



## Air Flow Monitoring Station Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

Air Flow Monitored: OSA Flow

Verify	Pass/Fail	Notes
Proper sensor locations with adequate clearances		
Sensors or probes are mounted for equal area spacing		
Sensors or probes mounted in proper air flow direction		
Transmitter installed within cable length of sensor or probes		
Transmitter location is not exposed to water or moisture		
Display is mounted at eye level		
Ambient conditions are within manufacturer's tolerances		
Drip loops formed in cables that may contact moisture		
All electrical connections are on proper terminals		
Proper phase relationship between multiple transmitters		
All wiring meets manufacturer's recommendations		
All units are properly mounted and secured		
Output ranges set properly - note switch or jumper settings		
Protocol set properly - note switch or jumper settings		
Address set properly - note switch or jumper settings		
Terminations set properly - note switch or jumper settings		

Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Ductwork Air Leakage Test

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: 710-AHU-1A  
System: Air Side  
Date:

**Test Number:** 1 ☐ All pre-functional testing is complete ☐ Backchecked by Commissioning Authority

### Part 1 - Physical Details

Section of ductwork tested:   
Surface area of duct being tested:   
Test leakage class (A/B/C/D):  Static Pressure:   
Leakage factor:   
Maximum permitted leakage (bxd):

### Part 2 - Test Details

Duct static pressure reading:   
Type of flow measuring device:  small / medium / large nozzle  
Range of measurement on flow measuring device:   
Reading of flow measuring device:   
Interpreted air flow leakage rate:   
Duration of test (normally 15 minutes):

### Part 3 - Calibration Details

Type of test instrument:   
Serial number:   
Calibration certificate:   
Date issued:

### Comments

Tested By:

Witnessed By:

Representing:

Representing:



## Ductwork Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: 710-AHU-1A  
System: Air Side  
Date:

Installation Checks		
Verify	Pass / Fail	Notes
Ductwork sealed		
Ductwork properly supported		
Ductwork in good condition		
Access panels properly installed and gasketed		
Seismic support installed per specs and code		
Ducts properly labeled		
Ducts properly insulated or lined		
Branch dampers installed		
Balancing dampers installed		
Turning vanes installed		
Penetrations thru construction properly sealed		
Flexible connections at equipment operational		
Sound attenuators installed		
Fire / smoke dampers installed properly		
Flex ducts properly installed and supported		
Diffusers, registers, and grills properly installed		
Diffuser deflections set per drawings		
Intakes and plenums clear of debris		
Clean up complete		

### Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Air Handling Unit Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Airflow (CFM)			
Cooling Capacity (MBH)			
Heating Capacity (MBH)			
Voltage			
Phase			

Components / Quantity			
Supply Fans	0	Economizers	0
Return Fans	0	Filters	0
Exhaust / Relief Fans	0	Humidifiers	0
VFDs	0	Air Flow Monitors	0
Cooling Coils	0	Dx Circuits	0
		CO2 Monitors	0
		Auxiliary Duct Heaters	0
		Condensate Pumps	0
		Heat Recovery Wheels	0
		Gas Burners	0

Installation Checks		
Verify	Pass / Fail	Notes
Cabinet and general installation acceptable		
Permanent labels affixed		
All damper actuators installed and operational		
Access doors close tightly - no leaks		
Duct connections tight and sealed properly		
Vibration isolation installed and released from locks		
Maintenance access acceptable		
Sound attenuation installed		
Insulation installed properly		
Instrumentation installed properly		
Unit free of debris, mold, or mildew		
Filters installed and labeled for replacements		
UV lights installed properly		



## Air Handling Unit Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

### Supply Fan Checks

Verify	Pass / Fail	Notes
Fan and motor alignment correct	<input type="checkbox"/>	
Belt tension and condition good	<input type="checkbox"/>	
Protective shrouds for belts in place and secure	<input type="checkbox"/>	
Compartment / area clean	<input type="checkbox"/>	
Fan and motor lubricated properly	<input type="checkbox"/>	
Fan rotates easily	<input type="checkbox"/>	
Check motor rotation	<input type="checkbox"/>	

### Return Fan Checks

Verify	Pass / Fail	Notes
Fan and motor alignment correct	<input type="checkbox"/>	
Belt tension and condition good	<input type="checkbox"/>	
Protective shrouds for belts in place and secure	<input type="checkbox"/>	
Compartment / area clean	<input type="checkbox"/>	
Fan and motor lubricated properly	<input type="checkbox"/>	
Fan rotates easily	<input type="checkbox"/>	
Check motor rotation	<input type="checkbox"/>	

### Filter and Damper Checks

Verify	Pass / Fail	Notes
Filters clean and tight fitting	<input type="checkbox"/>	
Filter pressure differential device installed	<input type="checkbox"/>	
Correct filter type installed	<input type="checkbox"/>	

