

Lebanese University Campus - Hadath

1.3.1.3 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Engineering (Bldg. G) - O & 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-34)	16 T.R	1	Variable Air Volume AHU with Supply air flow 1800 lps, External Static pressure 435 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-35)	10 T.R	1	Variable Air Volume AHU with Supply air flow 1050 lps, External Static pressure 411 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-36)	16 T.R	1	Variable Air Volume AHU with Supply air flow 2835 lps, External Static pressure 385 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-37)	24 T.R	1	Variable Air Volume AHU with Supply air flow 4370 lps, External Static pressure 423 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-38)	17 T.R	1	Variable Air Volume AHU with Supply air flow 2130 lps, External Static pressure 432 Pa, with 2 coils (heating / cooling) & electrical reheat of 5 Kw	✓
	Air Handling Unit (AHU-G-39)	22 T.R	1	Variable Air Volume AHU with Supply air flow 3725 lps, External Static pressure 467 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-G-40)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2785 lps, External Static pressure 489 Pa, with 2 coils (heating / cooling)	✓
	Split System A/C(SSAC-G-1)	3 T.R	2	Split system air conditioning of the electronic heat pump type with supply air flow 575 Lps .	✓
	Split System A/C(SSAC-G-2)	1 T.R	1	Split system air conditioning of the electronic heat pump type with supply air flow 290 Lps .	✓
	split unit	18000 BTU/hr	1	TROPICAL	✓
	split unit	24000 BTU/hr	9	TROPICAL	✓

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System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-G-01)	1235 Lps @ 73 Pa	1	Centrifugal type exhaust fan	✓
	Fan (F-G-02)	2910 Lps @ 87 Pa	1	Centrifugal type exhaust fan	✓
	Fan (F-G-03)	755 Lps @ 70 Pa	1	Roof extractor type fan	✓
	Fan (F-G-04)	855 Lps @ 67 Pa	1	Roof extractor type fan	✓
Ventilation	Fan (F-G-05)	975 Lps @ 60 Pa	1	Roof extractor type fan	✓
	Fan (F-G-06)	1525 Lps @ 69 Pa	2	Centrifugal type exhaust fan	✓
	Fan (F-G-07)	2620 Lps @ 85 Pa	1	Centrifugal type exhaust fan	✓
	Fan (F-G-08)	2620 Lps @ 77 Pa	1	Centrifugal type supply fan	✓
	Fan (F-G-09)	350 Lps @ 50 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-10)	375 Lps @ 127 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-11)	185 Lps @ 49 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-12)	1525 Lps @ 69 Pa	1	Roof extractor type fan	✓
	Fan (F-G-13)	210 Lps @ 56 Pa	2	In line centrifugal type exhaust fan	✓
	Fan (F-G-14)	770 Lps @ 55 Pa	1	Roof extractor type fan	✓
	Fan (F-G-15)	175 Lps @ 47 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-16)	240 Lps @ 52 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-17)	100 Lps @ 41 Pa	1	Roof extractor type fan	✓
	Fan (F-G-18)	2350 Lps @ 92 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-19)	620 Lps @ 50 Pa	2	In line centrifugal type exhaust fan	✓
	Fan (F-G-20)	310 Lps @ 45 Pa	1	Roof extractor type fan	✓
	Fan (F-G-21)	1560 Lps @ 56 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-22)	780 Lps @ 56 Pa	3	In line centrifugal type exhaust fan	✓
	Fan (F-G-23)	320 Lps @ 47 Pa	2	Roof extractor type fan	✓
	Fan (F-G-24)	6765 Lps @ 93 Pa	1	Roof extractor type fan	✓
	Fan (F-G-25)	5775 Lps @ 85 Pa	1	Roof extractor type fan	✓
	Fan (F-G-26)	120 Lps @ 40 Pa	1	Roof extractor type fan	✓
	Fan (F-G-27)	2100 Lps @ 77 Pa	2	In line centrifugal type exhaust fan	✓
	Fan (F-G-28)	390 Lps @ 46 Pa	1	Roof extractor type fan	✓
	Fan (F-G-29)	130 Lps @ 40 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-30)	800 Lps @ 60 Pa	1	Roof extractor type fan	✓
	Fan (F-G-31)	1610 Lps @ 50 Pa	7	Roof extractor type fan	✓
	Fan (F-G-31)	1610 Lps @ 50 Pa	7	In line centrifugal type exhaust fan	✓

