Los Angeles World Airports

LAWA Commissioning Forms

PROJECT:_____

Equipment Name/Tag:_____ Location:_____

System /Area Served: _____ Related Equipment: _____

Air Handling Unit

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number	N/A		
4	Cooling Capacity (MBH/gpm)	/	/	
5	Heating Capacity (MBH/gpm)	/	/	
6	Supply Air Flow, Design / Minimum (cfm)	/	/	
7	Supply Fan Motor Power / Speed (hp/rpm)	/	/	
8	Return Air flow, Design / Minimum (cfm)			
9	Return Fan Motor Power / Speed (hp/rpm)			
10	Voltage / Phase / Frequency (V / - / Hz)	/ /	/ /	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	Coil surface areas are free of damage	Yes	No	
3	The air openings are sealed with plastic	Yes	No	
4	The water openings are sealed with plastic plugs	Yes	No	
5	All components present and in proper order	Yes	No	
6	All access doors are operable	Yes	No	
7	Installation and startup manual provided	Yes	No	
8	Unit tags affixed	Yes	No	
2	**Construction Checklist**			
A	**Installation of AHU**			
1	Unit secured as required by manufacturing and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from the building	Yes	No	
5	Cooling coil drain pan slopes correctly	Yes	No	
6	Internal vibration isolators in good condition and shipping bolts are removed	Yes	No	
7	Belts are tight	Yes	No	
8	Unit labeled and is easy to see	Yes	No	

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Air Handling Unit (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
B	**Chilled Water Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit /coil removal	Yes	No	
3	Piping supported as required by specification	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation is complete and installed as per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
C	**Hot Water Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit/coil removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation is complete and installed per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
D	**Ductwork**			
1	Adequate locations available for testing and balancing of unit	Yes	No	
2	All dampers and sensors are accessible (access panels)	Yes	No	
3	Outdoor and return air arrangement will not freeze coils, i.e. outdoor air and return air is adequately mixed before reaching coils	Yes	No	
4	Vibration isolators installed	Yes	No	
5	All dampers close tightly and stroke fully and easily	Yes	No	
6	Ductwork is clean and free of debris	Yes	No	
E	**Electrical**			
1	Local disconnect installed in accessible location	Yes	No	
2	Motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
5	VFD installed (if applicable)	Yes	No	
F	**Controls – installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Temperature, humidity, pressure, and CO_2 sensors(as applicable) are installed and calibrated	Yes	No	
3	Dampers actuators installed and calibration verified	Yes	No	
4	Hot and chilled water actuators installed and calibration verified	Yes	No	
5	Safety items installed and verified (freezestat, high pressure, motor overland, etc.)	Yes	No	

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Air Handling Unit (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
G	**Mechanical – startup**			
1	Unit is clean	Yes	No	
2	Internal isolators free to move	Yes	No	
3	Fans and motors lubricated and aligned	Yes	No	
4	Fan belts have proper tension and in good condition			
5	Protective shrouds for fans and belts in place and secure	Yes	No	
6	Terminal unit dampers manually opened or are controllable and open	Yes	No	
7	Filters installed properly (no bypass air) and are clean	Yes	No	
8	System starts and runs without any unusual noise or vibration	Yes	No	
9	Manufacturer's startup checklist completed and attached	Yes	No	
H	**Controls – startup**			
1	Cooling sequence of control verified	Yes	No	
2	Heating sequence of control verified	Yes	No	
3	Warm-up sequence of control verified	Yes	No	
4	Cool-down sequence of control verified	Yes	No	
5	Economizer sequence of control verified	Yes	No	
6	Unoccupied sequence of control verified	Yes	No	
I	**TAB**			
1	Filters and coils are clean	Yes	No	
2	Motor rotation verified – each motor	Yes	No	
3	Motor voltage and amps verified – each phase of each motor	Yes	No	
4	Fan RPM verified – each fan	Yes	No	
5	Entering and leaving cooling coil air temperature (°F)	Yes	No	
6	Entering and leaving heating coil temperature (°F)	Yes	No	
7	Entering and leaving chilled water temperature (°F)	Yes	No	
8	Entering and leaving hot water temperature (°F)	Yes	No	
9	Coil flow and air/water pressure drops verified – each coil	Yes	No	

"NO" Responses

Item	Date	Reason for "NO" response

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Boiler, Hot Water

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Total Heating Capacity (MBH)			
5	Voltage / Phase / Frequency (V/ -/ Hz)	/ /	/ /	
6	Entering / Leaving Hot Water Temperature (°F)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The water openings are sealed with plastic plugs	Yes	No	
3	All components present	Yes	No	
4	Installation and startup manual provided	Yes	No	
5	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Boiler**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Flue completely installed and properly sloped	Yes	No	
6	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation is complete and installed as per specifications	Yes	No	
6	Thermometers and pressure gauges on supply and return lines	Yes	No	
7	All valves and test ports are easily accessible	Yes	No	
8	Valve tags attached	Yes	No	
C	**Electrical**			
1	Local disconnect installed in accessible location	Yes	No	
2	All electrical connections are tight	Yes	No	
3	All electrical components are grounded	Yes	No	

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LAWA Commissioning Forms

Boiler, Hot Water (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
D	**Controls - Installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Remote start and stop verified	Yes	No	
3	Hot water temperature reset signal verified (if applicable)	Yes	No	
4	Test ports installed near all control sensors	Yes	No	
5	Actuators installed and calibration verified	Yes	No	
E	**Mechanical - Startup**			
1	System flushed, filled, and air purged	Yes	No	
2	Burner adjusted to proper settings	Yes	No	
3	System starts and runs without any unusual noise or vibration	Yes	No	
4	Manufacturer's startup checklist completed and attached	Yes	No	
5	CO_2 and CO values from burner adjustment (ppm/ppm)	Yes	No	
F	**Controls –Startup**			
1	Low water switch operational	Yes	No	
2	Temperature sensors operational and calibrated	Yes	No	
3	Flow switch operational	Yes	No	
4	High pressure/ temperature cut out operational	Yes	No	
5	Unit operation sequence verified and correct	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" responses

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Centrifugal Chiller

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Capacity (tons)			
5	Condenser Fluid Type			
6	Condenser Fluid Flow rate (gpm)			
7	Chilled Fluid Type			
8	Chilled Fluid Flow rate (gpm)			
9	Refrigerant Type			
10	Compressor Motor Power (kW)			
11	Compressor Motor Voltage / Phase / Frequency (V / - / Hz)	/ /	/ /	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	Openings are sealed with plastic	Yes	No	
3	All components present (cooler, condenser, compressor, motor, etc)	Yes	No	
4	Motor bearings are double sealed and permanently lubricated	Yes	No	
5	Electrical disconnect is provided	Yes	No	
6	Installation and startup manual provided	Yes	No	
7	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Chiller**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	There is a minimum of 36 inches of clearance around entire unit	Yes	No	
3	There is a minimum of 48 inches of clearance in front of starter or VFD	Yes	No	
4	There is a minimum clearance of one unit length for tube pull space	Yes	No	
5	All components are accessible for maintenance	Yes	No	
6	Unit labeled and is easy to see	Yes	No	
B	**Refrigerant**			
1	Full tightened by chiller startup technician	Yes	No	
2	Unit factory leak tested and report is attached	Yes	No	
3	Relief piped to outdoors	Yes	No	
4	Refrigerant monitor installed and operational before refrigerant loaded	Yes	No	
5	Drip leg and flex connector at unit connection to relief piping	Yes	No	