### Electrical Checks

Verify	Pass / Fail	Notes
Disconnects installed properly and labelled	<input type="checkbox"/>	
All electrical connections tight	<input type="checkbox"/>	
Grounding installed properly	<input type="checkbox"/>	
Over current protection installed	<input type="checkbox"/>	
Convenience outlet operational	<input type="checkbox"/>	



## Air Handling Unit Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

### VFD Checks

Verify	Pass / Fail	Notes
VFD wiring complete	<input type="checkbox"/>	

### Control Checks

Verify	Pass / Fail	Notes
All control devices and wiring complete	<input type="checkbox"/>	
Smoke detectors installed	<input type="checkbox"/>	

### Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



### Coil Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

Piping Installation Checks		
Verify	Pass / Fail	Notes
System thermometers and gauges installed properly	<input type="checkbox"/>	
Unions positioned for easy coil removal	<input type="checkbox"/>	
Condensate drain piping installed properly	<input type="checkbox"/>	
Piping installed properly	<input type="checkbox"/>	
Insulation installed properly	<input type="checkbox"/>	
Piping penetrations sealed	<input type="checkbox"/>	
Piping flushed and checked for leaks	<input type="checkbox"/>	
Air vents installed and piped to drain	<input type="checkbox"/>	
Strainers in place and clean	<input type="checkbox"/>	
Isolation valves and balancing valves installed	<input type="checkbox"/>	
Valve tags installed	<input type="checkbox"/>	

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## VFD Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

Test Number: 1

### Nameplate Data

	Design	Submitted	Actual (As-Built)
Manufacturer			
Model Number			
Serial Number			
DDC Address			
Rating			
Operating Voltage			
Phase			
Hertz			

### General Installation Checks

Verify	Pass / Fail	Notes
Installation is complete		
Correct size and type of VFD installed		
Equipment in good condition		
Adequate maintenance access		
Equipment labels permanently affixed		
UL or other approved agency listing stamp affixed		
Location not subject to excessive moisture or dirt		
Location not subject to excessive temperatures		
Appropriate Voltage / Hz supplied to unit		
Drive size appropriate for motor size		
Cooling air flow path clean and unobstructed		
Unit is fully programmed and documented		
Note acceleration time setting		
Note deceleration time setting		
BAS / control interface complete		
Restart on power failure parameter set to auto		
Note minimum and maximum speed settings		
Security settings complete and documented		
Note drive response to loss of signal setting		
Note output pulse resolution setting		
Note input motor FLA settings		
Note maximum frequency limit setting		
Safety checks on VFD complete		
Electrical disconnects installed properly		
All wiring connections tight		
Overload protection sized properly		
Equipment grounded properly		





## VFD Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM  
Location: ROOF

Unit ID: **710-AHU-1A**  
System: Air Side  
Date:

Operational Checks		
Verify	Pass / Fail	Notes
Operation checked in HAND, OFF, and AUTO	<input type="checkbox"/>	
Operation checked in BYPASS mode	<input type="checkbox"/>	
Proper rotation is forward mode	<input type="checkbox"/>	
Fire alarm interface / operation verified	<input type="checkbox"/>	
Sequence of operation verified and documented	<input type="checkbox"/>	
Control panel is operational	<input type="checkbox"/>	
Verify proper operation on loss of control signal	<input type="checkbox"/>	

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Terminal Unit Pre-Functional Checklist

Project: VAPA - Research VMU

Service: AIR VALVE

Location:

Unit ID:

**710-AV-1-01**

System:

Air Side

Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Max Airflow			
Min Airflow			
Inlet Size			

Installation Checks		
Verify	Pass / Fail	Notes
Unit and ductwork supported properly		
Seismic supports installed		
Vibration isolation installed and functional		
Adequate maintenance access		
Equipment in good condition - no visible damage		
Equipment labels installed		
Room temperature sensor installed		
Unit controls installation complete		
Ductwork insulated or lined properly		
Volume dampers installed in each branch duct		
All duct fittings tight and properly sealed		
Flex duct installed properly		

### Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority

**Terminal Unit Pre-Functional Checklist**

Project: VAPA - Research VMU

Service: 1-221 / 1-223

Location:

Unit ID:

**710-TU-01-01**

System:

Air Side

Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Max Airflow			
Min Airflow			
Heating Capacity			
Heating Water Flow			
Inlet Size			

Installation Checks		
Verify	Pass / Fail	Notes
Unit and ductwork supported properly		
Seismic supports installed		
Vibration isolation installed and functional		
Adequate maintenance access		
Equipment in good condition - no visible damage		
Equipment labels installed		
Filters in place and clean		
Unit controls installation complete		
Room temperature sensor installed		
Piping installed properly		
All duct fittings tight and properly sealed		
Flex duct installed properly		
Volume dampers installed in each branch duct		
Ductwork insulated or lined properly		