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Faculty Of Engineering (Bldg. G) - O & 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
Ventilation	Fan (F-G-32)	1980 Lps @ 50 Pa	1	In line centrifugal type exhaust fan	✓
	Fan (F-G-33)	525 Lps @ 65 Pa	1	In line centrifugal type exhaust fan	✓
	Dehumidifier	500 W	1	Woods CO 2.4 A	✓

Cooling	End Suction Pumps (P-G-2)	25.1 Lps @ 29.6 m Head	3	End suction centrifugal secondary chilled water pump	✓
	End Suction Pumps (P-G-4)	23.1 Lps @ 22.25 m Head	2	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-G-1)	19.2 Lps @ 26.5 m Head	2	End suction centrifugal secondary heating water pump	✓
	End Suction Pumps (P-G-3)	8.5 Lps @ 21 m Head	2	End suction centrifugal secondary heating water pump	✓
	End Suction Pumps (P-G-5)	3.76 Lps @ 6.1 m Head	2	End suction centrifugal secondary heating water pump for heat exchangers	✓
	End Suction Pumps (P-G-6)	8.06 Lps @ 7.3 m Head	2	End suction centrifugal secondary heating water pump for heat exchangers	✓
	Circulator Pumps (P-G-8)	0.13 Lps @ 4.6 m Head	2	Circulators for hot water storage tank	✓
	Expansion Tank (EX-G-1)	750 L	1	Expansion tank for heating system	✓
	Expansion Tank (EX-G-2)	750 L	1	Expansion tank for heating system	✓
	Hot Water Storage Tank (HWST-G-1)	820 L	1	Vertical Type Hot Water Storage Tank of 0.5 Lps flow	✓
	Heat Exchanger (HEX-G-1)	446.7 Kw	2	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
	Heat Exchanger (HEX-G-2)	196.9 Kw	2	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓

Piping System & Insulation	Black Steel			Dia 25mm to Dia 160mm	✓
	Galvanized Steel			Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation			15mm to 65 mm thickness	✓

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Faculty Of Engineering (Bldg. G) - O & 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
Ducting System & Insulation	GSD- Medium Pressure				✓
	GSD-Low Pressure				✓
	Fiber Glass insulation			Blanket type/40 mm thick	✓
	VAV-1	0-230 Lps		With Thermostat	✓
	VAV-2	235-470 Lps		With Thermostat	✓
	VAV-3	475-660 Lps		With Thermostat	✓
	VAV-4	665-1040 Lps		With Thermostat	✓
Ducting System & Insulation	VAV-5	1045-1320 Lps		With Thermostat	✓
	VAV-6	1325-1890 Lps		With Thermostat	✓

Valves	Gate Valves			20mm to 125mm	✓
	Balancing Valves			20mm to 50mm	✓
	3 Way Valves			20mm	✓
	Globe Valves			20mm	✓

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1.3.1.3 - Work Parcel 1 - List of Plumbing Equipment

Faculty Of Engineering (Bldg. G) - O & M Ref:1.5.1 - Set18 / Div1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Laboratory Services	Air Compressor (AC-G-1)	9.4 Lps @ 6.8 Kpa	1	Duplex type air compressor	✓
	Air Compressor (AC-G-2)	14.2 Lps @ 6.8 Kpa	1	Duplex type air compressor	✓
	Vacuum pump (VAC-G-1)	12 lps @ 380 mm Hg	1	Duplex type vacuum pump	✓
	Water Still (WD-G-1)	5 KW	1	Electric type water still	✓
Soft Water	Water Softener (WS-G-2)	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	✓
Drainage	Pump (SP 1/2)	1.75 Lps @ 5 m Head	2	Submersible pump	✓
	Pump (SP 3/4)	3.48 Lps @ 4.8 m Head	2	Submersible pump	✓
	Pump (SP 5/6)	1.3 Lps @ 4.25 m Head	2	Submersible pump	✓
	Pump (SP 7/8)	3.3 Lps @ 5.25 m Head	2	Submersible pump	✓
	Pump (SP 9/10)	3.3 Lps @ 5.25 m Head	2	Submersible pump	✓
	Pump (SP 12/13)	4.4 Lps @ 11 m Head	2	Submersible pump	✓
Piping System & Insulation	PVC			16mm to 50mm DN	✓
	Copper			15mm to 54 mm DN	✓
	Cast Iron			75mm to 110mm DN	✓
	Polypropylene			50mm to 110mm DN	✓
	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓
	Fiber Glass Insulation			25mm to 67mm thickness	✓
Valves	Ball Valves			15mm to 40mm	✓
	Globe Valves			15mm	✓
Sanitary Fixtures & Accessories	Drinking Fountain				✓
	Lavatory Mixer LAV-1				✓
	Lavatory Tap LAV-2				✓
	Lavatory Mixer LAV-3				✓
	Mop Sink Tap				✓
	Shower Mixers				✓

