



Lebanese University Campus-Hadath

1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.11. Closed Type Expansion Tanks

Monthly

- Check all valves for full and free travel. Adjust or re-pack valve glands as required. Lubricate valve stems as necessary.

Quarterly

- Carry out tasks as detailed for Monthly.
- Check all associated pipework and connections for leaks. Repair as necessary and report findings.
- Check pressure relief valve for proper operation. Replace if found defective.

Electrical

- Test and ensure all pressure controls and associated components are operating correctly. Advise on necessity to recalibrate or replace any faulty component.

Annually

- Carry out tasks as detailed for Quarterly.
- Test and ensure security of all pipe brackets and supports.
- Check and report on condition of holding down and all retaining bolts. Tighten as required. Replace any defective item.
- Examine and ensure drain pipes and valves are free from obstruction.
- Test and ensure correct operation of gauges. Re-calibrate as necessary.
- Measure tank thickness by ultra-sonic tests.
- Inspect tank for corrosion. Clean tank externally from all spots. Repaint if necessary.



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1.4.12. Air Handling and Fan Coil Units

Specific Precautions

- Start motor for short times only if cover is opened, otherwise you risk overloading the motor. For a short start-up with opened revision cover you should stay near the unit.
- When adjusting regulating pulley do not exceed maximum impeller speed and admissible motor current consumption.

Monthly

- Visually examine entire unit, report on condition and carry out remedial works as required.
- Operate and examine for any undue noise, vibration, or rattling. Report and adjust as necessary.
- Check tightness and air leaks between the different sections of the unit. Replace gaskets as necessary.

Heating and Cooling Coils

- Check coils. Ensure no leakage to occur from coils, connections or pipe work. Adjust and report accordingly.
- Vent air from coil. Ensure tightness of vent cock, check for leakage and adjust if necessary.
- Check coil for dirt, corrosion or algae growth and clean with low-pressure water.

Air Filters

- Read differential pressure across filter using the manometer. Alternatively, examine filter medium for dirt and discoloration. Record and report findings. Advise on the need of any remedial work.



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Fan Drive Belts and Pulleys

- Check tension of belt drives and examine for wear and fraying. Renew defective belts.
- Ensure correct tension on belts. Adjust as necessary.
- Check alignment of drive pulleys. Rectify if incorrectly aligned.
- Inspect drive pulleys for security on their respective shafts. Re-secure a loose pulley tightening all security bolts and locks.
- Check security of drive guards. Tighten or refit as necessary. Inspect guards for corrosion and replace an inadequate guard.
- Check volume dampers for corrosion and dirt. Clean as necessary. Ensure clear motion of dampers. Lubricate as necessary, reset to the original position.

Electrical

Fan Motor

- Check voltage and amperage. Record data. Report any significant error.

Quarterly

- Carry out tasks as detailed for Monthly.
- Examine anti-vibration mountings, ensure their security and performance. Report and repair any defects. Replace item if necessary.
- Examine and ensure all brackets, fixings are secure. Check bolts for corrosion. Tighten and replace as necessary. Report on condition of supports.
- Examine and ensure drip trays, drain points, and drain pipework are free from dirt, scale, obstruction, corrosion and algae deposits. Clean as necessary.
- Ensure all space, duct and equipment sensors are functioning correctly. Report and re-set as appropriate. Replace any defective item.

Fan Bearings



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- Examine fan shaft bearings and lubrication system. Check for shaft and bearing overheating, lubricant dilution, or over lubrication. Adjust to ensure suitable lubrication. Lubricate or grease bearings to the manufacturers recommendations.
- Check shaft and bearings for end play. Report on condition. Replace bearings if necessary.
- Examine motor to shaft alignment. Adjust if necessary.

Fan Motor

- Test bearings for wear and shaft endplay. Report findings.
- Check motor RPM. Record data. Compare with commissioning figures. Report significant change.
- Lubricate motor to the manufacturer's recommendations.
- Examine and ensure that motor ventilation airways are clear. Remove all dirt and dust by vacuum cleaning.
- Check motor isolation mounts and fixings. Tighten as necessary.