Comments

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Tested By: 

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Witnessed By: 

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Representing: 

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Representing: 

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☐ All pre-functional testing is complete☐ Backchecked by Commissioning Authority



## Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: CHILLED WATER  
Location: MECH RM - LEVEL V

Unit ID: **710-CHWP-1**  
System: Chilled Water  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Water Flow (GPM)			
Head (feet)			
Pump HP			
Voltage			
Phase			
Amperage			

### General Installation Checks

Verify	Pass / Fail	Notes
Pump properly secured to isolation pad		
Manufacturers installation check list completed		
Nameplate data is correct		
Flexible connections installed properly		
Suction diffuser installed properly		
Pump isolation valves installed properly		
Adequate clearances for maintenance access		
Equipment in good condition - no visible damage		
Vibration isolation devices installed and functioning		
Seismic restraint installed properly		

### Equipment Installation Checks

Verify	Pass / Fail	Notes
Equipment labels affixed properly		
Pump and motor are aligned properly		
Pump shroud in place and secure		
Pump and motor properly lubricated		
Pump rotates freely		
Instrumentation installed properly		
Check valve installed in correct direction		



## Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: CHILLED WATER  
Location: MECH RM - LEVEL V

Unit ID: **710-CHWP-1**  
System: Chilled Water  
Date:

### Electrical Checks

Verify	Pass / Fail	Notes
Motor overload protection installed properly	<input type="checkbox"/>	
VFD installation and start-up checklist completed	<input type="checkbox"/>	
Grounding installed properly	<input type="checkbox"/>	
Disconnects installed properly	<input type="checkbox"/>	
Motor starter indicating lights functioning properly	<input type="checkbox"/>	
HOA / VFD switches installed properly	<input type="checkbox"/>	
Controls installed and wiring completed	<input type="checkbox"/>	
Junction boxes closed and/or covers installed	<input type="checkbox"/>	

### Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Ductwork Air Leakage Test

Project: VAPA - Research VMU  
Service: VIVARIUM - GENERAL EXHAUST  
Location: ROOF

Unit ID: **710-EF-1**  
System: Air Side  
Date:

**Test Number:** 1 ☐ All pre-functional testing is complete ☐ Backchecked by Commissioning Authority

### Part 1 - Physical Details

Section of ductwork tested:   
Surface area of duct being tested:   
Test leakage class (A/B/C/D):  Static Pressure:   
Leakage factor:   
Maximum permitted leakage (bxd):

### Part 2 - Test Details

Duct static pressure reading:   
Type of flow measuring device:  small / medium / large nozzle  
Range of measurement on flow measuring device:   
Reading of flow measuring device:   
Interpreted air flow leakage rate:   
Duration of test (normally 15 minutes):

### Part 3 - Calibration Details

Type of test instrument:   
Serial number:   
Calibration certificate:   
Date issued:

### Comments

Tested By:

Witnessed By:

Representing:

Representing:



### Ductwork Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM - GENERAL EXHAUST  
Location: ROOF

Unit ID: 710-EF-1  
System: Air Side  
Date:

Installation Checks		
Verify	Pass / Fail	Notes
Ductwork sealed		
Ductwork properly supported		
Ductwork in good condition		
Access panels properly installed and gasketed		
Seismic support installed per specs and code		
Ducts properly labeled		
Ducts properly insulated or lined		
Branch dampers installed		
Balancing dampers installed		
Turning vanes installed		
Penetrations thru construction properly sealed		
Flexible connections at equipment operational		
Sound attenuators installed		
Fire / smoke dampers installed properly		
Flex ducts properly installed and supported		
Diffusers, registers, and grills properly installed		
Diffuser deflections set per drawings		
Intakes and plenums clear of debris		
Clean up complete		

Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Unitary Fan Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM - GENERAL EXHAUST  
Location: ROOF

Unit ID: **710-EF-1**  
System: Air Side  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Airflow (CFM)			
TSP			
RPM			
HP			
Voltage			
Phase			
Hz			
Direct Drive	<input type="checkbox"/>		

### Installation Checks

Verify	Pass / Fail	Notes
Equipment labels installed	<input type="checkbox"/>	
Equipment in good condition	<input type="checkbox"/>	
Vibration isolation devices installed correctly	<input type="checkbox"/>	
Duct connections tight and sealed properly	<input type="checkbox"/>	
Maintenance access acceptable	<input type="checkbox"/>	
Seismic restraints installed	<input type="checkbox"/>	
Clean up complete	<input type="checkbox"/>	
Backdraft damper installed properly	<input type="checkbox"/>	
Fan rotates freely	<input type="checkbox"/>	
Sheaves aligned with proper belt tension	<input type="checkbox"/>	
Belt guards in place and secure	<input type="checkbox"/>	