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LAWA Commissioning Forms

Centrifugal Chiller (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
C	**Electrical**			
1	Lugs tightened by chiller startup technician	Yes	No	
2	Safety disconnect switch installed in an accessible location	Yes	No	
3	Lug sizing matches wire size requirement	Yes	No	
4	Primary and secondary fused control power transformer provided	Yes	No	
5	Star-delta starter provided	Yes	No	
6	AIC and withstand ratings exceed available fault shown on electrical drawing s	Yes	No	
7	VFD installed (if applicable)	Yes	No	
D	**Controls - Installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	All sensors are installed and calibrated	Yes	No	
3	Safety items installed and verified	Yes	No	
E	**Controls - Startup**			
1	Unit voltage and amps verified	Yes	No	
2	Remote start and stop signal verified	Yes	No	
3	Chilled water reset signal verified	Yes	No	
4	Demand limiting signal verified	Yes	No	
5	Unit "run" sequences verified	Yes	No	
6	Unit "alarm" sequences verified	Yes	No	
F	**Mechanical - Startup**			
1	Manufacturer's startup checklist completed and attached	Yes	No	
2	The following safety controls are operational and have been verified	Yes	No	
3	Low chilled water temperature	Yes	No	
4	High refrigerant pressure	Yes	No	
5	Low oil flow protection	Yes	No	
6	Loss of chilled water flow	Yes	No	
7	Loss of condenser flow	Yes	No	
8	Loss of refrigerant protection	Yes	No	
9	Motor current overload	Yes	No	
10	Phase reversal / unbalance/single phasing	Yes	No	
11	Over/ under voltage	Yes	No	
12	Failure of water temperature sensor used by controller	Yes	No	
13	Full load test to verify load limiting	Yes	No	
14	System starts and runs without any unusual noise or vibration	Yes	No	

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LAWA Commissioning Forms

Centrifugal Chiller (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
G	**TAB**			
1	Chilled water strainer is clean	Yes	No	
2	Evaporator pressure drop (ft)	Yes	No	
3	Chilled water flow rate (gpm)	Yes	No	
4	Condenser water strainer is clean	Yes	No	
5	Condenser water pressure drop (ft)	Yes	No	
6	Condenser water flow rate (gpm)	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" responses

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Cooling Tower

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Cooling Capacity (MBH/gpm)			
5	Fan speed / power (rpm / hp)			
6	Motor Power and Speed (hp / rpm)			
7	Motor Voltage / Phase / Frequency (V / - / Hz)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The air openings are sealed with plastic	Yes	No	
3	The water openings are sealed with plastic plugs	Yes	No	
4	All components present (fans, pumps, fill, etc)	Yes	No	
5	All access doors are operable	Yes	No	
6	Installation and startup manual provided	Yes	No	
7	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Cooling Tower**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit location is clear of trees, rubbish, dust, etc. to prevent fouling	Yes	No	
5	Vibration isolators installed and in good condition	Yes	No	
6	Ladder reached grade level	Yes	No	
7	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawings	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Makeup water supply provided	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
8	Piping insulation complete and installed as per specifications	Yes	No	

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LAWA Commissioning Forms

Cooling Tower (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
C	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Fan motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components grounded	Yes	No	
5	VFD installed (if applicable)	Yes	No	
D	**Controls - Installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	All sensors (temperature, pressure, etc) are installed and calibrated verified	Yes	No	
3	Valve actuators installed and calibration verified	Yes	No	
4	Safety items installed and verified (low water, high water, etc)	Yes	No	
E	**Controls - Startup**			
1	Sequence of control verified	Yes	No	
2	High / low water alarms operational	Yes	No	
3	VFD operational	Yes	No	
4	Float switch, motorized valves, makeup water are operational	Yes	No	
F	**Mechanical - Startup**			
1	Tower basin filled	Yes	No	
2	Sump strainers and nozzles are clean	Yes	No	
3	Motors and gear box lubricated	Yes	No	
4	Fan pitch adjusted	Yes	No	
5	Critical frequencies identified, recorded, and programmed out of VFD	Yes	No	
6	System start and runs without any unusual noise or vibration	Yes	No	
7	Manufacturer's startup checklist completed and attached	Yes	No	
G	**Water treatment - Startup**			
1	Galvanized surfaces passivated (if applicable)	Yes	No	
2	Conductivity and pH controls operational	Yes	No	
3	Makeup flow meter signal operational	Yes	No	
4	Blow – down control operational	Yes	No	
5	No – flow injection interlock operational	Yes	No	

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LAWA Commissioning Forms

Cooling Tower (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
H	**TAB**			
1	Unit is free of unusual noise or vibration	Yes	No	
2	Motor overloads verified	Yes	No	
3	Motor rotation verified – each motor	Yes	No	
4	Motor voltage and amps verified - each phase of each motor	Yes	No	
5	Flow rate through tower verified	Yes	No	
6	Water distributed evenly in hot water basin with flow at 50% - no dumping	Yes	No	
7	Water distributed evenly in hot water with flow at 100%	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" responses		

Contactor:			**LAWA Representative:**		
Checks by: _____	_____	Date: _____;	Checks by:_____	_____	Date: _____
Commissioning Agency:					
Checks by: _____	_____	Date: _____;	Checks by:_____	_____	Date: _____
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LAWA Commissioning Forms

Coil, HW Heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Equipment or Area Served			
5	Heating Capacity (MBH/gpm)	/	/	
6	Piping Inlet / Outlet Diameter (in.)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The water openings are sealed	Yes	No	
3	Installation and startup manual provided	Yes	No	
4	Unit tags affixed	Yes	No	
5	Manufacturer's rating readable/accurate	Yes	No	
2	**Construction checklist**			
A	**Installation of Reheat Coil**			
1	Unit secured as required by specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawings	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation complete and installed as per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	

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LAWA Commissioning Forms

Coil, HW Heat (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
C	**Controls**			
1	Temperature sensor calibration verified	Yes	No	
2	Hot water actuator calibration verified	Yes	No	
3	Point-to-point connections of control wiring verified	Yes	No	
4	Central system accurately represents conditions of unit	Yes	No	
5	Heating sequence of control verified	Yes	No	
D	**TAB**			
1	Entering and leaving coil air temperature ()	/	/	
2	Entering and leaving coil water temperature	/	/	
3	Coil flow and air /water pressure drops verified	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Ductwork: Installation