Fan wheel and Housing

- Remove dirt accumulation from wheel and housing.
- Check wheel, housing, bolts and set screws for tightness.

Air Filters

- Open up and examine filter framework and casing for corrosion. Wire brush and paint with anti-corrosion primer. Report on condition.
- Examine filter element seating for air leakage. Repair and re-join filter element seating as required.
- Check filter element locking devices for security of fastening. Adjust, refit or replace defective fastenings to ensure air tightness.
- Examine and calibrate manometer as necessary.

Mixing Box & Plenum Section



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1.4 – Work Parcel 1 – Maintenance Scope of Work

- Ensure air tightness. Tighten gaskets, bolts, and brackets as necessary. Change defective items.
- Audibly inspect for rattling sounds. Repair as necessary.
- Clean outside and inside as necessary.

Associated Ductwork

- Inspect flexible connections for leaks. Re-tighten brackets or gaskets as necessary. Replace a defective connection.
- Inspect duct insulation paying particular attention to the vapour seal. Repair damaged areas and report on condition.
- Ensure duct hangers rigidity and tightness. Tighten as necessary. Inspect condition of brackets, hangers, and bolts. Report accordingly.

Associated Pipe work

- Check and ensure satisfactory operation of regulating (3way or 2way) valve assembly. If necessary renew as per manufactures recommendations.
- Check for any water leaks. Repair as necessary.
- Examine valves for leakage. Ensure full and free travel. Adjust or re-pack valve glands as required. Lubricate valve stem. Reset valves to their original position.
- Examine strainers for leakage. Clean strainer as necessary.
- Audibly check for cavitation noise in strainer. Repair as required.
- Examine insulation. Repair any defective section.
- Check condensate drain pipe work or hoses for blockage, corrosion, cracks etc.. Repair as appropriate.

Electrical

Electrical Connections



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1.4 – Work Parcel 1 – Maintenance Scope of Work

- Check and ensure correct operation of all switches, controls and controllers.(Smoke detectors, manometers, motorized valves).
- Examine and report on condition of all associated wiring facilities and wiring. Ensure security of termination.

Bi-annually

- Carry out tasks as detailed for Quarterly.
- Clean out external and internal dust and dirt from the unit.

Heating and Cooling Coils

- Comb out fins. Clean deposits on coil with brush where necessary with appropriate sterilising solution such as chlorine.

Fan Shaft.

- Check the bearing locking collar or set screw for tightness.

Annually

- Carry out tasks as detailed for Bi-Annually.
- Check paintwork for corrosion, if present determine and report cause. Clean, wire brush and repaint as necessary.
- Check validity of pressure and temperature readings in gauges. Recalibrate or replace defective gauges.
- Replace air filter if necessary.
- Check CFM and pressure developed by the Air Handling Unit. Compare with previous commissioning results.

Electrical

- Carry out insulation resistance and earth continuity test, report results.
- Check and calibrate all control devices.



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1.4 – Work Parcel 1 – Maintenance Scope of Work



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.13. Ductwork, Filters, Insulation And Attenuators

Specific Precautions

- When cleaning or working in ducts it is essential that all sensors or probes be withdrawn from the duct to prevent any damage.
- Care should also be taken to prevent any damage to dampers, linkages and other control devices that may be located in a duct.
- All volume dampers are set up during commissioning and should not normally be subject to further adjustment unless modifications are made to the ductwork distribution system.
- It is essential that all regulated settings of dampers be marked before work is undertaken on the system and noted, so that they can be correctly returned to the position as set when commissioned.
- Check all air filters, attenuators and duct insulation

Quarterly

- Ensure all ductwork supports, brackets and suspension rods are secure. Tighten bolts as necessary. Report any signs of corrosion. Advise on any remedial work.
- Check flexible connections for condition, leaks and secure fittings. Ensure all connections are airtight. Repair or replace as necessary.
- Inspect access doors for any loose panels and ensure door fixings are secure.
- Check door gaskets for damage and air tightness. Repair/Replace as necessary.
- Ensure that all door handles, catches, hinges and locking systems are functioning correctly.
- Check all accessible turning vanes in ductwork are secure and free from debris.