### Electrical and Control Checks

Verify	Pass / Fail	Notes
Disconnects properly installed and labeled	<input type="checkbox"/>	
Speed controls installed	<input type="checkbox"/>	
Grounding installed properly	<input type="checkbox"/>	
Motor starter indicator lights functioning properly	<input type="checkbox"/>	
Overload protection installed	<input type="checkbox"/>	
HOA / VFD switches installed	<input type="checkbox"/>	
Junction boxes closed and/or covers installed	<input type="checkbox"/>	
Check motor rotation	<input type="checkbox"/>	





## Unitary Fan Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VIVARIUM - GENERAL EXHAUST  
Location: ROOF

Unit ID: **710-EF-1**  
System: Air Side  
Date:

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Energy Recovery Unit Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: HEAT RECOVERY UNIT  
Location:

System: 710-ERC-1A  
Date: Air Side

Recovery Side	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Type			
Airflow (CFM)			
Efficiency			
Heating Capacity (MBH)			
Entering Air Temp			
Leaving Air Temp			
External Static Pressure			
Total Static Pressure			
HP			
Voltage			
Phase			
Exhaust Side			
Airflow (CFM)			
Entering Air Temp			
Leaving Air Temp			
External Static Pressure			
Total Static Pressure			
HP			
Voltage			
Phase			

### General Installation Checks

Verify	Pass/Fail	Notes
Cabinet and general installation acceptable		
Permanent labels affixed		
Heat exchanger is clean and in good condition		
Access doors close tightly - no leaks		
Duct connections tight and sealed properly		
Vibration isolation installed properly		
Maintenance access acceptable		
Adequate clearance for airflow around condenser		
Insulation installed properly		
Heat wheel operates properly		
Unit is clean and free of debris, mold, or mildew		
Condensate pump installed properly		



## Energy Recovery Unit Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: HEAT RECOVERY UNIT  
Location:

System: 710-ERC-1A  
Date: Air Side

### Filter Checks

Verify	Pass/Fail	Notes
Filters correct size, clean, and tight fitting	<input type="checkbox"/>	
Filter pressure differential device installed	<input type="checkbox"/>	
Unit labelled for replacement filter size / quantity	<input type="checkbox"/>	

### Electrical / Controls Checks

Verify	Pass/Fail	Notes
Disconnects installed properly	<input type="checkbox"/>	
Disconnects labelled properly	<input type="checkbox"/>	
All electrical connections tight	<input type="checkbox"/>	
Grounding installed properly	<input type="checkbox"/>	
Over current protection installed	<input type="checkbox"/>	
Convenience outlet installed and operational	<input type="checkbox"/>	
All control devices and wiring complete	<input type="checkbox"/>	
Motor rotation correct	<input type="checkbox"/>	

### Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Terminal Unit Pre-Functional Checklist

Project: VAPA - Research VMU

Service: FAN COIL UNIT

Location:

Unit ID:

**710-FC-1-01**

System:

Air Side

Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Max Airflow			
Min Airflow			
Heating Capacity			
Cooling Capacity			
Fan HP			
Voltage			
Phase			

Installation Checks		
Verify	Pass / Fail	Notes
Unit and ductwork supported properly		
Seismic supports installed		
Vibration isolation installed and functional		
Adequate maintenance access		
Equipment in good condition - no visible damage		
Equipment labels installed		
Filters in place and clean		
Unit controls installation complete		
Room temperature sensor installed		
Electrical installation complete		
All duct fittings tight and properly sealed		
Flex duct installed properly		
Volume dampers installed in each branch duct		
Ductwork insulated or lined properly		
Piping installed properly		

### Comments

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Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Heat Exchanger Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: HHW Heat Exchanger  
Location: MECH ROOM

Unit ID: **710-HEX-1**  
System: TING HOT WATER SYSTEM  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Cooling Capacity			
<b>Cool / Primary Side</b>			
Water Flow (GPM)			
Head (feet)			
EWT			
LWT			
<b>Warm / Secondary</b>			
Water Flow (GPM)			
Head (feet)			
EWT			
LWT			

### General Installation Checks

Verify	Pass / Fail	Notes
Equipment in good condition - no visible damage		
Installation is per manufacturers instructions		
Piping installed and supported properly		
Valves installed properly		
Record drawings updated to actual installations		
Seismic restraint installed properly		
Equipment labels affixed properly		
Piping supported independent of heat exchanger		
Provisions provided for future capacity expansion		
Insulation installed properly		
Piping labelled with fluid types and flow direction		
Pressure tested per mfr recommendations		
Flushed and cleaned properly		
All ancillary devices installed properly		
Strainers and low-point drains checked and clean		
Construction strainers removed		
Test plugs (P/T ports) installed properly		
Chemical treatment system installed properly		
No apparent signs of leakage		
Air vents installed properly and piped to drain		
Isolation / balancing valves installed properly		