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Faculty Of Engineering (Bldg. G) - O & M Ref:1.5.1 - Set18 / Div1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Sanitary Fixtures & Accessories	Emergency shower				✓
	Bib Cock Perineal Hose				✓
	Angle Valves/Flexibles				✓
	WC Flush Valves				✓
	Urinal Flush Valves				✓
	Flush Tanks				✓
	Hand Dryers				✓
	Liquid Soap Dispensers				✓
	Paper Towel Dispenser				✓

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1.3.1.4 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / 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-H-1)	24 T.R	1	Variable Air Volume AHU with Supply air flow 3895 lps, External Static pressure 535 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-2)	39 T.R	1	Variable Air Volume AHU with Supply air flow 6385 lps, External Static pressure 558 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-3)	23 T.R	1	Variable Air Volume AHU with Supply air flow 3835 lps, External Static pressure 1359 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-4)	22.5 T.R	1	Variable Air Volume AHU with Supply air flow 4055 lps, External Static pressure 417 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-5)	20 T.R	1	Variable Air Volume AHU with Supply air flow 2580 lps, External Static pressure 770 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-6)	11.5 T.R	1	Variable Air Volume AHU with Supply air flow 1350 lps, External Static pressure 1073 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-7)	20 T.R	1	Variable Air Volume AHU with Supply air flow 3150 lps, External Static pressure 673 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-8)	13.5 T.R	1	Variable Air Volume AHU with Supply air flow 1910 lps, External Static pressure 1028 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-9)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2505 lps, External Static pressure 464 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-10)	16 T.R	1	Variable Air Volume AHU with Supply air flow 2785 lps, External Static pressure 513 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-11)	14 T.R	1	Variable Air Volume AHU with Supply air flow 2260 lps, External Static pressure 512 Pa, with 2 coils (heating / cooling)	✓

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1.3.1.4 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / 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-H-12)	17 T.R	1	Variable Air Volume AHU with Supply air flow 2485 lps, External Static pressure 642 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-13)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2180 lps, External Static pressure 647 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-14)	23 T.R	1	Variable Air Volume AHU with Supply air flow 3618 lps, External Static pressure 578 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-15)	25.5 T.R	1	Variable Air Volume AHU with Supply air flow 3325 lps, External Static pressure 726 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-H-16)	12 T.R	2	Constant Air Volume AHU with Supply air flow 1150 lps, External Static pressure 105 Pa, with 2 coils (heating / cooling)	✓
	Fan Coil Unit (FCU-H-Garbage)	2 T.R	1	Ceiling type FCU, 378 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Fan Coil Unit (FCU-H-CT)	1.5 T.R	2	Ceiling type FCU, 273 lps Supply air flow, External Static pressure 30 Pa, with 1 coil	✓
	Mini Split unit (SRAC-H-1)	-	1	Split Unit for L.C room	✓
Cooling / Heating	Split Unit	9000 BTU/hr	1	Carrier	✓
	Split Unit	12000 BTU/hr	2	York decorative wall type pump mode HLHA24FSA	✓
	Split Unit	18000 BTU/hr	1	M D V	✓
	Split Unit	18000 BTU/hr	5	O General	✓
	Split Unit	24000 BTU/hr	5	O General	✓
	Split Unit	32000 BTU/hr	1	York high wall decorative heat pump model MCH35/ BOH35	✓
	Split Unit	50000 BTU/hr	1	York high ceiling decorative heat pump model MCH55/BOH55	✓

