrical reheat of 9 Kw	✓
	Air Handling Unit (AHU-D-26)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 378.4 Pa, with 2 coils (heating / cooling) & electrical reheat of 8 Kw	✓
	Air Handling Unit (AHU-D-27)	42.5 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 249.6 Pa, with 2 coils (heating / cooling) & electrical reheat of 9 Kw	✓
	Air Handling Unit (AHU-D-28)	42 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 250 Pa, with 2 coils (heating / cooling) & electrical reheat of 10 Kw	✓

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**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling/ Heating	Air Handling Unit (AHU-D-29)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 279.6 Pa, with 2 coils (heating / cooling) & electrical reheat of 9 Kw	✓
	Air Handling Unit (AHU-D-30)	41 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 3424 lps, External Static pressure 233 Pa, with 2 coils (heating / cooling) & electrical reheat of 7 Kw	✓
	Air Handling Unit (AHU-D-31)	65 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 6040 lps, External Static pressure 292.5 Pa, with 2 coils (heating / cooling) & electrical reheat of 20 Kw	✓
	Air Handling Unit (AHU-D-32)	31 T.R	1	Variable Air Volume AHU with Supply air flow 5141 lps, External Static pressure 389.3 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-33)	25 T.R	1	Variable Air Volume AHU with Supply air flow 3845 lps, External Static pressure 366.3 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-D-34)	34 T.R	1	Variable Air Volume AHU with Supply air flow 4702 lps, External Static pressure 342.3 Pa, with 2 coils (heating / cooling)	✓
	Fan Coil Unit (FCU-DI-1)	1 T.R	1	Horizontal concealed type FCU, 420 lps Supply air flow, External Static pressure 30 Pa, with 2 coils	✓
	Fan Coil Unit (FCU-DI-2)	0.75 T.R	1	Horizontal concealed type FCU, 185 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-DI-3)	0.75 T.R	1	Horizontal concealed type FCU, 185 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Split Unit	18000 BTU/hr	2	M D V	✓
	split unit	48000 btu/hr	1	YORK floor standing pump mode FLHA048	✓
	Split Unit	60000 BTU/hr	1	YORK floor standing pump mode FLHA060	✓

**Lebanese University Campus - Hadath****1.3.1.2 - Work Parcel 1 - List of HVAC Equipment****Faculty Of Law & Political Sciences - (Bldg.D) - O & M Ref:1.5.1 - Set3 / Div2**

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-D-01)	8092 Lps @ 254 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-02)	9248 Lps @ 293.5 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-03)	990 Lps @ 133.5 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-04)	880 Lps @ 36.9 Pa	1	In line Centrifugal fan	✓

## Lebanese University Campus - Hadath

**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-D-05)	5780 Lps @ 214.3 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-06)	5202 Lps @ 238.5 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-07)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-08)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-09)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-10)	3424 Lps @ 220 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-11)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-12)	3424 Lps @ 210 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-13)	3424 Lps @ 150 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-14)	3424 Lps @ 190 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-15)	3424 Lps @ 200 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-16)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-17)	3424 Lps @ 240 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-18)	3424 Lps @ 200 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-19)	3424 Lps @ 190 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-20)	6040 Lps @ 220 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-21)	3424 Lps @ 190 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-D-22)	5655 Lps @ 320.5 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-23)	5655 Lps @ 184.9 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-24)	2200 Lps @ 239.4 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-25)	300 Lps @ 76 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-26)	300 Lps @ 68 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-27)	560 Lps @ 71 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-28)	650 Lps @ 90.2 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-29)	550 Lps @ 166.9 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-30)	1700 Lps @ 169.3 Pa	2	In line Centrifugal fan	✓
	Fan (F-D-31)	4450 Lps @ 539.2 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-32)	4450 Lps @ 535.5 Pa	1	In line Centrifugal fan	✓