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- Inspect insulation for any damage or deterioration. Report on condition in particular the integrity of the vapour seal and/or loose wire mesh.
- Ensure all ductwork test holes are plugged and airtight.
- Examine grilles, check mountings and clean.
- Check louvers for damage clean & remove any debris.
- Check screens for any damage, clean. Replace if badly blocked.

Volume Dampers

- Check volume dampers for position, ease of movement and security of locking devices. Ensure that damper opens and closes to desired positions.
- Ensure that the damper blades are secure & are correctly aligned and report any that are loose.
- Check for duct leakage through volume damper.
- Operate dampers through total range of travel to check for freedom of movement.
- Apply light oil on linkages and pivot pins.
- Check linkages for wear. Report on condition.

Fire Dampers

- Check action and proper operation. Inspect all dampers; apply a few drops of oil to the mechanism.
- Examine dampers for security in the fire barrier and that all fire stopping around the damper is intact repaired. Report any breaks in stopping. Replace damper if necessary.
- Clean out any dirt or debris collected in the blade guide slots.

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1.4 – Work Parcel 1 – Maintenance Scope of Work

- Ensure fusible links to be secure and of correct rating. Replace fusible links if damaged or faulty.
- Lubricate axis or guide slots as necessary.
- Gravity shutter fire damper: check free fall of damper to tight shut position.
- Spring shutter fire damper: check the spring for corrosion and elasticity. Replace if required.
- Plate gravity fire damper: check counter weight for tightness if applicable.
- Check for duct leakage.
- Check duct lock for tightness.

Annually

- Carry out tasks as detailed for Quarterly.
- Check internal condition through sampling points where fitted.
- Measure air volumes at each grille and compare with commissioning values. Report any significant alteration in readings.
- Check air volumes on supply diffusers and adjust where required.
- Inspect anti-vibration mounts for permanent set (in springs). Report if renewal is required. If replaced ensure that the correct type is used.
- Check air deflectors for correct position and ensure the absence of rattling sound. Report and repair if required.
- Check all attenuator supports and fixings for security.
- Ensure that all doors, handles, latches, hinges and locking systems are functioning correctly.
- Ensure that seals are intact and efficient. Replace seals if necessary.



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- Ensure that the access doors are not damaged and that they make perfect contact all around with seal.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.14. Grilles, Registers, and Diffusers

Quarterly

- Ensure correct and secure fixing.
- Check for smut around perimeter surface of grilles. Report findings.
- Inspect air leakage around grille neck. Report and repair as appropriate.

Fresh Air Intake Louvers / Grilles

- Check for obstruction debris and blockage. Clean off grille louver and remove obstruction.
- Check for damage and mishap. Repair damage or replace grille / louver if necessary.
- Check for corrosion or rot. A corroded grille / louver is to be wire brushed, dried thoroughly and have one coat of anti-corrosion primer and two coats of paint applied. Renew any grille / louver weakened by corrosion.

Annually

- Carry out tasks as detailed for Quarterly.
- Measure air volumes at each grille and compare with commissioning or design values. Report any significant alterations in readings. Advise on need to re balance system.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.15. Centrifugal In-Line Fans

Weekly

- Visually examine entire unit and ensure correct operation. Check for any undue noise, vibration, or rattling. Report condition and carry out any remedial work as required.
- Examine fan shaft bearings and lubrication system. Check for shaft overheating, lubricant dilution, or over lubrication. Adjust to ensure suitable lubrication according to the manufacturer's recommendations.