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1.3.1.4 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-H-01)	3100 Lps @ 280 Pa	1	Roof extractor type fan	✓
	Fan (F-H-02)	705 Lps @ 115 Pa	1	Roof extractor type fan	✓
	Fan (F-H-03)	2985 Lps @ 214 Pa	1	Roof extractor type fan	✓
	Fan (F-H-04)	3650 Lps @ 166 Pa	1	Roof supply type fan	✓
	Fan (F-H-05)	2220 Lps @ 125 Pa	1	Roof extractor type fan	✓
	Fan (F-H-06)	440 Lps @ 140 Pa	1	Roof extractor type fan	✓
	Fan (F-H-07)	865 Lps @ 178 Pa	1	Roof extractor type fan	✓
	Fan (F-H-08)	1040 Lps @ 89 Pa	1	Roof extractor type fan	✓
	Fan (F-H-09)	1080 Lps @ 126 Pa	1	Roof extractor type fan	✓
	Fan (F-H-10)	1800 Lps @ 174 Pa	1	Roof extractor type fan	✓
Ventilation	Fan (F-H-11)	1280 Lps @ 132 Pa	1	Roof extractor type fan	✓
	Fan (F-H-12)	165 Lps @ 91 Pa	1	Roof extractor type fan	✓
	Fan (F-H-13)	3925 Lps @ 213 Pa	1	Roof extractor type fan	✓
	Fan (F-H-14)	765 Lps @ 113 Pa	1	Roof extractor type fan	✓
	Fan (F-H-15)	2665 Lps @ 172 Pa	1	Roof supply type fan	✓
	Fan (F-H-16)	180 Lps @ 79 Pa	1	Roof extractor type fan	✓
	Fan (F-H-17)	2040 Lps @ 130 Pa	1	Roof supply type fan	✓
	Fan (F-H-18)	770 Lps @ 110 Pa	1	Roof extractor type fan	✓
	Fan (F-H-19)	3320 Lps @ 127 Pa	1	Roof supply type fan	✓
	Fan (F-H-21)	2451 Lps @ 111 Pa	1	In Line Centrifugal fan	✓
	Fan (F-H-22)	1927 Lps @ 123 Pa	1	Roof supply type fan	✓
	Fan (F-H-23)	5852 Lps @ 286 Pa	1	Centrifugal fire rated fan	✓
	Fan (F-H-B)	4165 Lps @ 336 Pa	1	In Line Centrifugal fan	✓
	Fan (F-H-T)	3860 Lps @ 298 Pa	1	Centrifugal fan	✓

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1.3.1.4 - Work Parcel 1 - List of HVAC Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / Div2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling	End Suction Pumps (P-H-2)	28.26 Lps @ 18.77 m Head	2	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-H-1)	9.85 Lps @ 26.8 m Head	2	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-H-3)	4.38 Lps @ 6.9 m Head	2	Circulators for Heat exchanger	✓
	Circulator Pumps (P-H-4)	1.7 Lps @ 7.2 m Head	2	Circulators for Hot water storage tank	✓
	Expansion Tank (EX-H-1)	440.86 Lps	1	Expansion tank for heating system	✓
	Hot Water Storage Tank (HWST H-1)	2790 Liter	1	Vertical Type Hot Water Storage Tank of 1.71 Lps flow	✓
	Heat Exchanger (HEX-H-1)	457.89 Kw	1	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
Piping System & Insulation	Black Steel			Dia 25mm to Dia 160mm	✓
	Galvanized Steel			Dia 20mm to Dia 50mm	✓
	Fiber Glass insulation			15mm to 65 mm thickness	✓
Ducting System & Insulation	GSD- Medium Pressure				✓
	GSD-Low Pressure				✓
	Fiber Glass insulation			Blanket type/40 mm thick	✓
	VAV-1	0-230 Lps		With Thermostat	✓
	VAV-2	235-470 Lps		With Thermostat	✓
	VAV-3	475-660 Lps		With Thermostat	✓
	VAV-4	665-1040 Lps		With Thermostat	✓
	VAV-5	1045-1320 Lps		With Thermostat	✓
	VAV-6	1325-1890 Lps		With Thermostat	✓
Valves	Gate Valves			20mm to 125mm	✓
	Balancing Valves			20mm to 50mm	✓
	3 Way Valves			20mm	✓
	Globe Valves			20mm	✓