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

Item	Task Description	Response		Comment:
1	**System Checks**			
A	**Sheet Metal Ductwork Installation Checks**	Submitted	Delivered	
1	Ductwork is clean and free of damage prior to installation.	Yes	No	
2	Ductwork is installed in accordance with SMACNA HVAC Duct Construction Standards, 2005	Yes	No	
3	All hat sections and standoff brackets are at the same height as the duct lining.	Yes	No	
4	Access doors are installed in all casting, plenums, ductwork adjacent to fire dampers, automatic dampers, smoke dampers, and reheat coils, and as indicated on drawing.	Yes	No	
5	The access doors on casings or housings open to the inside on the discharge side and to the outside on the suction side.	Yes	No	
6	All galvanized sheet metal is separated from aluminum and copper with lead or felt gaskets.	Yes	No	
7	Ductwork is structurally sound to prevent drumming and sagging.	Yes	No	
8	All transverse and longitudinal joints are sealed	Yes	No	
9	All branch the tee connections are 45 degree.	Yes	No	
10	All medium pressure branch and tee connections are expanded 30 degrees on at least three sides.	Yes	No	
11	Ductwork meets static pressure requirements specified below and leakage class A for these pressures as defined by SMACNA HVAC Duct Construction Standards, 1985	Yes	No	
12	All ductwork except as noted in the specification is leak tested.	Yes	No	
13	Elbows have an inside radius equal to a minimum of ¾ of the width if the duct	Yes	No	
14	All square elbows and radius elbows larger than 18 inches have turning vanes	Yes	No	
15	All wall and floor penetrations are sealed	Yes	No	
16	Volume dampers are at minimum provided for each horizontal branch from vertical risers serving two or more floors and branches serving two or more outlets	Yes	No	
17	All equipment requiring maintenance is accessible (valves, junction boxes, etc.)	Yes	No	
18	All duct openings temporary sealed to maintain duct system cleanliness.	Yes	No	
19	Record drawings have been updated to reflect any changes made.	Yes	No	
		Yes	No	

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Ductwork: Installation (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

Item	Task Description	Response		Comment:
1	**System Checks**			
B	**Flexile Ductwork Installation Checks**	Submitted	Delivered	
1	Flexible ductwork is clean and free from damage prior to installation	Yes	No	
2	Flexible ductwork is free of sags and kinks.	Yes	No	
3	Flexible ductwork is installed using extra heavy flexible duct straps	Yes	No	
4	The maximum length of flexible ductwork is 5 feet	Yes	No	
5	Flexible ductwork does not penetrate walls	Yes	No	
6	Flexible ductwork does not have 90 degree bends.	Yes	No	
C	**Ductwork Type Static Pressure Classification Installation Checks**			
1	From fan discharge to and including vertical risers, +6 in. static pressure	Yes	No	
2	Branch supply ductwork, +4 in. static pressure.	Yes	No	
3	Branch supply ductwork from terminal to room outlet, +1 in. static pressure.	Yes	No	
4	Exhaust/return ductwork, ± 1 in. static pressure	Yes	No	
5	All other ductwork, ± 2 in. static pressure	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Ductwork: Installation- Daily Checklist

Checklist for Daily Progress

Instructions: Step 1: This form is completed daily by each work crew at the end of their shift, indicate crew/shift designation.
Step 2: Date and describe work completed in the appropriate section (1 for pre-installation and 2 for installation.
Step 3: verify achievement of quality requirements by circling "Yes" or "No". For negative responses, complete Section 3

1. Pre-insulation inspection by installer

Date	Description of Work Performed (relate to drawings and number)	Checklist Items			Percent Complete	Initial
		A. Clean	B. Flex	C. Less 5'		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Ductwork is clean and free of damage prior to installation.
B. Flexible ductwork is clean and free of damage prior to installation.
C. The maximum length of flexible ductwork is 5'.

2. Installation of Insulation Checklist by installer

Date	Description of Work Performed (relate to drawings and drawing number)	Checklist Items			Percent Complete	Initial
		A. SMACNA	B. Drumming	C. Assess Doors		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Ductwork is installed in accordance with SMACNA HVAC Duct Construction Standards, 2005.
B. Ductwork is structurally sound to prevent drumming and sagging.
C. All required access doors installed.

3. Conflicts (Attach sketches or other documentation, including resolutions support; all items in section 1 and 2 to be noted in this section. In addition, any conflicts or non-compliance of any items on the general checklist (Checklist Number 7A) or items not on the checklist should be noted in this section. If Cx Team determines it is significant issues, items will be added to the daily checklist

Date	Description of Conflict	Resolution or Suggested Resolution	Resolved
			Yes/No
			Yes/No
			Yes/No
			Yes/No

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

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LAWA Commissioning Forms

Ductwork: Insulation

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

Item	Task Description	Response		Comment:
1	**System Checks**			
A	**Installation Checks**	Submitted	Delivered	
1	Ductwork is clean, dry and free of damage prior to insulation installation.	Yes	No	
2	Insulation is clean and dry during installation and application of any finish	Yes	No	
3	Pressure and leakage tests performed and reports have been submitted prior to insulation installation.	Yes	No	
4	All equipment requiring maintenance is accessible (valve, junction boxes, etc.)	Yes	No	
5	Insulation is continuous through openings and sleeves in mom-rated construction, and is butted tightly against the fire stop with butt joints taped in rated construction.	Yes	No	
6	All insulation edges temporary sealed to maintain duct insulation cleanliness	Yes	No	
7	Insulation is removable at access panels with metal corner beads.	Yes	No	
8	Insulation omitted at all equipment name plates and/or data plates	Yes	No	
9	All outdoor intakes, housing, plenums from point of entry into the building to the fan or supply discharge and to exhaust duct from damper to outside and elsewhere be indicated on drawings are insulated with 1 ½ inch rigid insulation board w/ vapor barrier	Yes	No	
10	All exposed conditioned supply ductwork within the building is insulated with 1 inch thick rigid insulation board with vapor barrier	Yes	No	
11	All non flexible ductwork insulation is fastened by applying Foster No. 85-20 adhesive in 4-inch wide continuous bands on 120inch centers and further secured by welded mechanical pins applied on 12-inch centers as specified.	Yes	No	
12	All concealed flexible and round ductwork is insulated with 1 ½ inch thick insulation and secured by the means of metal staples using the stitching methods of application an das detailed in the specifications.	Yes	No	
13	All exterior corners are sealed with a 5-inch wide tape	Yes	No	

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Ductwork: Insulation (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

Item	Task Description	Response		Comment:
1	**System Checks**			
B	**Installation checks – Flexible Ductwork**	Submitted	Delivered	
1	Flexible ductwork is clean and free from damage prior to installation	Yes	No	
2	Flexible ductwork is free of sags and kinks.	Yes	No	
3	Flexible ductwork is installed using extra heavy flexible duct straps	Yes	No	
4	The maximum length of flexible ductwork is 5 feet	Yes	No	
5	Flexible ductwork does not penetrate walls	Yes	No	
6	Flexible ductwork does not have 90 degree bends.	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Ductwork: Insulation- Daily Checklist

Checklist for Daily Progress

Instructions: Step 1: This form is completed daily by each work crew at the end of their shift, indicate crew/shift designation.
Step 2: Date and describe work completed in the appropriate section (1 for pre-installation and 2 for installation.
Step 3: verify achievement of quality requirements by circling "Yes" or "No". For negative responses, complete Section 3

1. Pre-insulation inspection by installer

Date	Description of Work Performed (relate to drawings and number)	Checklist Items			Percent Complete	Initial
		A. Clean	B. Leak Tested	C. Material		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Ductwork is clean or cleaned before insulation installed.
B. All sections leak tested prior to applying insulation.
C. Insulation material inspected to assure it had not been damaged.