Monthly

- Carry out tasks as detailed under Weekly.
- Lubricate or grease fan bearings according to the manufacturer's recommendations.

Quarterly

- Carry out tasks as detailed for Monthly
- Examine anti-vibration mountings; ensure their security and performance. Report and repair any defect. Replace items if necessary.
- Examine and ensure all brackets, fixings, fan enclosure and housing to be secure. Check bolts for corrosion. Tighten and replace as necessary. Report on condition of supports.

Fan Bearings

- Inspect shaft and bearings for wear corrosion and tightness. Repair or replace bearings as necessary.
- Check shaft and bearings for end play. Report on condition. Replace bearings if necessary.
- Check bearing locking collar. retighten and repair as necessary.

Drive Belts and Pulleys

- Check tension of belt drives and examine for wear and fraying. Renew defective belts.
- Ensure correct tension on belts. Adjust as necessary.
- Check alignment of drive pulleys. Rectify if incorrectly aligned.
- Inspect drive pulleys for security on their respective shafts. Re-secure a loose pulley, tightening all security bolts and locks.
- Check security of drive guards. Tighten or refit as necessary. Inspect guards for corrosion and replace an inadequate guard.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

Motor

- Test bearings for wear and shaft endplay. Report findings.
- Check motor RPM. Record data. Compare with commissioning figures. Report significant change.
- Lubricate motor according to the manufacturer's recommendations.
- Examine and ensure that motor ventilation airways are clear. Remove all dirt and dust by vacuum cleaning.
- Check motor isolation mounts and fixings. Tighten as necessary.

Fan Wheel and Housing

- Remove dirt accumulation from wheel and housing.
- Check wheel, housing, bolts and set screws for tightness.

Associated Ductwork

- Inspect flexible connections for leaks. Re-tighten brackets or gaskets as necessary. Replace a defective connection.
- Ensure duct hangers rigidity and tightness. Tighten as necessary. Inspect condition of brackets, hangers, and bolts. Report accordingly.

Electrical Motor

- Check voltage and amperage. Record data. Report any significant error.

Electrical Connections

- Check and ensure correct operation of all switches, controls and controllers.
- Examine and report on condition of all associated wiring facilities and wiring. Ensure security of termination.
- Carry out insulation resistance and earth continuity tests. Reports results.

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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.16. Centrifugal Fans (Belt Driven)

Weekly

- Visually examine entire unit and ensure correct operation. Report condition and carry out any remedial work as required.
- Examine unit for any undue noise, vibration, or rattling. Report and repair as appropriate.
- Examine fan shaft bearings and lubrication system. Check for shaft overheating, lubricant dilution, or over lubrication. Adjust to ensure suitable lubrication according to the manufacturer's recommendations.

Monthly

- Carry out tasks as detailed under Weekly.

Fan Bearings

- Lubricate or grease bearings according to manufacturer's recommendations.

Quarterly

- Carry out tasks as detailed for Monthly.
- Examine anti-vibration mountings, ensure their security and performance. Report and repair any defect. Replace items if necessary.
- Examine and ensure all brackets, fixings, fan enclosure and housing to be secure. Check bolts for corrosion. Tighten and replace as necessary. Report on condition of supports.

Fan Bearings

- Inspect shaft and bearings for wear corrosion and tightness. Repair or replace bearings as necessary.
- Check shaft and bearings for end play. Report on condition. Replace bearings if necessary.
- Examine motor to shaft alignment. Adjust if necessary.
- Check bearing locking collar, retighten and repair as necessary.

Drive Belts and Pulleys

- Check tension of belt drives and examine for wear and fraying. Renew defective belts.
- Ensure correct tension on belts. Adjust as necessary.
- Check alignment of drive pulleys. Rectify if incorrectly aligned.
- Inspect drive pulleys for security on their respective shafts. Re-secure a loose pulley, tightening all security bolts and locks.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

- Check security of drive guards. Tighten or refit as necessary. Inspect guards for corrosion and replace an inadequate guard.