## Heat Exchanger Pre-Functional Checklist

Project: VAPA - Research VMU

Service: HHW Heat Exchanger

Location: MECH ROOM

Unit ID:

**710-HEX-1**

System: TING HOT WATER SYSTEM

Date:

### Valve Installation Checks

Verify	Pass / Fail	Notes
Isolation valves properly located properly	<input type="checkbox"/>	
Valves installed properly	<input type="checkbox"/>	
Valve manufacturer labels permanently affixed	<input type="checkbox"/>	
Manual isolation valves seal and travel freely	<input type="checkbox"/>	
Valves installed in proper flow direction	<input type="checkbox"/>	
Valves stroke fully and easily	<input type="checkbox"/>	
Valves spanning is properly calibrated	<input type="checkbox"/>	
Verify positive shut-off valves seal properly	<input type="checkbox"/>	
No signs of leakage on any valve	<input type="checkbox"/>	
Valves tagged properly	<input type="checkbox"/>	
Adequate maintenance access provided	<input type="checkbox"/>	
Unions installed to allow removal of control valves	<input type="checkbox"/>	
Installation of balancing devices completed	<input type="checkbox"/>	

### Control Installation Checks

Verify	Pass / Fail	Notes
All instruments / gauges / sensors installed	<input type="checkbox"/>	
All instrumentation read-outs match within specs	<input type="checkbox"/>	
Installation of all control devices is complete	<input type="checkbox"/>	
Control system interlocks connected and functional	<input type="checkbox"/>	



## Heat Exchanger Pre-Functional Checklist

Project: VAPA - Research VMU

Service: HHW Heat Exchanger

Location: MECH ROOM

Unit ID:

**710-HEX-1**

System: TING HOT WATER SYSTEM

Date:

Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Humidifier Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: STEAM HUMIDIFIER  
Location: 710-AHU-1A

Unit ID: **710-HS-1A**  
System: Air Side  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Capacity			
Steam Pressure			
Voltage			
Amperes			
KW			
Phase			

### Field Installation Checks

Verify	Pass	Notes
Equipment in good condition - no visible damage		
Installation is per manufacturers instructions		
Fan installed properly		
Adequate maintenance access provided		
Steam absorption distance adequate		
Seismic restraint installed properly		
Equipment labels affixed properly		
Cleanup complete		
Provisions provided for future capacity expansion		
Insulation installed properly		
Instrumentation installed properly		
Pressure tested per manufacturers recommendations		
Flushed and cleaned per mfr recommendations		
All ancillary devices installed properly		
Strainers and low-point drains checked and clean		
Construction strainers removed		
Test plugs (P/T ports) installed per plans and specs		
Chemical treatment system installed per specs		
No apparent signs of leakage		
Steam condensate trap operational		
Access panels close tightly		





### Humidifier Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: STEAM HUMIDIFIER  
Location: 710-AHU-1A

Unit ID: **710-HS-1A**  
System: Air Side  
Date:

#### Field Installation Checks (continued)

Verify	Pass	Notes
Piping installed and supported properly	<input type="checkbox"/>	
Piping supported independently of the humidifier	<input type="checkbox"/>	
Valves properly tagged	<input type="checkbox"/>	
Valves installed properly in correct flow direction	<input type="checkbox"/>	
Power disconnects in place and labeled	<input type="checkbox"/>	
Overcurrent protection properly sized installed	<input type="checkbox"/>	
Safeties in place and operational	<input type="checkbox"/>	
Wiring connections tight	<input type="checkbox"/>	
Equipment properly grounded	<input type="checkbox"/>	
Control devices and wiring complete	<input type="checkbox"/>	
Gauges, BAS, and panel read-outs match	<input type="checkbox"/>	
Control system interlocks connected and functional	<input type="checkbox"/>	

#### Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



### Split-System Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: DX SPLIT SYSTEM  
Location:

Unit ID: **710-SS-1-01**  
System: Air Side  
Date:

Indoor Unit	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Airflow (CFM)			
Cooling Capacity (MBH)			
Heating Capacity (MBH)			
Voltage			
Phase			
MCA			
Outdoor Unit			
Manufacturer			
Model Number			
Serial Number			
Refrigerant Charge			
Voltage			
Phase			
FLA			
LRA			

#### General Installation Checks

Verify	Pass	Notes
Cabinet and general installation acceptable		
Permanent labels affixed		
Coils are clean and fins are in good condition		
Access doors close tightly - no leaks		
Duct connections tight and sealed properly		
Vibration isolation installed and released from locks		
Maintenance access acceptable		
Adequate clearance for airflow around condenser		
Insulation installed properly		
Hard-start kit installed for low ambient temp operation		
Unit is clean and free of debris, mold, or mildew		
Condensate pump installed properly and operational		



## Split-System Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: DX SPLIT SYSTEM  
Location:

Unit ID: **710-SS-1-01**  
System: Air Side  
Date:

### Piping Checks

Verify	Pass	Notes
Refrigerant piping sized according to manufacturer	<input type="checkbox"/>	
Refrigerant piping installed and supported properly	<input type="checkbox"/>	
Suction piping insulated	<input type="checkbox"/>	
Liquid line solenoid valve located at evaporator coil	<input type="checkbox"/>	
Condensate drain properly piped and trapped	<input type="checkbox"/>	
All service valves open	<input type="checkbox"/>	
Filter/Dryer properly installed	<input type="checkbox"/>	

### Refrigeration Checks

Verify	Pass	Notes
Refrigerant lines evacuated and dehydrated	<input type="checkbox"/>	
Correct refrigerant type used	<input type="checkbox"/>	
Correct amount of refrigerant charged	<input type="checkbox"/>	
Leak checked with detector and no leaks found	<input type="checkbox"/>	
Refrigerant sight glass clear of bubbles	<input type="checkbox"/>	
Moisture indicator shows no moisture	<input type="checkbox"/>	
Correct oil level in compressor	<input type="checkbox"/>	

### Filter Checks

Verify	Pass	Notes
Filters correct size, clean, and tight fitting	<input type="checkbox"/>	
Filter pressure differential device installed	<input type="checkbox"/>	
Unit labelled for replacement filter size / quantity	<input type="checkbox"/>	

### Electrical / Controls Checks

Verify	Pass	Notes
Disconnects installed properly and labelled	<input type="checkbox"/>	
Compressor crankcase heater operational	<input type="checkbox"/>	
All electrical connections tight	<input type="checkbox"/>	
Grounding installed properly	<input type="checkbox"/>	
Over current protection installed	<input type="checkbox"/>	
Convenience outlet installed and operational	<input type="checkbox"/>	
All control devices and wiring complete	<input type="checkbox"/>	
Motor rotation correct	<input type="checkbox"/>	



### Split-System Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: DX SPLIT SYSTEM  
Location:

Unit ID: **710-SS-1-01**  
System: Air Side  
Date:

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Fire / Smoke Damper Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: FIRE SMOKE DAMPERS  
Location:

Unit ID:  
System:  
Date:

**FSD**  
Life Safety

Label	Location	System	Size	Unit Wiring Complete	Power Available	Motor Functional	Damper Labelled	Installed per Mfr Requirements	Damper Properly Supported	Access Door Installed	Damper Linkage Unobstructed	Damper Strokes Fully And Easily	Notes
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Compressor / Vacuum Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: AIR COMPRESSOR  
Location: MECH RM V-ME2

Unit ID: **710-MAC-1**  
System: Plumbing / Water Systems  
Date:

### Nameplate Data

	Design	Submitted	Actual (As-Built)
Manufacturer			
Model Number			
Serial Number			
Size			
Voltage			
Phase			
Hertz			
Amperage			
Horsepower / KW			

### General Installation Checks

Verify	Pass/Fail	Notes
Equipment in good condition - no visible damage		
Installation is per manufacturers instructions		
Components connected and operational		
Adequate maintenance access		
Piping installed and supported properly		
Valves properly tagged		
Valves installed properly in correct flow direction		
Power disconnects in place and labeled		
Overcurrent protection sized and installed properly		
Wiring connections tight		
Equipment properly grounded		
Safeties in place and operational		
Control devices and wiring complete		
Control system interlocks connected and functional		
Condensate drains installed properly		
Air dryer installed properly		
Water separator installed properly		
Oil atomizer installed properly		
Pressure relief valve installed properly and tested		
Filters are clean and installed properly		
Gauges and ports installed properly		
Gauges, BAS, and panel readings match within tolerance		



## Compressor / Vacuum Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: AIR COMPRESSOR  
Location: MECH RM V-ME2

Unit ID: **710-MAC-1**  
System: Plumbing / Water Systems  
Date:

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Compressor / Vacuum Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VACUUM PUMP  
Location:

Unit ID: **710-MVP-1**  
System: Plumbing / Water Systems  
Date:

### Nameplate Data

	Design	Submitted	Actual (As-Built)
Manufacturer			
Model Number			
Serial Number			
Size			
Voltage			
Phase			
Hertz			
Amperage			
Horsepower / KW			

### General Installation Checks

Verify	Pass/Fail	Notes
Equipment in good condition - no visible damage		
Installation is per manufacturers instructions		
Components connected and operational		
Adequate maintenance access		
Piping installed and supported properly		
Valves properly tagged		
Valves installed properly in correct flow direction		
Power disconnects in place and labeled		
Overcurrent protection sized and installed properly		
Wiring connections tight		
Equipment properly grounded		
Safeties in place and operational		
Control devices and wiring complete		
Control system interlocks connected and functional		
Condensate drains installed properly		
Air dryer installed properly		
Water separator installed properly		
Oil atomizer installed properly		
Pressure relief valve installed properly and tested		
Filters are clean and installed properly		
Gauges and ports installed properly		
Gauges, BAS, and panel readings match within tolerance		