2. Installation of Insulation Checklist by installer

Date	Description of Work Performed (relate to drawings and drawing number)	Checklist Items			Percent Complete	Initial
		A. Thickness	B. Sealed	C. Vapor Barrier		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Insulation thickness checked against project manual and is correct.
B. All flex duct installed per drawing and no runs more than five feet.
C. All vapor barriers installed.

3. Conflicts (Attach sketches or other documentation, including resolutions support; all items in section 1 and 2 to be noted in this section. In addition, any conflicts or non-compliance of any items on the general checklist (Checklist Number 8A) or items not on the checklist should be noted in this section. If Cx Team determines it is significant issues, items will be added to the daily checklist

Date	Description of Conflict	Resolution or Suggested Resolution	Resolved
			Yes/No
			Yes/No
			Yes/No

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Operations and Maintenance: Energy Efficiency Checklist

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description		Response		Comment:
1	**Owner's Project Requirements**				
A	**Energy Efficiency Goal: Less than 20,000 kWh/ month, 35 kW, and 120 therms**	**Record Actual Usage**	**Was OPR Achieved?**		
1	Actual kWh		Yes	No	
2	Actual kW		Yes	No	
3	Actual therms		Yes	No	
B	**System Manual and Building Documentation**	**Provide appropriate document**	**Do the system operations meet OPR?**		
1	Have changes been made to the energy control hardware this month?		Yes	No	
2	Have software change been made, such as schedule or sequences?		Yes	No	
3	Has the Systems Manual been updated?		Yes	No	
4	Have changes been made to the drawings and schedules?		Yes	No	
5	Has the commissioning team or commissioning authority been involved?		Yes	No	
6	Has the optimization in section 24 of the System Manual implemented this month?		Yes	No	
C	**General Owner's Needs**				
1	Are there any unresolved punchlist items related to energy efficiency open? If so, list the number		Yes	No	
2	Was Elementary Control Services required to resolve any energy efficiency related issues this month?		Yes	No	
3	Where the seasonal control checks in Section 88 of the System Manual implemented?		Yes	No	
4	Are there any conflicts with user' needs and energy efficiency?		Yes	No	
5	Was a commissioning optimization workshop held this month?		Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Operations and Maintenance: Energy Efficiency Checklist

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

"YES" or "NO" Responses:

Item	Item	Explain all "YES" Responses and Provide Reason for "NO" Responses

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Energy Recovery Wheel

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Exhaust air flow (cfm)			
5	Supply air flow (cfm)	/	/	
6	Voltage / Phase / Frequency (V/ _/Hz)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The air openings are sealed with plastic	Yes	No	
3	All components present and in proper order	Yes	No	
4	All access doors are operable	Yes	No	
5	Installation and startup manual provided	Yes	No	
6	Unit identification attached and visible	Yes	No	
2	**Construction checklist**			
A	**Installation of Energy Recovery Wheel**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Purge section in correct direction	Yes	No	
3	Adequate clearance around unit for service	Yes	No	
4	All components accessible for maintenance	Yes	No	
5	Unit can be removed from building	Yes	No	
6	Unit identification attached and visible	Yes	No	
B	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Wheel rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
5	VFD installed (if applicable)	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Energy Recovery Wheel (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
C	**Ductwork**			
1	Duct work is attached according to manufacturer recommendations	Yes	No	
2	Inlets and outlets of energy recovery wheel are free of ductwork blockage.	Yes	No	
3	Structural support for ductwork is independent of wheel unit	Yes	No	
4	Ductwork placement allows unrestricted airflow and clear view of rotation labeling	Yes	No	
5	Access doors have been supplied in each duct near the unit	Yes	No	
6	Adequate locations for testing and balancing of unit	Yes	No	
7	All dampers and sensors are accessible (access doors)	Yes	No	
8	Ductwork is clean and free of debris	Yes	No	
D	**Controls – installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Temperature, pressure, and CO_2 sensors (as applicable) are installed and calibrated	Yes	No	
3	Safety items installed and verified (freezestat, high pressure, motor overload, etc)	Yes	No	
E	**Mechanical – startup**			
1	System clean	Yes	No	
2	Wheel lubricated and aligned	Yes	No	
3	Wheel belts have proper tension and are in good condition	Yes	No	
4	Seals have been adjusted according to manufacturer specifications	Yes	No	
5	Duct installation conforms to airflow labeling	Yes	No	
6	System starts and runs without any unusual noise or vibration	Yes	No	
7	Manufacturer's startup checklist completed and attached	Yes	No	
F	**Control – Startup**			
1	Warm-up sequence of control verified	Yes	No	
2	Cool-down sequence of control verified	Yes	No	
3	Economizer sequence of control verified	Yes	No	
4	Unoccupied sequence of control verified	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

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LAWA Commissioning Forms

Energy Recovery Wheel (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
G	**TAB**			
1	Motor voltage and amps verified	Yes	No	
2	Wheel speed, design/ actual (rpm)	Yes	No	
3	Pressure drop between outside air and return air is large enough	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Exhaust Fan