Motor

- Test bearings for wear and shaft end play. Report findings.
- Check motor RPM. Record data. Compare with commissioning figures. Report significant change.
- Lubricate motor according to the manufacturer's recommendations.
- Examine and ensure that motor ventilation airways are clear. Remove all dirt and dust by vacuum cleaning.
- Check motor isolation mounts and fixings. Tighten as necessary.

Fan Wheel and Housing

- Remove dirt accumulation from wheel and housing.
- Check wheel, housing, bolts and set screws for tightness.

Associated Ductwork

- Inspect flexible connections for leaks. Re-tighten brackets or gaskets as necessary. Replace a defective connection.
- Ensure duct hangers rigidity and tightness. Tighten as necessary. Inspect condition of brackets, hangers, and bolts. Report accordingly.

Electrical

Electrical Connections

- Check and ensure correct operation of all switches, controls and controllers.
- Examine and report on condition of all associated wiring facilities and wiring. Ensure security of termination.
- Carry out insulation resistance and earth continuity tests. Report results.

Motor

- Check voltage and amperage. Record data. Report any significant error.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.17. Minisplits And Wall Type Air Conditioners

Monthly

- Check and clean air filter
- Remove dust from the front panel
- Thermostat Checking
- Freon Level
- Freon temp
- Noise level
- Indoor conditions
- Check power supply Wiring

Quarterly

- Clean and check for obstruction in drain.
- Pan and evacuating piping.
- Contactors and relays.
- Fan voltage and amperage.
- Compressor voltage and amperage.
- Compressor oil level.
- Crankcase heater amperage.
- Pulleys and belts.
- Suction pressure.
- Discharge pressure.
- Coil cleaning and washing.
- Bearings and lubrication.

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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.18. Axial Fans

Quarterly

- Examine unit for any undue noise, vibration, or rattling. Repair as appropriate.
- Examine anti-vibration mountings; ensure their security and performance. Report and repair any defect. Replace items if necessary.
- Examine and ensure all brackets, fixings, fan enclosure and housing to be secure. Check bolts for corrosion. Tighten and replace as necessary. Report on condition of supports.

Motor

- Test bearings for wear and shaft end play. Report findings.
- Check motor RPM. Record data. Compare with commissioning figures. Report significant change.
- Lubricate motor to the manufacturer's recommendations.
- Examine and ensure that motor ventilation airways are clear. Remove all dirt and dust by vacuum cleaning.
- Check motor isolation mounts and fixings. Tighten as necessary.

Fan Impeller and Housing

- Remove dirt accumulation from impeller and housing.
- Check impeller, housing, bolts and set screws for tightness.
- Ensure tightness of all locking collars, and bolts. Retighten as necessary.

Electrical

Motor

- Check voltage and amperage. Record data. Report any significant changes from rated values.

Electrical Connections

- Check and ensure correct operation of all switches, controls and controllers.
- Examine and report on condition of all associated wiring facilities and wiring. Ensure security of termination.
- Carry out insulation resistance and earth continuity tests. Reports results.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.19. Propeller Fans

Quarterly

- Examine unit for any undue noise, vibration, or rattling. Repair as appropriate.
- Examine anti-vibration mountings; ensure their security and performance. Report and repair any defect. Replace items if necessary.
- Examine and ensure all brackets, fixings, fan enclosure and housing to be secure. Check bolts for corrosion. Tighten and replace as necessary. Report on condition of supports.

Motor

- Test bearings for wear and shaft endplay. Report findings.
- Check motor RPM. Record data. Compare with commissioning figures. Report significant change.
- Lubricate motor to the manufacturer's recommendations.
- Examine and ensure that motor ventilation airways are clear. Remove all dirt and dust by vacuum cleaning.
- Check motor isolation mounts and fixings. Tighten as necessary.