## Compressor / Vacuum Pump Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: VACUUM PUMP  
Location:

Unit ID: **710-MVP-1**  
System: Plumbing / Water Systems  
Date:

Comments

Tested By:   
Representing:

Witnessed By:   
Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Automatic Transfer Switch Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: AUTOMATIC XFER SWITCH  
Location:

Unit ID: **ATS-A**  
System: Electrical System  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Catalog Number			
Class / Rating			
Interrupt Rating			
Voltage			
Amperage			
Phase			

Components Included		
Conductor		Number of Poles
Controller Voltage		Controller Type
Other Components		

Insulation Resistance Test										
Insulation resistance in megohms @ <input type="text"/> VDC										
Position Tested	A-G	B-G	C-G	N-G	A-N	B-N	C-N	A-B	B-C	C-A
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



## Automatic Transfer Switch Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: AUTOMATIC XFER SWITCH  
Location:

Unit ID: **ATS-A**  
System: Electrical System  
Date:

### Installation Checks

Verify	Pass / Fail	Notes
Shop drawings are approved		
Nameplate data are approved		
Verify manual transfer labels are attached and visible		
Verify positive mechanical interlocking between sources		
Equipment is in good condition with no signs of damage		
Inspect for evidence of moisture or corona discharge		
Maintenance access is acceptable		
Equipment is properly anchored per plans and specs		
Verify manual transfer operation		
Verify DDC addressing		
Verify all interconnections in building / generator systems		
Verify voltage and frequency sensing settings		
Verify all time delay settings		
Unit cleaned prior to testing		
Verify lubricants per manufacturer's recommendations		
Verify all bolted electrical connections are tight		
Measure resistance of all bolted electrical connections		
Unit is properly labelled per plans and specs		
Equipment is properly grounded		

### Operational Checks

Verify	Pass / Fail	Notes
Insulation test performed in normal position		
Insulation test performed in transferred position		
Simulate loss of power		
Simulate return of normal power		
Simulate loss of emergency power		
Simulate return of emergency power		
Simulate loss of phase		
Verify normal voltage source sensing		
Verify operation of engine starting sequence		
Verify time delay upon transfer		
Verify alternate voltage source sensing		
Verify automatic transfer operation		
Verify re-transfer sequence when normal power restore		
Verify engine cool-down / shutdown sequence		



## Automatic Transfer Switch Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: AUTOMATIC XFER SWITCH  
Location:

Unit ID: **ATS-A**  
System: Electrical System  
Date:

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### Tools / Instruments Used

Tool ID	Description	MFR	Model	Serial	Certification Date	Recertification Due

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### Comments

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Tested By:   
Representing:

Witnessed By:   
Representing:

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☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Switchgear Pre-Functional Checklist

Project:  
Service:  
Location:

Unit ID:  
System:  
Date:

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Catalog Number			
Class / Rating			
Interrupt Rating			
Voltage			
Amperage			
Phase			

### Components Included

Conductor		Number of Bays		Number of CPTs	
Number of Breakers		Number of PLCs		Number of Transducers	
Number of Instruments		Number of VTs		Number of Relays	
Number of Panel Meters		Number of CTs		Number of Switches	
Breaker Type		Other Equipment			

### Insulation Resistance Test

Insulation resistance in megohms @  VDC

Section Tested	A-G	B-G	C-G	N-G	A-N	B-N	C-N	A-B	B-C	C-A

### Bolted Bus Connection Resistance Test

Resistance measurement range

Section Tested	Phase A as found	Phase A as left	Phase B as found	Phase B as left	Phase C as found	Phase C as left	Neutral as found	Neutral as left	Ground as found	Ground as left



## Switchgear Pre-Functional Checklist

Project:  
Service:  
Location:

Unit ID:  
System:  
Date:

### Installation Checks

Verify	Pass / Fail	Notes
Shop drawings are approved	<input type="checkbox"/>	
Nameplate data are approved	<input type="checkbox"/>	
Coordination study is complete	<input type="checkbox"/>	
Fault study is complete	<input type="checkbox"/>	
Equipment is in good condition with no signs of damage	<input type="checkbox"/>	
Inspect for evidence of moisture or corona discharge	<input type="checkbox"/>	
Maintenance access is acceptable	<input type="checkbox"/>	
Equipment is properly anchored and aligned	<input type="checkbox"/>	
Verify breaker sizes and types match plans and specs	<input type="checkbox"/>	
Verify breaker addressing	<input type="checkbox"/>	
Clean up of equipment completed	<input type="checkbox"/>	
Inspect bus assembly for any deficiencies	<input type="checkbox"/>	
Inspect bus assembly sizing per plans and specs	<input type="checkbox"/>	
Inspect control power transformers	<input type="checkbox"/>	
Verify lubricants per manufacturer's recommendations	<input type="checkbox"/>	
Verify that VT and CT ratios meet plans and specs	<input type="checkbox"/>	
Verify all bolted electrical connections are tight	<input type="checkbox"/>	
All protective devices are properly labelled	<input type="checkbox"/>	
Equipment is properly grounded	<input type="checkbox"/>	
Proper filters are in place	<input type="checkbox"/>	
Correct barrier and shutter installation and operation	<input type="checkbox"/>	
Mechanical indicating devices working properly	<input type="checkbox"/>	