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Fan type			
5	Capacity / Static Pressure (cfm / in.wg)	/	/	
6	Motor Power / Speed (hp/rpm)	/	/	
7	Motor Voltage / Phase / Frequency (V/ - / Hz)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The air openings are sealed with plastic	Yes	No	
3	All components present (belt guard, motor, damper, spring isolators, etc.)	Yes	No	
4	Installation and startup manual provided	Yes	No	
5	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Exhaust Fan**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Shipping bots have been removed (if applicable)	Yes	No	
6	Belts are tight (if applicable)	Yes	No	
7	Back draft damper installed and moves freely	Yes	No	
8	Protective shrouds for fan and belts in place and secure	Yes	No	
9	Unit labeled and is easy to see	Yes	No	
B	**Ductwork**			
1	Adequate locations available for testing and balancing unit	Yes	No	
2	All dampers and sensors are accessible (access panels)	Yes	No	
3	Vibration isolators installed	Yes	No	
4	All dampers close tightly and stroke fully and easily	Yes	No	
5	Ductwork is clean and free of debris	Yes	No	
C	**Electrical**			
1	Safety disconnect installed in an accessible location	Yes	No	
2	Motor rotation is in correct direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Exhaust Fan (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
D	**Controls – installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Dampers actuators installed and calibration verified	Yes	No	
3	Safety items installed and verified (high pressure, motor overload, etc)	Yes	No	
E	**Mechanical – startup**			
1	Unit is clean	Yes	No	
2	Internal isolators free to move	Yes	No	
3	Fan and motor lubricated and aligned	Yes	No	
4	Fan belts have proper tension and are in good condition (if applicable)	Yes	No	
5	System starts and runs without any unusual noise or vibration	Yes	No	
6	Manufacturer's startup checklist completed and attached	Yes	No	
F	**Control – Startup**			
1	Remote start/stop from central system verified	Yes	No	
2	Sequence of control is correct	Yes	No	
G	**TAB**			
1	Air flow, design / actual (cfm)	Yes	No	
2	Pressure drop, design / actual (in. wg)	Yes	No	
3	Fan rotation is in proper direction	Yes	No	
4	Motor overloads verified	Yes	No	
5	Motor voltage and amps verified – each phase	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Fan Coil Unit, CW & HW

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Capacity / Static Pressure (cfm / in. wg)			
5	Fan Motor Power (hp)	/	/	
6	Fan Motor Voltage / Phase / Frequency (V/ _ / Hz)	/	/	
7	Total / Sensible Cooling Capacity (MBH)	/	/	
8	Cooling Fluid Flow / Pressure Drop (gpm / ft.wg)			
9	Total Heating Capacity (MBH)			
10	Heating Fluid Flow / Pressure Drop (gpm / ft. wg)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	Coil surface areas are free of damage	Yes	No	
3	The water openings are sealed with plastic plugs	Yes	No	
4	All components present	Yes	No	
5	Installation and startup manual provided	Yes	No	
6	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Fan Coil Unit**			
1	Unit supported using adequately sized mounting anchors	Yes	No	
2	Metal-to-metal connections eliminated to prevent noise problems	Yes	No	
3	Adequate clearance around unit for service	Yes	No	
4	All components are accessible for maintenance	Yes	No	
5	Unit can be removed from building	Yes	No	
6	Unit labeled and is easy to see	Yes	No	
B	**Chilled Water Piping**			
1	Condensate piping properly installed (trapped and run to a drain)	Yes	No	
2	P/T ports installed across the cooling coil	Yes	No	
3	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
4	Piping arranged for ease of unit/coil removal	Yes	No	
5	Piping supported as required by specifications	Yes	No	
6	Piping is clean	Yes	No	
7	Piping insulation complete and installed as per specifications	Yes	No	
8	All valves and test ports are easily accessible	Yes	No	
9	Valve tags attached	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

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LAWA Commissioning Forms

Fan Coil Unit, CW & HW (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
C	**Hot Water Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit/coil removal	Yes	No	
3	Piping is supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation complete and installed as per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
D	**Ductwork**			
1	Adequate location available for testing and balancing of unit	Yes	No	
2	All dampers and sensors are accessible (access doors)	Yes	No	
3	All dampers close tightly and stroke fully and easily	Yes	No	
4	Filter is clean	Yes	No	
5	Filter is properly installed (air bypassing the filter is prevented)	Yes	No	
6	Ductwork is clean and free of debris	Yes	No	
E	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
F	**Controls – Installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Room thermostat installed and calibration verified	Yes	No	
3	Chilled and hot water actuators installed and calibration verified	Yes	No	
G	**Control – Startup**			
1	Unit operation accurately represented on main system	Yes	No	
2	Cooling sequence of control verified	Yes	No	
3	Heating sequence of control verified	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Fan Coil Unit, CW & HW (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
H	**TAB**			
1	Filters and coils are clean	Yes	No	
2	Motor rotation verified	Yes	No	
3	Motor overloads verified	Yes	No	
4	Motor voltage and amps verified – each phase	Yes	No	
5	Entering and leaving cooling coil air temperature()	Yes	No	
6	Entering and leaving heating coil air temperature()	Yes	No	
7	Entering and leaving chilled water temperature ()	Yes	No	
8	Entering and leaving hot water temperature ()	Yes	No	
9	Coil flow and air/water pressure drops verified – each coil	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Fire Damper

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Style	N/A		
4	Width (in.)			
5	Height (in.)	/	/	
6	Orientation	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components/accessories present	Yes	No	
3	Installation manual provided	Yes	No	
2	**Construction checklist**			
A	**Installation of Fire Damper**			
1	Unit secured as required by manufacturer and specification	Yes	No	
2	Adequate clearance around unit for maintenance	Yes	No	
3	Unit mounted in correct orientation	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Grilles, Registers & Diffusers

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Frame			
4	Color			
5	Neck Width (in.)	/	/	
6	Neck Height (in.)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components/accessories present	Yes	No	
3	Installation manual provided	Yes	No	
2	**Construction checklist**			
A	**Installation of Grilles / Register**			
1	Unit secured as required by manufacturer and specification	Yes	No	
2	Any surface blemishes have been touched up	Yes	No	
3	Design CFM confirmed	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

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LAWA Commissioning Forms

Humidifier, Steam

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial number	N/A		
4	Steam Output Capacity (lb/hr)			
5	Steam Input Capacity (lb/hr)	/	/	
6	Inlet Steam Maximum Pressure (psig)	/	/	
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	Installation and startup manual provided	Yes	No	
4	Unit tags affixed	Yes	No	
2	**Construction checklist**			
A	**Installation of Humidifier**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components are accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Unit located below duct level for good drainage	Yes	No	
6	Dispersion tube located as per manufacturer's recommendations	Yes	No	
7	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing.	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping sloped for complete drainage	Yes	No	
4	Piping supported as required by specifications	Yes	No	
5	Piping is clean and free from leaks	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
C	**Controls - Installation**			
1	Air flow sensor installed and calibration verified	Yes	No	
2	Duct high limit humidistat in stalled and calibration verified	Yes	No	

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Humidifier, Steam

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
D	**Controls – Startup**			
1	Sequence of control verified	Yes	No	
2	Unit operation accurately represented on main system	Yes	No	
3	Airflow sensor operation verified	Yes	No	
4	Duct high limit humidistat operation verified	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Response