Fan Impeller and Housing

- Remove dirt accumulation from impeller and housing.
- Check impeller, housing, bolts and set screws for tightness.
- Ensure tightness of all locking collars, and bolts. Retighten as necessary.

Dampers

- Check and ensure correct operation of shutter vanes. Adjust as necessary.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

Electrical

Motor

- Check voltage and amperage. Record data. Report any significant changes from rated values.

Electrical Connections

- Check and ensure correct operation of all switches, controls and controllers.
- Examine and report on condition of all associated wiring facilities and wiring. Ensure security of termination.
- Carry out insulation resistance and earth continuity tests. Reports results.



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1.4 – Work Parcel 1 – Maintenance Scope of Work

1.4.20.Wall and Roof Extract Fans

Quarterly

- Clean impeller and spinner and ensure no build up of dirt.
- Check fan impeller for cracks, corrosion or other damage. Repair or renew as required.
- Clean exterior surfaces, wheel and housing.
- Remove dust build up on motor housing to ensure proper motor cooling.
- Ensure that all bolts, anti-vibration mountings, locking collars, set screws and fasteners are to be present and secure. Tighten and replace if necessary.
- Check fan casing for corrosion. Repair or renew as necessary.
- Ensure that the fan bearings are in sound condition with adequate lubrication.
- Check belt tension and adjust if necessary.
- Check pulleys for wear and replace both pulleys and belts if wear is evident.
- Ensure motor, drive and pulley are correctly aligned. Replace if aligned condition warrants it.
- Grease motor according to manufacturer's recommendations.
- Grease fan bearings as necessary.

Electrical

- Check operation of switch. Repair or replace as necessary.

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1.5.1- Work Parcel 1- List of Operation And Maintenance Manuals

HVAC System

Faculty	Set Nb.	Division Nb.
Faculty of Fine Arts-Bldg (B)	2	2
Faculty of Law-Bldg (D)	3	2
Faculty of Engineering-Bldg (G)	18	2
Faculty of Pharmacy-Bldg (H)	5	2
Extension of the Faculty of Sciences-Bldg (J)	6	2
Faculty of Medicine-Bldg (M1.1 & M1.2)	8	2
Faculty of Dentistry-Bldg (M1.3 & M1.4)	8	2
Faculty of public Health-Bldg (Q)	10	2

Building	Set Nb.	Division Nb
Conference center-Bldg (F)	4	2
Sport Complex-Bldg (K)	7	2
Library of Medical Sciences-Bldg (M2)	9	2
Male Dormitories-Bldg (R01)	11	2
Female Dormitories-Bldg (R02)	12	2
Technical Area-Bldg (T1,T2&T3)	13	2
Restaurant& Functional Housing-Bldg (U2)	15	2
Central Parking-Bldg (U3)	14	2
Eastern Parking-Bldg (V1)	14	2
Pain Pumping Station-Bldg (V3)	1	6
Utility Tunnel-Bldg (V4)		
Underground Western Parking and Central Catering - Bldg (X)	16	2

Plumbing System

Faculty	Set Nb.	Division Nb.
Faculty of Fine Arts-Bldg (B)	2	1
Faculty of Law-Bldg (D)	3	1
Faculty of Engineering-Bldg (G)	18	1
Faculty of Pharmacy-Bldg (H)	5	1
Extension of the Faculty of Sciences-Bldg (J)	6	1
Faculty of Medicine-Bldg (M1)	8	1
Library of Medical Sciences-Bldg (M2)	9	1
Faculty of public Health-Bldg (Q)	10	1

Building	Set Nb.	Division Nb
Conference Center-Bldg (F)	4	1
Sport Complex-Bldg (K)	7	1
Male Dormitories-Bldg (R01)	11	1
Female Dormitories-Bldg (R02)	12	1
Technical Area-Bldg (T1,T2&T3)	13	1
Restaurant& Functional Housing-Bldg (U2)	14	1
Central Parking-Bldg (U3)	15	1
Eastern Parking-Bldg (V1)	15	1
Pain Pumping Station-Bldg (V3)	1	6
Utility Tunnel-Bldg (V4)		
Underground Western Parking and Central Catering - Bldg (X)	16	1