### Operational Checks

Verify	Pass / Fail	Notes
Insulation test performed on each bus section	<input type="checkbox"/>	
Resistance test done on each bolted bus connection	<input type="checkbox"/>	
Perform all electrical testing per NETA guidelines	<input type="checkbox"/>	
Exercise all active components	<input type="checkbox"/>	
Operation of all electrical and mechanical interlocks	<input type="checkbox"/>	



## Switchgear Pre-Functional Checklist

Project:  
Service:  
Location:

Unit ID:  
System:  
Date:

---

### Tools / Instruments Used

Tool ID	Description	MFR	Model	Serial	Certification Date	Recertification Due
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

---

Comments

---

Tested By:   
Representing:

Witnessed By:   
Representing:

---

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority



## Lighting Control Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: LIGHTING CONTROL PANEL  
Location: V-EC2

Unit ID: **710-LCP-V1**  
System: Electrical System  
Date:

Installation Checks		
Verify	Pass / Fail	Notes
Lighting Control Panel installed properly		
Size and type are correct		
Correct height and mounting locations		
Devices have correct cover plate or escutcheon		
Equipment labels installed properly		
Devices are connected to proper control panel		
Light fixtures connected with proper lamps		
All junction box and enclosure cover plates in place		
Time adjustments set properly		
Sensitivity adjusted for space served		
Zone circuits and inputs correctly wired and labelled		
Panel schedule is complete and correct		
Control panel settings adjusted, tested, and recorded		
Software programming complete and tested		
Control display meets specs and owner requirements		
Manual override switch labelled and tested		
Time clock set and reading correctly		
All fixtures with photo cells visually identified at location		
LCP labelled with feeder and circuit breaker number		
Main dimmer panel and dimmer modules installed		
Emergency dimmer panel installed and interfaced		
Graphical interface software programmed and tested		
LCP processor powered and battery backup checked		
LCP processor diagnostics performed		
LCP communications interface functioning properly		
Test photoelectric devices with certified photometer		
Energize all circuits and verify all lamps operating		
Verify all switched lights are operating properly		
Verify emergency lights are operating properly		
Interrupt normal power and verify emergency operation		
Restore normal power and verify normal operations		
All fixtures aimed or adjusted properly		
All equipment grounded properly		





## Lighting Control Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: LIGHTING CONTROL PANEL  
Location: V-EC2

Unit ID: **710-LCP-V1**  
System: Electrical System  
Date:

Operational Checks		
Verify	Pass / Fail	Notes
Contractor has tested units for correct operation		
Sequence of operation and schedules are available		
Specified point-to-point checks have been completed		
Documentation for this system has been submitted		
Preset dimming stations operational with LCP controls		
Verify programming operates as required		
Verify manual controls operate as required		
Verify all lighting zones operate as required		
Verify required light levels are achieved		
Run system through all scenes in random order		
Simulate loss of power and return to normal power		
Adjust schedule to unoccupied mode. Release override		
Adjust schedule to occupied mode. Release override		
Verify emergency lighting is adequate on loss of power		
Verify preset scenes return to normal after override		
Use controls in sequence that mimics typical operation		
Use dimmers in sequence that mimics typical operation		
Verify motion sensing zones light on entering space		
Verify motion sensing zones turn off after time delay		
Verify all override switches operate correctly		
Verify all override time delays set properly		
Verify operation of wireless remote controls and devices		

Zones Tested					
Description	On Schedule	Off Schedule	Automatic Operation	Manual Operation	Notes / Reading



## Lighting Control Pre-Functional Checklist

Project: VAPA - Research VMU  
Service: LIGHTING CONTROL PANEL  
Location: V-EC2

Unit ID: **710-LCP-V1**  
System: Electrical System  
Date:

### Tools / Instruments Used

Tool ID	Description	MFR	Model	Serial	Certification Date	Recertification Due

	Design	Submitted	Actual
Manufacturer			
Model Number			
Serial Number			
Catalog Number			
Type			
Voltage			
Amperage			
Phase			

### Comments

Tested By:

Witnessed By:

Representing:

Representing:

☐ All pre-functional testing is complete

☐ Backchecked by Commissioning Authority