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

HVAC Piping: Installation

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

Item	Task Description	Response		Comment:
1	**System Checks**			
A	**Installation Checks**	Submitted	Delivered	
1	Piping is clean and free of damage prior to installation	Yes	No	
2	Piping is free to expand and contract without noise or damage to hangers, joints, or the building.	Yes	No	
3	Piping is installed with sufficient pitch and arranged in a manner to ensure drainage and venting of the entire system	Yes	No	
4	Manual air vents are provided at high points in close water systems	Yes	No	
5	Changes in pipe sizes are made with the proper size reducing fittings, reducing fittings, reducing elbow or reducing tees. Bushings are not allows	Yes	No	
6	All piping supports and hangers meet criteria set in Section 15140 of the specification	Yes	No	
7	All fittings meet specification requirements.	Yes	No	
8	All equipment requiring maintenance is accessible (valves, junction boxed, etc)	Yes	No	
9	Piping does not block access to equipment that is part of this system or another system (e.g., air terminal units)	Yes	No	
10	Piping is installed in a manner to ensure that insulation will not contact adjacent surfaces	Yes	No	
11	All pipe openings are temporarily sealed to maintain piping system cleanliness	Yes	No	
12	Record drawings have been updated to reflect any changes made.	Yes	No	
13	Nipples are made of the same material as the pipe	Yes	No	
14	Connections between copper and steel pipes are made with dielectric fittings	Yes	No	
15	A union is provided ahead of each screwed valve, trap, or strainer, and on each side of each piece of equipment and whatever needed to dismantle piping.	Yes	No	
16	Mechanical coupling if used is only used for piping and location as described in the specification section 15060	Yes	No	
17	The chilled water system is installed with high pressure fittings, flanges and unions	Yes	No	
18	Auxiliary drain valves are provided at all low points in hose bib piping to facilitate seasonal draining.	Yes	No	

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LAWA Commissioning Forms

HVAC Piping: Installation

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

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Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

HVAC Piping: Insulation

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist
Step 3: Samples of installed ductwork will be periodically reviewed to verify compliance

General Overall (Total Job) HVAC Piping Insulation Requirement

Item	Task Description	Response		Comment:
1	**System Checks**			
A	**Installation Checks**	Submitted	Delivered	
1	Piping is clean, dry and free of damage prior to installation.	Yes	No	
2	Pressure and leakage tests performed and reports have been submitted prior to insulation installation.	Yes	No	
3	All chilled water piping is insulated with 1 ½ inch thick fiberglass pipe insulation with vapor barrier except runouts to radiant cooling panels located beyond 1' – 0" within room being served.	Yes	No	
4	Secondary chilled water, low temperature chilled water (2 ½ inched thick), fan coil drain piping (2 ½ inched thick), and piping with electric trace freeze protection is insulated in the same manner as the chilled water pipes	Yes	No	
5	All chilled water pumps are insulated with 1 ½ inch thick rectangular box made of Manville 817 rigid fiberglass board having a density of 6 lb/ft^3 with rated vinyl coated and embossed laminate vapor seal (ASJ) jacket.	Yes	No	
6	The insulation box for the pump is open at top and bottom with a removable top to effect a complete insulation for each base mounted pump.	Yes	No	
7	The pipe insulation sections are firmly butted together and the longitudinal seam of the vapor barrier is cemented with Foster No. 85-75.	Yes	No	
8	End joints are sealed with a minimum of 3 inch wide factory furnished vapor barrier strips cemented with Foster No. 85-75	Yes	No	
9	All fittings, valves, strainers etc. is insulated as described in the specifications.	Yes	No	
10	Exterior piping has a 0.016 inch aluminum jacket with moisture barrier lock seam and Gasco of equal factory applied fittings in lieu of glass cloth jackets, A sample is submitted	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

HVAC Piping: Insulation (Continued)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

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LAWA Commissioning Forms

HVAC Piping: Insulation- Daily Checklist

Checklist for Daily Progress

Instructions: Step 1: This form is completed daily by each work crew at the end of their shift, indicate crew/shift designation.
Step 2: Date and describe work completed in the appropriate section (1 for pre-installation and 2 for installation.
Step 3: verify achievement of quality requirements by circling "Yes" or "No". For negative responses, complete Section 3

1. Pre-insulation inspection by installer

Date	Description of Work Performed (relate to drawings and number)	Checklist Items			Percent Complete	Initial
		A. Clean	B. Valves	C. Material		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Piping clean or cleaned before insulation installed.
B. Valves and other accessory surfaces were clean.
C. Insulation material inspected to assure it had not been damaged.

2. Installation of Insulation Checklist by installer

Date	Description of Work Performed (relate to drawings and drawing number)	Checklist Items			Percent Complete	Initial
		A. Thick-ness	B. Sealed	C. Vapor barrier		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		
		Yes/No	Yes/No	Yes/No		

A. Insulation thickness checked against project manual and is correct.
B. The pipe insulation sections are firmly butted together and the longitudinal seam of the vapor barrier is cemented with foster No. 87-75.
C. All vapor barriers installed.

3. Conflicts (Attach sketches or other documentation, including resolutions support; all items in section 1 and 2 to be noted in this section. In addition, any conflicts or non-compliance of any items on the general checklist (Checklist Number 8A) or items not on the checklist should be noted in this section. If Cx Team determines it is significant issues, items will be added to the daily checklist

Date	Description of Conflict	Resolution or Suggested Resolution	Resolved
			Yes/No
			Yes/No
			Yes/No
			Yes/No

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LAWA Commissioning Forms

Pump, HVAC

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Pump Type			
5	Impeller diameter (in.)			
6	Inlet / Outlet Sizes (in.)			
7	Capacity / Heat (gpm / ft wg)			
8	Motor Speed / Power (rmp/hp)			
9	Motor Voltage / Phase / Frequency (V/ _ / Hz)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	The water openings are sealed with plastic plugs	Yes	No	
4	Unit tags affixed	Yes	No	
5	Installation and startup manual provided	Yes	No	
6	Manufacturer's ratings readable / accurate	Yes	No	
2	**Construction Checklist**			
A	**Installation of Pump**			
1	Unit is supported as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Shut-off valves and unions installed on inlet and outlet of pump	Yes	No	
4	Pressure gauges installed on inlet and outlet of pump	Yes	No	
5	Piping supported as required by specifications	Yes	No	
6	Piping is clean	Yes	No	
7	Piping insulation complete and installed as per specifications	Yes	No	
8	All valves and test ports are easily accessible	Yes	No	
9	Valve tags attached	Yes	No	

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LAWA Commissioning Forms

Pump, HVAC

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

C	**Electrical**			
1	Safety disconnect installed in an accessible location	Yes	No	
2	Motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
D	**Mechanical – Startup**			
1	Unit checked, aligned, and certified prior to startup and report submitted	Yes	No	
2	Unit and motor lubricated before startup	Yes	No	
3	Pump shaft rotates easily with power turned off	Yes	No	
4	System starts and runs without any unusual noise or vibration	Yes	No	
5	Manufacturer's startup checklist completed and attached	Yes	No	
E	**TAB**			
1	Flow Rate, gpm	Yes	No	
2	Inlet pressure (ft) / Outlet pressure (ft)	Yes	No	
3	Motor rotation in the proper direction	Yes	No	
4	Motor overload verified	Yes	No	
5	Motor voltage and amps verified – each phase	Yes	No	
6	Start-up strainer removed (after 24 hours)	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Split System A/C Unit (Coil portion)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Airflow (cfm)			
5	Fan Motor Power (hp)			
6	Fan Motor Voltage / Phase / Frequency (V/ _ / Hz)			
7	Total Cooling Capacity (MBH)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	The refrigerant line openings are sealed	Yes	No	
4	Unit tags affixed	Yes	No	
5	Installation and startup manual provided	Yes	No	
2	**Construction Checklist**			
A	**Installation of Split System Coil**			
1	Unit supported using adequately sized mounting anchors	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Condensate drain piping un-trapped and runs to open sight drain	Yes	No	
6	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Refrigerant lines connected to indoor and outdoor units	Yes	No	
5	Piping is clean and free from leaks	Yes	No	
6	Piping insulation complete and installed as per specifications	Yes	No	
7	Unit filled with correct refrigerant	Yes	No	
8	All valves and test ports are easily accessible	Yes	No	
9	Valve tags attached	Yes	No	