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Work Parcel 1: Mechanical Works

1.5.2 List of As Built Drawings in all Trades

IRN	Trades	Block:Zone	Subzone or Scale	Type of Document	Level of Plans	Running Number	Revision
Internal Revision Number		Zone defining the Building Examples: R2: Female Dorm R1: Male Dorm TS: Type Spaces OO: Whole Project	0= (Whole Zone) 1,2,3,4,5,6 (Parts of zone or whole zone) 7= Miscellaneous 8=Typical Spaces	1= Plans 2=Sections 3=Elevations 4=Details on A0 5=General Details on A3 6=Particular Details on A3 7=Schedules 8=Miscellaneous	0=Foundation 1=2nd Basement 3=Ground Floor 4=1st Floor 5=2nd Floor 6=3rd Floor 7=4th Floor 8=5th Floor 9=Roof	To facilitate different documents of the same type and the same location	A, B, C, D

Trades (As needed for Drawing Numbering)

Trade A		Trade B		Trade C		Trade D		Trade E	
Site Works		Structures & OutBoards		Technical Equipment		Technical Equipment		Finishes	
A05	Main Pumping Station	B00	General Structure Drawings	C00	General M/E Drawings	D02	Swimming Pool Treatment equipment & accessories	E00	Architectural Executive Drawings
A06	Water Supply	B01	Concrete Works	C10	HVAC	D04	Decorative Fountains		
A07	Waste Water	B02	Frame Works & Canopies	C20	Plumbing	D08	Scientific Lab Equipment		
A11	External Signs & Boards	B03	Waterproofing & Joints	C30	High Voltage Installation				
A13	Electrical Network	B05	External Aluminum & Glazing	C31	General Transformer Substat				
A14	Low Current (Refer to C04)	B09	Reinforcement	C32	Static UPS System				
A15	Chilled & Heating Water	B10	Precast Elements	C33	Lighting Layout				
		B11	Concrete Drawings with Reinforcement	C34	Miscellaneous				
				C35	Earthing System & Lightning Project				
				C40	Low Current Installation General				
				C41	Telephone Systems				
				C42	Computer Network				
				C43	Sound System				
				C44	Fire Alarm System				
				C45	Clock System				

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1.5.3- Work Parcel 1- List of Equipment Suppliers/Subcontractors

HVAC System

	Equipment	Subcontractor/ Supplier	Contact (TEL.)	Manufacturer	Concerned Bldgs
1	End Suction Pumps	Wilo Salomon SARL	04-772280	Wilo	All except Engineering
		Ghazzawi		Vogel	Faculty of Engineering (G)
2	Air Handling Units (AHU)	ICIE Petra	01-663573	Petra	All except Engineering
		Modern Trading I.T.L.		Golden star	Faculty of Engineering (G)
3	Fan Coil Units (FCU)	ICIE Petra	01-663573	Petra	All except Engineering
		Modern Trading I.T.L.		Golden star	Faculty of Engineering (G)
4	Split System Air Conditioner (SSAC)	Al Salem Agencies	01-567115	York	All except Engineering
		Modern Trading I.T.L.		Golden star	Faculty of Engineering (G)
5	Computer Room Air Conditioner (CRAC)	Al Salem Agencies	01-567115	Denco	All except Engineering
6	Fans	Jacteco Mechanical	01-353223	Greenheck	All Buildings
7	Hot Water Storage Tanks (HWST)	A.Z. Tec	01-682407	IMI Rycroft	All Buildings
8	Heat Exchangers (HEX)	A.Z. Tec	01-682407	IMI Rycroft	All Buildings
9	Expansion Tanks (EX)	Rimawa	01-204728	Armstrong	All Buildings

