

EXHIBIT 01 91 13-3, SAMPLE PREFUNCTIONAL CHECKLIST  
AIR HANDLING UNIT

Construction checklist items are to be completed as part of initial checkout and subsequent startup, preparatory to Functional testing.

- This checklist does not take the place of the manufacturer’s recommended checkout, startup procedures or report.
- If this form is not used for documenting, one of similar rigor shall be used.
- Contractors assigned responsibility for sections of the Checklist shall be responsible to see that checklist items by their subcontractors are completed and validated.
- When completing these Forms electronically - enter all Text in the shaded boxes.

PROJECT: _____	UNIT NO: _____
LOCATION: _____	SERVICE: _____
MANUFACTURER: _____	MODEL: _____
SERIAL NUMBER: _____	CFM = _____
SERVICE AREA: _____	Cap MBH _____

Show **Signatures** on this cover page of this Set. Submitting this Form signifies the equipment and systems integral to them are complete at this phase of construction. The completed checklist items have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This construction checklist is submitted for approval, subject to Noted items and/or an attached list of outstanding minor items yet to be completed and not already listed on this Form. A Statement of Correction will be submitted upon completion of any outstanding areas. None of the outstanding items preclude safe and reliable functional tests being performed. List attached ? (Yes or No)

Mechanical Contractor	Date	BAS Contractor	Date
Electrical Contractor	Date	Sheet Metal Contractor	Date
TAB Contractor	Date	CM / General Contractor	Date

REQUIRED DOCUMENTATION Have the Following Contractor Submittals been provided to the CxA?	CxA to Answer this Section
Manufacturer’s cut sheets	
Performance data (fan curves, coil data, etc.)	
Installation and startup manual and plan	
O&M manuals	
Flushing and cleaning plan	
Manufacturer Start-Up Sheets filled in & Submitted	
Sequences and control strategies	
Leak test reports	
Water treatment report	
Welder Certification	
Warranty Certificate	

The attached filled-out AHU Pre-Functional Checklist has been reviewed. [Each Group will receive an Evaluation of “Approved”, “Approved as Noted”, “Resubmit” [Resubmit = Retain this form and resubmit it with new data for new signatures].

Group 1	Group 2	Group 3	Group 4
Group 5	Group 6	Group 7	Group 8
Checklist as shown, is		CxA	Date
AE	Date	PM	Date
Return to the CxA			

**Installation Checks**

<b>OK</b>	<b>ITEM</b> (The requirements listed in the Contract Documents and the Manufacturers' I&OMs supersede the requirements listed below when conflicts arise.)	<b>CONTRACTOR – Comment if / why ITEM is NOT READY (NA = Not in Project)</b>
	Note: TC, TAB(s), and Vent Contractors must all be present and working on unit while unit is running for this checklist work. Unit may be in manual mode for TC and Tab work for pre-startup work and but not left running.	All Checklists associated with this Unit/System must be complete prior to Running for or during Construction and not violate LEED criteria!
<b>General</b>		<b>Group 1.</b>
<input type="checkbox"/>	Cabinet and general installation all interior surfaces are clean (per Contract else SMACNA occupancy)	
<input type="checkbox"/>	Permanent labels affixed, including for fans	
<input type="checkbox"/>	Casing condition good: no dents, leaks, door gaskets installed	
<input type="checkbox"/>	Access doors close tightly - no leaks	
<input type="checkbox"/>	Connection between duct and unit tight and in good condition	
<input type="checkbox"/>	Vibration isolation equipment properly set blocks removed	
<input type="checkbox"/>	Maintenance access acceptable for unit and components	
<input type="checkbox"/>	Sound attenuation installed per Mfr's I&OM else Project Docs	
<input type="checkbox"/>	Thermal insulation properly installed and according to specs	
<input type="checkbox"/>	Instrumentation (gages, flow meters, etc.) installed per specs.	
<input type="checkbox"/>	Clean up of equipment completed per contract documents	
<input type="checkbox"/>	All coils are clean. Fins are in good condition Piping & Valves complete	
<input type="checkbox"/>	Protective Caps (or if allowed per Contract - Construction Filters) replaced with appropriate type(s) for Startup/Functional Testing	
<b>Valves, Piping</b>		<b>Group 2.</b>
<input type="checkbox"/>	Adequate maintenance clearance in provided and valve(s) accessible	
<input type="checkbox"/>	Balancing valves installed	
<input type="checkbox"/>	Isolation valves provided at all branches and main takeoffs to facilitate isolation (as required by contract)	
<input type="checkbox"/>	All valve installations per manufacturer's instructions	
<input type="checkbox"/>	Valve manufacturer labels permanently affixed	
<input type="checkbox"/>	Manual isolation valves checked for proper seal and found to travel freely	
<input type="checkbox"/>	No leaking apparent around fittings	
<input type="checkbox"/>	Valves that require a positive shut-off are verified to not be leaking when closed at normal operating pressure (Static test at Pre-Functional)	
<input type="checkbox"/>	Valves tagged and valve schedule submitted and displayed as required	
<input type="checkbox"/>	Valves installed in proper direction Proper fluid flow direction	
<input type="checkbox"/>	Valves properly & fully stroke	
<input type="checkbox"/>	Valves opened Piping system properly flushed	
<input type="checkbox"/>	(When used) 3 way Valves properly ported	
<input type="checkbox"/>	Unions installed to allow for easy removal of control valves	
<input type="checkbox"/>	Condensate drains clear Proper Trap Depth	
<input type="checkbox"/>	Humidifier section installation including piping completed	
<input type="checkbox"/>	Pipe fittings complete and pipes properly supported	
<input type="checkbox"/>	Pipes properly labeled	
<input type="checkbox"/>	Pipes properly Insulated	
<input type="checkbox"/>	Strainers in place and clean, blow-down installed	
<input type="checkbox"/>	Steam Traps do not leak through when Valves are open	