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LAWA Commissioning Forms

Split System A/C Unit (Coil portion)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

C	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Fan motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
D	**Control – installation**			
1	Room thermostat installed and calibration verified	Yes	No	
2	Control wiring provided to outdoor (compressor) unit	Yes	No	
3	Communication with outdoor unit verified	Yes	No	
E	**Control – startup**			
1	Cooling sequence of control verified	Yes	No	
2	System starts and runs with no unusual noise or vibration	Yes	No	
3	Manufacturer's startup checklist completed and attached	Yes	No	
F	**TAB**			
1	Filters installed and are clean	Yes	No	
2	Entering and leaving air temperature (°F)	Yes	No	
3	Airflow (cfm)	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Split System A/C Unit (Compressor portion)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Airflow (cfm)			
5	Fan Motor Power (hp)			
6	Fan Motor Voltage / Phase / Frequency (V/ _ / Hz)			
7	Ambient Temperature (°F)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	The refrigerant line openings are sealed	Yes	No	
4	Unit tags affixed	Yes	No	
5	Installation and startup manual provided	Yes	No	
2	**Construction Checklist**			
A	**Installation of Split System Compressor**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit labeled and is easy to see	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Refrigerant lines connected to indoor and outdoor units	Yes	No	
5	Piping is clean and free from leaks	Yes	No	
6	Piping insulation complete and installed as per specifications	Yes	No	
7	Unit filled with correct refrigerant	Yes	No	
8	All valves and test ports are easily accessible	Yes	No	
9	Valve tags attached	Yes	No	

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LAWA Commissioning Forms

Split System A/C Unit (Compressor portion)

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

C	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Fan motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
D	**Control – installation**			
1	Control wiring provided to outdoor (compressor) unit	Yes	No	
2	Communication with outdoor unit verified	Yes	No	
E	**Control – startup**			
1	Safety items operational (high pres., low pres., discharge temp. switch).	Yes	No	
2	System starts and runs with no unusual noise or vibration	Yes	No	
3	Manufacturer's startup checklist completed and attached	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

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LAWA Commissioning Forms

Unit Heater

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Total Heating Capacity (MBH)			
5	Fan Motor Power (hp)			
6	Fan Motor Voltage / Phase / Frequency (V/ _ / Hz)			
7	Heating Fluid Flow /Pressure Drop (gpm / ft wg)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	The water openings are sealed with plastic plugs	Yes	No	
4	Manufacturer's data readable/ accurate	Yes	No	
5	Unit identification attached and visible	Yes	No	
2	**Construction Checklist**			
A	**Installation of Unit Heater**			
1	Unit supported using adequately sized mounting anchors	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Unit identification attached and visible	Yes	No	
B	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping arranged for ease of unit removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation complete and installed as per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
C	**Electrical**			
1	Local disconnect installed in an accessible location	Yes	No	
2	Motor rotation in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	

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LAWA Commissioning Forms

Unit Heater

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

D	Control			
1	Room thermostat installed and calibration verified	Yes	No	
2	Hot water actuator calibration verified	Yes	No	
3	Heating sequence of control verified	Yes	No	
4	Valve tags are attached	Yes	No	
E	**TAB**			
1	Motor rotation in the proper direction	Yes	No	
2	Motor overloads verified	Yes	No	
3	Motor voltage and amps verified – each phase	Yes	No	
4	Entering and leaving air temperatures (°F)	Yes	No	
5	Flow and air/water pressure drops verified	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

Variable Speed Drive

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Service Area			
5	Maximum Capacity (amps)			
6	Voltage / Phase / Frequency (V/ _ / Hz)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	All components present	Yes	No	
3	Installation and startup manual provided	Yes	No	
4	Wiring schematics (electrical & controls) for this application attached	Yes	No	
5	Unit tags affixed	Yes	No	
6	Manufacturer's ratings readable/accurate	Yes	No	
2	**Construction Checklist**			
A	**Installation of VSD**			
1	Unit secured as required by manufacturer and specifications	Yes	No	
2	Adequate clearance around unit for service	Yes	No	
3	All components accessible for maintenance	Yes	No	
4	Unit can be removed from building	Yes	No	
5	Unit labeled and is easy to see	Yes	No	
6	Wiring schematic inside enclosure and includes bypass section	Yes	No	
B	**Electrical**			
1	Drive to motor leads are in grounded metal conduit	Yes	No	
2	All electrical connections are tight	Yes	No	
3	All electrical components are grounded	Yes	No	
C	**Control – Installation**			
1	Control panel accessible and labeled properly	Yes	No	
2	Low voltage control signals are shielded and in own conduit	Yes	No	
3	Auxiliary safeties (F/A shutdown, etc) are installed and operational	Yes	No	
4	Analog output to control unit is isolated type	Yes	No	

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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LAWA Commissioning Forms

Variable Speed Drive

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

D	**Electrical – Pre-startup Checks**			
1	Motor full load amps less than max rating, design / actual	Yes	No	
2	Input voltage, design / actual (within 10% of rating)	Yes	No	
3	All grounds verified	Yes	No	
4	All fuses verified	Yes	No	
E	**Electrical – Startup**			
1	VSD properly powers up	Yes	No	
2	Stop button works	Yes	No	
3	Motor rotation is in the proper direction	Yes	No	
4	Minimum and maximum speeds reached using remote command	Yes	No	
5	"Accel" and "Decel" adjustments are made within the drive and do not depend on ramping signal from the DDC controls	Yes	No	
6	VSD restarts automatically	Yes	No	
7	No disconnect on load side of VSD	Yes	No	
8	Critical frequencies have been programmed out of VSD (if applicable)	Yes	No	
9	Motor runs in bypass mode while servicing or removing unit	Yes	No	
10	Motor overload protection and phase loss protection provided during bypass mode	Yes	No	
11	System starts and runs without any unusual noise or vibration	Yes	No	
12	Manufacturer's startup checklist completed and attached	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

Commissioning Agency:

Checks by: _____ _____ Date: _____; Checks by:_____ _____ Date: _____

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Los Angeles World Airports

LAWA Commissioning Forms

VAV Box, Fan Power w/ Elect heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Size (in)			
5	Max / Min Airflow (cfm)			
6	Heating Capacity (MBH/kW)			
7	Total Static Pressure (in. w.g.)			
8	Fan Power / Speed (hp/rpm)			
6	Voltage / Phase / Frequency (V/ _ / Hz)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The air openings are sealed with plastic	Yes	No	
3	The airflow sensing tubing is plugged	Yes	No	
4	The grommets for the airflow sensing tubing are secure	Yes	No	
5	The enclosure for the DDC control panel is in the proper location	Yes	No	
6	Installation and startup manual provided	Yes	No	
7	Unit tags affixed	Yes	No	
8	Manufacturer's ratings readable/accurate	Yes	No	
2	**Construction Checklist**			
A	**Hanging**			
1	Unit is supported as required by manufacturer and specifications	Yes	No	
2	Metal to metal connections eliminated to prevent noise problems	Yes	No	
3	Adequate clearance around control panel for maintenance	Yes	No	
4	Clear access below unit for easy maintenance	Yes	No	
5	Unit labeled and is easy to see	Yes	No	
6	Box openings temporarily sealed to maintain system cleanliness	Yes	No	
B	**Ductwork**			
1	Balancing damper present on inlet duct	Yes	No	
2	Sufficient length of straight ductwork installed upstream of unit	Yes	No	
3	Downstream ductwork free of transitions for sufficient length	Yes	No	
4	All components are accessible for maintenance			
5	Flexible connector (vibration isolator) installed on inlet duct to avoid noise problems from metal to metal contact			
6	Flex duct (if used) is installed in a way that avoids forming kinks on both inlet and outlet ductwork			

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VAV Box, Fan Power w/ Elect heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

C	**Electrical Heating Coil**			
1	Heating coil inspected for damage prior to applying power	Yes	No	
2	Wiring is properly sized	Yes	No	
3	All electrical connections are properly grounded	Yes	No	
4	All electrical connections are tight	Yes	No	
D	**Electrical**			
1	Local disconnect switch installed in an accessible location	Yes	No	
2	Motor rotation is in the proper direction	Yes	No	
3	All electrical connections are tight	Yes	No	
4	All electrical components are grounded	Yes	No	
5	Variable speed selector is operational	Yes	No	
6	P.E. switch is operational	Yes	No	
E	**Controls – Installation**			
1	Temperature sensor calibration verified	Yes	No	
2	Airflow sensor calibration verified	Yes	No	
3	Point-to-point connections of control wiring verified	Yes	No	
4	Central system accurately represents condition of unit	Yes	No	
F	**Control – Startup**			
1	Cooling/heating sequence of control verified	Yes	No	
2	Warm-up/cool-down sequence of control verified	Yes	No	
3	Unoccupied sequence of control verified	Yes	No	
G	**TAB**			
1	Motor rotation is in the proper direction	Yes	No	
2	Motor overloads verified	Yes	No	
3	Motor voltage and amps verified – each phase	Yes	No	
4	Minimum airflow (cfm) (design/measured)	Yes	No	
5	Maximum airflow (cfm) (design/measured)	Yes	No	
6	Entering and leaving coil air temperatures (°F)	Yes	No	

"NO" Responses:

Item	Item	Reason for "NO" Responses

Contactor: **LAWA Representative:**

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Los Angeles World Airports

LAWA Commissioning Forms

VAV Box, Non Fan Powered w/HW Heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

Item	Task Description	Response		Comment:
1	**Delivery Book**			
A	**Model Verification**	Submitted	Delivered	
1	Manufacturer			
2	Model			
3	Serial Number			
4	Size (in.)			
5	Max/Min Airflow (cfm)			
6	Heating Capacity (MBH/gpm)			
B	**Physical Checks**			
1	Unit is free from physical damage	Yes	No	
2	The air openings are sealed with plastic	Yes	No	
3	The water openings are sealed with plastic plugs	Yes	No	
4	The airflow sensing tubing is plugged	Yes	No	
5	The grommets for the airflow sensing tubing are secure	Yes	No	
6	The enclosure for the DDC control panel is in the proper location	Yes	No	
7	Installation and startup manual provided	Yes	No	
8	Unit tags affixed	Yes	No	
9	Manufacturer's ratings readable/accurate	Yes	No	
2	**Construction Checklist**			
A	**Hanging**			
1	Unit is supported as required by manufacturer and specifications	Yes	No	
2	Metal to metal connections eliminated to prevent noise problems	Yes	No	
3	Adequate clearance around control panel for maintenance	Yes	No	
4	Clear access below unit for easy maintenance	Yes	No	
5	Unit labeled and is easy to see	Yes	No	
6	Box openings temporarily sealed to maintain system cleanliness	Yes	No	

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Los Angeles World Airports

LAWA Commissioning Forms

VAV Box, Non Fan Powered w/HW Heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

B	**Ductwork**			
1	Balancing damper present on inlet duct	Yes	No	
2	Sufficient length of straight ductwork installed upstream of unit	Yes	No	
3	Downstream ductwork free of transitions for sufficient length	Yes	No	
4	All components are accessible for maintenance	Yes	No	
5	Flexible connector (vibration isolator) installed on inlet duct to avoid noise problems from metal-to-metal contact	Yes	No	
6	Flex duct (if used) is installed in a way that avoids forming kinks on both inlet and outlet ductwork	Yes	No	
C	**Piping**			
1	All piping components have been installed (in the correct order) as required by detail drawing	Yes	No	
2	Piping is arranged for ease of unit/coil removal	Yes	No	
3	Piping supported as required by specifications	Yes	No	
4	Piping is clean	Yes	No	
5	Piping insulation is complete and installed as per specifications	Yes	No	
6	All valves and test ports are easily accessible	Yes	No	
7	Valve tags attached	Yes	No	
D	**Controls - Installation**			
1	Temperature sensor calibration verified	Yes	No	
2	Airflow sensor calibration verified	Yes	No	
3	Point-to- Point connections of control wiring verified	Yes	No	
4	Central system accurately represents condition of unit	Yes	No	
E	**Controls – Startup**			
1	Cooling/heating sequence of control verified	Yes	No	
2	Warm-up/cool-down sequence of control verified	Yes	No	
3	Unoccupied sequence of control verified	Yes	No	

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VAV Box, Non Fan Powered w/HW Heat

Instructions: Step 1: Circle Yes or No and fill in with requested information
Step 2: Explain all "No" responses at the bottom of the checklist

F	TAB			
1	Minimum airflow (cfm) (design / measured)	Yes	No	
2	Maximum airflow (cfm) (design / measured)	Yes	No	
3	Entering and leaving coil air temperature (°F)	Yes	No	
4	Entering and leaving coil water temperature (°F)	Yes	No	
5	Coil flow and air/water pressure drops verified	Yes	No	

"NO" Responses:

Item	Date	Reason for "NO" Response

Contactor: **LAWA Representative:**

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