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1.3.1.4 - Work Parcel 1 - List of Plumbing Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / Div1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Laboratory Services	Air Compressor (AC-H-1)	51.5 Lps @ 7 bar	1	Duplex type air compressor	✓
	Vacuum pump (VAC-H-1)	54 lps @ 610 mm HG	1	Duplex type vacuum pump	✓
	Distilled Water Booster pumps	25 Gpm, 41.5 m Head	1	Booster pumps for distilled water system	✓
	Water Still (WD-H-1)	14 KW	1	Electric type water still	✓
Soft Water	Water Softener (WS-H-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	✓
	Water Softener (WS-H-2)	1 lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 36 L	✓
Domestic Hot Water	Circulator pumps (P-H-51)	0.21 lps @ 9 m head	2	Hot Water storage tank circulator pumps one acting as stand by	✓
Piping System & Insulation	PVC			16mm to 50mm DN	✓
	Copper			15mm to 54 mm DN	✓
	Cast Iron			75mm to 110mm DN	✓
	Polypropylene			50mm to 110mm DN	✓
	Galvanized Steel			20mm to 80mm DN	✓
	HDPE			50mm to 200mm DN	✓
	BSP			15mm to 42mm DN	✓
	Fiber Glass Insulation			25mm to 67mm thickness	✓
Valves	Ball Valves			15mm to 40mm	✓
	Globe Valves			15mm	✓
Sanitary Fixtures & Accessories	Drinking Fountain				✓
	Lavatory Mixer LAV-1				✓
	Lavatory Tap LAV-2				✓
	Lavatory Mixer LAV-3				✓
	Sink Mixer				✓
	Sink Tap				✓
	Mop Sink Tap				✓
	Shower Mixers				✓
	Emergency shower				✓

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1.3.1.4 - Work Parcel 1 - List of Plumbing Equipment

Faculty Of Pharmacy (Bldg. H) - O & M Ref:1.5.1 - Set5 / Div1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Sanitary Fixtures & Accessories	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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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / 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-J-1)	36 T.R	1	Motorized damper variable Air Volume AHU with Supply air flow 5000 lps, External Static pressure 412.5 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-4)	30 T.R	1	Variable Air Volume AHU with Supply air flow 2610 lps, External Static pressure 822 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-5)	17 T.R	2	Variable Air Volume AHU with Supply air flow 2160 lps, External Static pressure 535 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-6)	21 T.R	1	Variable Air Volume AHU with Supply air flow 2184 lps, External Static pressure 594 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-7)	35 T.R	1	Variable Air Volume AHU with Supply air flow 5700 lps, External Static pressure 474 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-9)	28 T.R	1	Variable Air Volume AHU with Supply air flow 4630 lps, External Static pressure 313 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-10)	12.5 T.R	1	Variable Air Volume AHU with Supply air flow 1490 lps, External Static pressure 508 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-11)	20.5 T.R	1	Variable Air Volume AHU with Supply air flow 1680 lps, External Static pressure 532 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-12)	15.5 T.R	1	Variable Air Volume AHU with Supply air flow 1300 lps, External Static pressure 211 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-13)	8.5 T.R	1	Constant Volume AHU with Supply air flow 1020 lps, External Static pressure 148 Pa, with 2 coils (heating / cooling)	✓

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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / 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-J-14L)	33 T.R	1	Motorized damper constant Volume AHU with Supply air flow 2406 lps, External Static pressure 386 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-14R)	33 T.R	1	Motorized damper constant Volume AHU with Supply air flow 2406 lps, External Static pressure 386 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-15)	19 T.R	1	Motorized damper constant Volume AHU with Supply air flow 1535 lps, External Static pressure 143 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-16)	18 T.R	1	Motorized damper constant Volume AHU with Supply air flow 1985 lps, External Static pressure 189 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-17)	19 T.R	1	Motorized damper constant Volume AHU with Supply air flow 2125 lps, External Static pressure 126 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-18)	18.4 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 2125 lps, External Static pressure 149 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-19L)	14 T.R	1	Motorized damper constant Air Volume AHU with Supply air flow 1220 lps, External Static pressure 119 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-J-19R)	14 T.R	2	Motorized damper constant Air Volume AHU with Supply air flow 1220 lps, External Static pressure 119 Pa, with 2 coils (heating / cooling)	✓