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<input type="checkbox"/>	All condensate drain pans clean and slope to drain, per spec	
<input type="checkbox"/>	OSAT, MAT, SAT, RAT, chilled water supply sensors properly located and secure (related OSAT sensor shielded)	
<input type="checkbox"/>	Test plugs (P/T) and isolation valves installed per drawings	
<b>FANS COILS DAMPERS</b>		<b>Group 3.</b>
<input type="checkbox"/>	Supply Fan & Drive Set	
<input type="checkbox"/>	Supply VFD	
<input type="checkbox"/>	Return / Relief Fan	
<input type="checkbox"/>	Return / Relief Fan Drive Set	
<input type="checkbox"/>	Return / Relief VFD	
<input type="checkbox"/>	Exhaust Fan & Drive Set	
<input type="checkbox"/>	Exhaust Fan VFD Ready	
<input type="checkbox"/>	Pre-Heat Coil(s) & Valve(s) & all Piping	
<input type="checkbox"/>	New / Installed Pre-Filters & Bag / Cartridge Filters	
<input type="checkbox"/>	Mountings checked (shipping bolts removed)	
<input type="checkbox"/>	Equipment guards installed	
<input type="checkbox"/>	Pulleys aligned and belt tension correct	
<input type="checkbox"/>	Plenums clear and free of loose material	
<input type="checkbox"/>	Fans rotate freely	
<input type="checkbox"/>	Fans, motors and linkages lubricated	
<input type="checkbox"/>	Fire and balance dampers positioned	
<input type="checkbox"/>	start-up filters installed / Coordinate W/ Duct Cleaning	
<input type="checkbox"/>	Filter pressure Photohelic device installed and functional	
<input type="checkbox"/>	Code appropriate Smoke and fire dampers installed properly	
<input type="checkbox"/>	All dampers & actuators properly installed	
<b>Energy Recovery Wheel &amp; VFD</b>		<b>Group 4.</b>
<input type="checkbox"/>	Installation per manufacturer's requirements and start up instructions completed	
<input type="checkbox"/>	Drive location is not subject to visual moisture or dirt	
<input type="checkbox"/>	Drive location not subject to temperatures exceeding Mfr's operating range. (i.e. not close to Steam apparatus or heat exchangers)	
<input type="checkbox"/>	Appropriate Volts vs. Hz curve is being used	
<input type="checkbox"/>	Drive size matches motor size	
<input type="checkbox"/>	Drive mounted on house keeping pad (if applicable)	
<input type="checkbox"/>	Cooling air flow path clean and unobstructed	
<input checked="" type="checkbox"/>	Permanent label affixed and UL stamp approved	
<input type="checkbox"/>	VFD interlocked to control system	
<input type="checkbox"/>	Unit is programmed with full written programming record on site	
<input type="checkbox"/>	Accel time set to _____ and Decel time set to _____	
<input type="checkbox"/>	Operation checked in HAND – OFF - AUTO. As applicable operation also checked in BYPASS	
<input type="checkbox"/>	Where applicable, ensure safeties are active in all modes	
<input type="checkbox"/>	Coordinated with BAS for all interface ranges and signal isolation	
<input type="checkbox"/>	Restart on Power Failure parameter set to auto	