## Lebanese University Campus - Hadath

## 1.3.1.2 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-D-33)	300 Lps @ 71.1 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-34)	100 Lps @ 25 Pa	1	Propeller	✓
	Fan (F-D-35)	100 Lps @ 25 Pa	1	Propeller	✓
	Fan (F-D-36)	150 Lps @ 40 Pa	1	Propeller	✓
	Fan (F-D-37)	100 Lps @ 25 Pa	1	Propeller	✓
	Fan (F-D-38)	150 Lps @ 40 Pa	1	Propeller	✓
	Fan (F-D-39)	100 Lps @ 25 Pa	1	Propeller	✓
	Fan (F-D-40)	150 Lps @ 40 Pa	1	Propeller	✓
	Fan (F-D-41)	1200 Lps @ 127.7 Pa	2	In line Centrifugal fan	✓
	Fan (F-D-42)	2109 Lps @ 106 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-43)	1490 Lps @ 88.1 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-44)	978 Lps @ 83.1 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-45)	1736 Lps @ 123 Pa	1	In line Centrifugal fan	✓
	Fan (F-D-46)	870 Lps @ 136 Pa	1	Roof Supply type fan	✓
	Fan (F-D-47)	1761 Lps @ 162.2 Pa	1	Roof Supply type fan	✓
	Fan (F-D-48)	500 Lps @ 74.3 Pa	1	Roof extractor type fan	✓
	Fan (F-D-49)	900 Lps @ 102.8 Pa	1	Roof extractor type fan	✓
	Fan (F-D-50)	2687 Lps @ 303.4 Pa	1	Centrifugal fan	✓
	Dehumidifier	500 W	1	Woods CO 220/240 V AC	✓
	Dehumidifier	231 W 10 liter/day	1	clima smart	✓
Cooling	End Suction Pumps (P-D-1)	57.63 Lps @ 26 m Head	3	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-D-2)	22.31 Lps @ 34.72 m Head	3	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-D-3)	20 Lps @ 15.32 m Head	2	Circulators for Heat exchanger	✓
	Expansion Tank (EX-D-1)	1500 Lps	2	Expansion tank for heating system	✓
	Heat Exchanger (HEX-D-1)	1033.26 Kw	2	Heat Exchanger Primary temperature	✓

## Lebanese University Campus - Hadath

**1.3.1.2 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Law &amp; Political Sciences - (Bldg.D) - O &amp; M Ref:1.5.1 - Set3 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Piping System & Insulation	Black Steel			20mm to 300mm DN	✓
	Galvanized Steel			16mm to 50mm DN	✓
	Fiber Glass insulation			15mm to 50 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure				✓
	GSD-Low Pressure				✓
	Fiber Glass insulation			Blanket type/40 mm thick	✓
	VAV-2	235-470 Lps		With Thermostat	✓
	VAV-3	475-660 Lps		With Thermostat	✓
Ducting System & Insulation	VAV-4	665-1040 Lps		With Thermostat	✓
	VAV-5	1045-1320 Lps		With Thermostat	✓
	VAV-6	1325-1890 Lps		With Thermostat	✓
Valves	Gate Valves			50mm to 100mm DN	✓
	Balancing Valves			50 mm to 100mm DN	✓
	3 Way Valves				✓
	Globe Valves				✓



## Lebanese University Campus - Hadath

## 1.3.1.2 - Work Parcel 1 - List of Plumbing Equipment

Faculty Of Law &amp; Political Sciences (Bldg. D) - O &amp; M Ref:1.5.1 - Set3 / Div1

System	Equipment	Capacity	Qty	Technical Description	Level	Room No.	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Soft Water	Water Softener (WS-D-1)	1 lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 72 L	Basement	Pump room	✓
Domestic Hot Water	Electric Water Heater (EWH-D1-1)	100	1	3 KW Electric water heater	Ground	Cafeteria	✓
	Electric Water Heater (EWH-D2-1)	100	2	3 KW Electric water heater	Ground	Cafeteria	✓
Drainage	Pump (P-D-51)	1.6 Lps @ 10 m Head	2	Submersible	Basement	37	✓
	Pump (P-D-52)	2 Lps @ 10 m Head	2	Submersible	Basement	Mech. room	✓
Piping System & Insulation	PVC			20mm to 75mm DN			✓
	Copper			15 mm DN			✓
	Galvanized Steel			65mm to 100mm DN			✓
	HDPE			50mm to 250mm DN			✓
	BSP			25mm to 80mm DN			✓
Valves	Ball Valves			15mm to 40mm			✓
	Gate Valves			50 mm			✓
Sanitary Fixtures & Accessories	Drinking Fountain						✓
	Lavatory Mixer LAV-1						✓
	Lavatory Tap LAV-2						✓
	Lavatory Mixer LAV-3						✓
	Sink Tap						✓
	Mop Sink Tap						✓
	Bib Cock Perineal Hose						✓
	Angle Valves/Flexibles						✓
	WC Flush Valves						✓
	Urinal Flush Valves						✓
	Flush Tanks						✓
	Hand Dryers						✓
	Liquid Soap Dispensers						✓
	Paper Towel Dispenser						✓