Plumbing System

	Equipment	Subcontractor/ Supplier	Contact (TEL.)	Manufacturer	Concerned Bldgs
1	Circulator Pumps for HWST	A.Z. Tec	01-682407	Pullen	All except Engineering
		Ghazzawi		Vogel	Faculty of Engineering (G)
2	Distilled Water booster pumps	Arison	01-793900	IDP	All Buildings
3	Submersible Pumps	linaset	01-663316	ABS	All Buildings
4	Water Softener (WS)	Progress Water products	03-324244	Aqua Spring	All Buildings
5	Drinking Fountain	Aqua treat	03-655929	Elkay	All Buildings
6	Electric Water Heater (EWH)	Webeo	01-853047	Applimo	All Buildings
7	Lavatory mixers LAV-1	Charles Boustany	01-388412	Presto	All except Engineering
		Domcol	03-437768	Delabie	Faculty of Engineering (G)
8	Lavatory Taps LAV-2	Charles Boustany	01-388412	Presto	All except Engineering
		Domcol	03-437768	Delabie	Faculty of Engineering (G)
9	Lavatory Mixers LAV-3	Charles Boustany	01-388412	Kludi	All Buildings
10	Sink Mixers	Charles Boustany	01-388412	Kludi	All Buildings
11	Sink Taps	Charles Boustany	01-388412	Kludi	All Buildings
12	Mop Sink Taps	Charles Boustany	01-388412	Kludi	All Buildings
13	Shower Mixers	Charles Boustany	01-388412	Presto	All Buildings
14	Bib Cock Perineal Hose	Domcol	03-437768	Delabie	All Buildings
15	Angle Valves/Flexibles	Charles Boustany	01-388412	Kludi	All except Engineering
		Domcol	03-437768	Delabie	Faculty of Engineering (G)
16	WC Flush Valves	Domcol	03-437768	Delabie	All Buildings
17	Flush Tanks	Georges Khoury	01-873872	Duravit	All except Engineering
18	Emergency Showers	Bauhoff	01-312271	potteau	All Buildings
19	Water Hammer Arrestor (WHA)	Domcol	03-437768	Delabie	All except Engineering
		Akiki	01-339322	Zurn	Faculty of Engineering (G)
20	Bathub Mixer	Charles Boustany	01-388412	Kludi	Bldg U2
21	Jacuzzi Mixer			Grohe	Bldg U2
22	Hand Dryers	Charles Boustany	01-388412	Mediclinics	All Buildings
23	Liquid Soap Dispensers	Charles Boustany	01-388412	Mediclinics	All Buildings
24	Paper towel Dispensers	Charles Boustany	01-388412	Mediclinics	All Buildings
25	Gas Solenoid Valve	Natgas	01-884388	Asco	All Buildings
26	Air Compressor	Philka	03-334335	Ingersoll Rand	All Buildings
27	Vacuum Pumps	Philka	03-334335	Ingersoll Rand	All Buildings
28	Gas Pressure Regulator	Natgas	01-884388	Briffault	All Buildings
29	Emergency Shut off Valves	Wilo Salomon SARL	04-772280	Crane	All Buildings
30	Gas Leak Detector	Automation&con.	01-487726	Etrans	All Buildings

Lebanese University Campus-Hadath

1.5.4 - Work Parcel 1- List of Consummables

	Consummable	Systems/Location	Form
1	Refrigerant (R22)	DX air conditionners	Gas
2	Gas	Labs/Workshops	Gas
3	Oxygene	Labs/Workshops	Gas
4	Acetylene	Labs/Workshops	Gas
5	AHU filters	AHUs	Pcs
6	FCU filters	FCUs	Pcs
7	Cartridges for filters	Drinking Fountains	Pcs
8	Lamps for Ultra-violet sterilizers	Drinking Fountains	Pcs
9	Cartridges for air compressors filters	Air compressors	Pcs
10	Anti-Scale Anti-Corrosion	Secondary Heating Loop	Liquid
11	Biocide		Liquid