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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / 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	8500 BTU/hr	2	AIR GENERAL	✓
	split unit	18000 BTU/hr	1	climasmart	✓
	split unit	24000 btu/hr	2	YORK decorative wall type pump mode HLHA24FSA	✓
	Split Unit	24000 BTU/hr	1	MDV	✓
	Split Unit	32000 BTU/hr	1	York	✓
Ventilation	Fan (F-J-01)	1240 Lps @ 104 Pa	1	Roof extractor type fan	✓
	Fan (F-J-02)	1340 Lps @ 105 Pa	1	Roof extractor type fan	✓
	Fan (F-J-03)	354 Lps @ 103 Pa	1	Roof extractor type fan	✓
	Fan (F-J-04)	50 Lps @ 86 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-05)	2125 Lps @ 129 Pa	1	Fire rated axial type return Fan	✓
	Fan (F-J-06)	2125 Lps @ 121.7 Pa	1	Fire rated axial type exhaust Fan	✓
	Fan (F-J-07)	1800Lps @ 91.2 Pa	1	Fire rated axial type return Fan	✓
	Fan (F-J-08)	1985 Lps @ 114.6 Pa	1	Fire rated axial type return Fan	✓
	Fan (F-J-09)	650 Lps @ 97 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-10)	552 Lps @ 94 Pa	2	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-11)	1210 Lps @ 119 Pa	2	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-12)	6900 Lps @ 173 Pa	1	Centrifugal type supply fan	✓
	Air Fan (F-J-13)	2450 Lps @ 293 Pa	2	Fire rated in line centrifugal type return fan	✓

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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Ventilation	Fan (F-J-14)	675 Lps @ 106 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-16)	1700 Lps @186 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-17)	3340 Lps @ 136 Pa	1	In Line Centrifugal type supply fan	✓
	Fan (F-J-18)	1040 Lps @ 116 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-19)	1320 Lps @ 77 Pa	1	Roof extractor type fan	✓
	Fan (F-J-20)	6650 Lps @ 165 Pa	1	In Line Centrifugal type supply fan	✓
	Fan (F-J-21)	1350 Lps @ 90 Pa	1	In Line Centrifugal type supply fan	✓
	Fan (F-J-22)	1345 Lps @ 129 Pa	1	In Line Centrifugal type supply fan	✓
	Fan (F-J-23)	501 Lps @140 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-24)	115 Lps @ 23 Pa	1	Propeller type exhaust Fan	✓
	Fan (F-J-25)	115 Lps @ 23 Pa	1	Propeller type exhaust Fan	✓
	Fan (F-J-26)	115 Lps @ 23 Pa	1	Propeller type exhaust Fan	✓
	Fan (F-J-27)	115 Lps @ 23 Pa	1	Propeller type exhaust Fan	✓
	Fan (F-J-28)	115 Lps @ 23 Pa	1	Propeller type exhaust Fan	✓
	Fan (F-J-29)	420 Lps @ 108 Pa	1	Roof extractor type fan	✓
	Fan (F-J-30)	80 Lps @ 85.7 Pa	1	In Line Centrifugal type exhaust fan	✓
	Fan (F-J-31)	539 Lps @ 30 Pa	1	Propeller type Fan	✓
	Fan (F-J-32)	104 Lps @ 25 Pa	1	Propeller type Fan	✓
	Fan (F-J-33)	2000 Lps @ 95.2 Pa	1	Roof type supply fan	✓
	Fan (F-J-34)	2000 Lps @ 95.2 Pa	1	Roof type supply fan	✓
	Fan (F-J-39)	1500 Lps @ 80 Pa	1	In Line Centrifugal type supply fan	✓
	Fan (F-J-40)	1800 Lps @ 100 Pa	1	Fire rated axial type smoke exhaust fan	✓
	Fan (F-J-41)	4400 Lps @ 105 Pa	1	Fire rated axial type exhaust Fan	✓