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(The requirements listed in the Contract Documents and the Manufacturers' I&OMs supersede the requirements listed below when conflicts arise.)		
<input type="checkbox"/>	VFD powered (wired to controlled equipment)	
<input type="checkbox"/>	Grounding installed for components and unit	
<input type="checkbox"/>	Drive min and max speed set to _____ Hz min and 60 Hz max	
<input type="checkbox"/>	Security settings set per Owner direction and Password documented for Owner	
<input type="checkbox"/>	Drive response to loss of signal set to _____	
<input type="checkbox"/>	Output pulse resolution set to _____ MHz. (This is coordinated with the application to minimize audible noise and coordinated with driven bearing allowances.)	
<input type="checkbox"/>	Checked the input voltage with drive disconnected	
<input type="checkbox"/>	Input of motor FLA represents 100% to 105% of motor FLA rating	
<input type="checkbox"/>	Upper frequency limit set at 100%, unless explained otherwise	
<b>Ducts</b>		<b>Group 5.</b>
<input type="checkbox"/>	Sound attenuators installed (if included in Project )	
<input type="checkbox"/>	Duct joint sealant properly installed	
<input type="checkbox"/>	No severe duct restrictions (Compliant w / SMACNA or better if Designed)	
<input type="checkbox"/>	Turning vanes in square elbows as per drawings (else SMACNA)	
<input type="checkbox"/>	OSA intakes located away from pollutant sources & exhaust outlets	
<input type="checkbox"/>	Static Pressure leakage tests completed	
<input type="checkbox"/>	Branch duct control dampers operable	
<input type="checkbox"/>	Balancing dampers installed as per drawings and TAB's site visit	
<input type="checkbox"/>	Duct cleaning completed / Coordinate w/ Project Requirements	
<b>Electrical and Controls</b>		<b>Group 6.</b>
<input type="checkbox"/>	NEMA Power disconnect is located within site of the unit it controls and labeled	
<input type="checkbox"/>	All electric connections tight	
<input type="checkbox"/>	Grounding installed for components and unit	
<input type="checkbox"/>	Safeties and Smoke Detectors installed and operational	
<input type="checkbox"/>	Starter overload heaters / breakers installed and correct size	
<input type="checkbox"/>	All control devices and wiring complete	
<input type="checkbox"/>	Control system interlocks connected and functional	
<input type="checkbox"/>	Record drawings updated to reflect the actual installation	
<input type="checkbox"/>	Control system completed (end to end checks)	
<b>VFDs (general)</b>		<b>Group 7.</b>
<input type="checkbox"/>	Installation completed per manufacturer's requirements I&O/MS	
<input type="checkbox"/>	Drive location not subject to excessive temperatures moisture or dirt	
<input type="checkbox"/>	Appropriate Volts vs. Hz curve is being used	
<input type="checkbox"/>	Drive size matches motor size	
<input type="checkbox"/>	Drive mounted on house keeping pad (if applicable)	
<input type="checkbox"/>	Cooling air flow path clean and unobstructed	
<input type="checkbox"/>	Permanent label affixed and UL stamp approved	
<input type="checkbox"/>	VFD interlocked to control system	
<input type="checkbox"/>	Unit is programmed with full written programming record on site	

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<input type="checkbox"/>	Accel time set to _____ and Decel time set to _____	
<input type="checkbox"/>	Operation checked in HAND, OFF, and AUTO. As applicable operation also checked if BYPASS	
<input type="checkbox"/>	Where applicable, ensure safeties are active in all modes	
<input type="checkbox"/>	Coordinated with BAS for all interface ranges and signal isolation	
<input type="checkbox"/>	Restart on Power Failure parameter set to auto	
<input type="checkbox"/>	VFD powered (wired to controlled equipment)	
<input type="checkbox"/>	Grounding installed for components and unit	
<input type="checkbox"/>	Drive min and max speed set to _____ Hz min and 60 Hz max	
<input type="checkbox"/>	Security settings set per Owner direction and Password documented for Owner	
<input type="checkbox"/>	Drive response to loss of signal set to _____	
<input type="checkbox"/>	Output pulse resolution set to _____ MHz. (This is coordinated with the application to minimize audible noise and coordinated with driven bearing allowances.)	
<input type="checkbox"/>	Checked the input voltage with drive disconnected	
<input type="checkbox"/>	Input of motor FLA represents 100% to 105% of motor FLA rating	
<input type="checkbox"/>	Upper frequency limit set at 100%, unless explained otherwise	
<b>Sensors and Gages TC</b>		<b>Group 8.</b>
<input type="checkbox"/>	Flow switches installed as required	
<input type="checkbox"/>	Temperature, pressure and flow gages and sensors installed	
<input type="checkbox"/>	Piping gages, BAS and associated panel temperature and pressure readouts match.	
<input type="checkbox"/>	All Graphics real and virtual trend points match manual testing for calibration for all BAS and associated panel temperature and pressure and flow readouts.	
<input type="checkbox"/>	All Schedules programmed and sequences diagnostically tested.	
<b>TAB</b>		<b>Group 9.</b>
<input type="checkbox"/>	All BAS and associated temperature and pressure and flow readouts including real and virtual trend points match manual testing for calibration.	
<input type="checkbox"/>	All Schedules programmed and sequences diagnostically tested.	
<input type="checkbox"/>	Installation of system and balancing devices allow balancing to be completed following specified NEBB or AABC procedures and Contract documents.	

**This concludes the Master Listing for the AHU Pre-Functional Checklist items relating to this unit for this Project.**