## Lebanese University Campus - Hadath

**1.3.1.3 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Engineering (Bldg. G) - O &amp; M Ref:1.5.1 - Set18 /Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-G-1)	33 T.R	1	Variable Air Volume AHU with Supply air flow 5135 lps, External Static pressure 405 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-2)	23 T.R	1	Variable Air Volume AHU with Supply air flow 3365 lps, External Static pressure 316 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-3)	10 T.R	1	Constant Air Volume AHU with Supply air flow 1600 lps, External Static pressure 118 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-4)	17 T.R	1	Constant Air Volume AHU with Supply air flow 3055 lps, External Static pressure 104 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-5)	18 T.R	2	Constant Air Volume AHU with Supply air flow 1540 lps, External Static pressure 101 Pa, with 2 coils (heating / cooling) & electrical reheat of 2 Kw	✓
	Air Handling Unit (AHU-G-6)	20 T.R	1	Constant Air Volume AHU with Supply air flow 1980 lps, External Static pressure 101 Pa, with 2 coils (heating / cooling) & electrical reheat of 5.5 Kw	✓
	Air Handling Unit (AHU-G-7)	19 T.R	3	Constant Air Volume AHU with Supply air flow 1610 lps, External Static pressure 101 Pa, with 2 coils (heating / cooling) & electrical reheat of 3.5 Kw	✓
	Air Handling Unit (AHU-G-8)	18 T.R	1	Constant Air Volume AHU with Supply air flow 1575 lps, External Static pressure 102 Pa, with 2 coils (heating / cooling) & electrical reheat of 4 Kw	✓
	Air Handling Unit (AHU-G-9)	18 T.R	1	Constant Air Volume AHU with Supply air flow 1540 lps, External Static pressure 102 Pa, with 2 coils (heating / cooling) & electrical reheat of 3.5 Kw	✓
	Air Handling Unit (AHU-G-10)	23 T.R	2	Constant Air Volume AHU with Supply air flow 1980 lps, External Static pressure 103 Pa, with 2 coils (heating / cooling) & electrical reheat of 7.5 Kw	✓

**Lebanese University Campus - Hadath****1.3.1.3 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Engineering (Bldg. G) - O &amp; M Ref:1.5.1 - Set18 /Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-G-11)	31 T.R	1	Variable Air Volume AHU with Supply air flow 3330 lps, External Static pressure 368 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-12)	11 T.R	2	Variable Air Volume AHU with Supply air flow 1170 lps, External Static pressure 331 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-13)	9 T.R	1	Constant Air Volume AHU with Supply air flow 1260 lps, External Static pressure 104 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-14)	9 T.R	1	Constant Air Volume AHU with Supply air flow 1380 lps, External Static pressure 106 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-15)	13 T.R	1	Variable Air Volume AHU with Supply air flow 2200 lps, External Static pressure 338 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-16)	13 T.R	1	Variable Air Volume AHU with Supply air flow 1905 lps, External Static pressure 366 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-17)	17 T.R	1	Variable Air Volume AHU with Supply air flow 2735 lps, External Static pressure 372 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-18)	22 T.R	1	Variable Air Volume AHU with Supply air flow 4425 lps, External Static pressure 343 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-19)	11 T.R	1	Variable Air Volume AHU with Supply air flow 2200 lps, External Static pressure 448 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-20)	11 T.R	1	Variable Air Volume AHU with Supply air flow 1640 lps, External Static pressure 402 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-21)	16 T.R	1	Variable Air Volume AHU with Supply air flow 3175 lps, External Static pressure 355 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-22)	7 T.R	1	Variable Air Volume AHU with Supply air flow 1605 lps, External Static pressure 371 Pa, with 2 coils (heating / cooling)	✓

## Lebanese University Campus - Hadath

**1.3.1.3 - Work Parcel 1 - List of HVAC Equipment**

Faculty Of Engineering (Bldg. G) - O &amp; M Ref:1.5.1 - Set18 /Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling / Heating	Air Handling Unit (AHU-G-23)	13 T.R	1	Variable Air Volume AHU with Supply air flow 2895 lps, External Static pressure 426 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-24)	10.5 T.R	1	Variable Air Volume AHU with Supply air flow 2440 lps, External Static pressure 371 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-25)	6 T.R	1	Constant Air Volume AHU with Supply air flow 1050 lps, External Static pressure 134 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-26)	16.5 T.R	1	Variable Air Volume AHU with Supply air flow 3770 lps, External Static pressure 402 Pa, with 2 coils (heating / cooling) & electrical reheat of 3.5 Kw	✓
	Air Handling Unit (AHU-G-27)	21 T.R	1	Variable Air Volume AHU with Supply air flow 3910 lps, External Static pressure 335 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-28)	19 T.R	1	Variable Air Volume AHU with Supply air flow 4130 lps, External Static pressure 589 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-29)	19.5 T.R	1	Variable Air Volume AHU with Supply air flow 3290 lps, External Static pressure 338 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-30)	15 T.R	2	Variable Air Volume AHU with Supply air flow 2865 lps, External Static pressure 375 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-31)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2890 lps, External Static pressure 384 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-32)	15 T.R	1	Variable Air Volume AHU with Supply air flow 1575 lps, External Static pressure 394 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-33)	21 T.R	1	Variable Air Volume AHU with Supply air flow 2115 lps, External Static pressure 458 Pa, with 2 coils (heating / cooling)	✓