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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Cooling	End Suction Pumps (P-J-1)	24.6 Lps @ 28.7 m	2	End suction centrifugal secondary chilled water pump	✓
	End Suction Pumps (P-J-3)	18.6 Lps @ 21.5 m	2	End suction centrifugal secondary chilled water pump	✓
Heating	End Suction Pumps (P-J-2)	7.14 Lps @ 28.6 m	2	End suction centrifugal secondary hot water pump	✓
	End Suction Pumps (P-J-4)	4.87 Lps @ 21.03 m	2	End suction centrifugal secondary hot water pump	✓
	Circulator Pumps (P-J-5)	3.17 Lps @ 4.5 m	2	Circulators for Heat exchanger	✓
	Circulator Pumps (P-J-6)	2.18 Lps @ 6.33 m	2	Circulators for Heat exchanger	✓
	Expansion Tank (EX-J-1)	500 Lps	1	Expansion tank for heating system	✓
	Expansion Tank (EX-J-2)	500 Lps	1	Expansion tank for heating system	✓
	Heat Exchanger (HEX-J-1)	165.97 KW	2	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓

Heating	Heat Exchanger (HEX-J-2)	114.2 KW	2	Heat Exchanger Primary temperature 95 deg C, secondary temperature 60 deg C	✓
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Piping System & Insulation	Black Steel			Dia 25mm to Dia 160mm	✓
	Fiber Glass insulation			40mm thickness to 50 mm	✓

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1.3.1.5 - Work Parcel 1 - List of HVAC Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
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-4	665-1040 Lps		With Thermostat	✓
	VAV-5	1045-1320 Lps		With Thermostat	✓
Valves	Gate Valves		76	25mm to 65mm	✓
	Double Regulating Valves		38	20mm to 65mm	✓
	Globe Valves		38	20mm	✓

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1.3.1.5 - Work Parcel 1 - List of Plumbing Equipment

Extension of the Faculty of Sciences(Bldg.J) - O & M Ref:1.5.1 - Set 6 / Div 1

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.1
Soft Water	Water Softener (WS-J-1)	0.5 Lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 36 L	✓
	Water Softener (WS-J-2)	0.5 Lps	1	Simplex type WS with Exchange capacity 69225 g/m3, Hardness at inlet 350 ppm, Hardness at outlet 5 ppm, & resin volume 36 L	✓
Domestic Hot Water	Electric Water Heater EWH-J-1	100 Ltr	1	Electric Water Heater 3 KW	✓
Piping System & Insulation	PVC			16mm to 110mm DN	✓
	Copper			15mm DN	✓
	Galvanized Steel			75 mm To 100 DN	✓
	HDPE			50mm to 200mm DN	✓
Valves	Ball Valves			15mm to 50mm	✓
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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1.3.1.6-Work Parcel 1- List of HVAC Equipment

Faculty Of Medicine-(Bldg.M1.1 & M1.2) - O & M Ref: 1.5.1 - Set 8 / Div 2

System	Equipment	Capacity	Qty	Technical Description	Maintenance Instruction Provided in O&M Manuals Listed in Appendix 1.5.I
Cooling / Heating	Air Handling Unit (AHU-M1-1)	30 T.R	1	Variable Air Volume AHU with Supply air flow 5478 lps, External Static pressure 877.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-2)	7 T.R	1	Constant Air Volume AHU with Supply air flow 1080 lps, External Static pressure 193.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-3)	26 T.R	1	Constant Air Volume AHU with Supply air flow 2240 lps, External Static pressure 174.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-4)	23 T.R	1	Variable Air Volume AHU with Supply air flow 3610 lps, External Static pressure 504.1 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-5)	15.5 T.R	1	Constant Air Volume AHU with Supply air flow 1440 lps, External Static pressure 169.4 Pa, with 2 coils (heating / cooling) & electric reheat of 1Kw capacity	✓
	Air Handling Unit (AHU-M1-6)	20 T.R	1	Variable Air Volume AHU with Supply air flow 3888 lps, External Static pressure 566.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-7)	15 T.R	1	Variable Air Volume AHU with Supply air flow 2382 lps, External Static pressure 549.7 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-8)	26 T.R	1	Variable Air Volume AHU with Supply air flow 3468 lps, External Static pressure 492.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-9)	14 T.R	1	Variable Air Volume AHU with Supply air flow 2165 lps, External Static pressure 285.6 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-10)	25 T.R	1	Variable Air Volume AHU with Supply air flow 5610 lps, External Static pressure 602.9 Pa, with 2 coils (heating / cooling)	✓
	Air Handling Unit (AHU-M1-11)	15 T.R	1	Constant Air Volume AHU with Supply air flow 2550 lps, External Static pressure 248 Pa, with 2 coils (heating / cooling)	✓