# Prefunctional Checklist

Project _____

## PC-___ AIR COOLED CONDENSER and COMPRESSOR

(For AC or Split Heat Pump) ID#'s_____

Components included: FCU-____, ____,

**Associated Checklists: _____**

## 1. Submittal / Approvals

**Submittal.** The above equipment and systems integral to them are complete and ready for functional testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This prefunctional checklist is submitted for approval, subject to an attached list of outstanding items yet to be completed. 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.

| | | | |
|---|---|---|---|
| _____ Mechanical Contractor | _____ Date | _____ Controls Contractor | _____ Date |
| _____ Electrical Contractor | _____ Date | _____ Sheet Metal Contractor | _____ Date |
| _____ TAB Contractor | _____ Date | _____ General Contractor | _____ Date |

Prefunctional checklist items are to be completed as part of startup & initial checkout, preparatory to functional testing.

- This checklist does not take the place of the manufacturer's recommended checkout and startup procedures or report.
- Items that do not apply shall be noted with the reasons on this form (N/A = not applicable, BO = by others).
- 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 checked off.
- "Contr." column or abbreviations in brackets to the right of an item refer to the contractor responsible to verify completion of this item. A/E = architect/engineer, All = all contractors, CA = commissioning agent, CC = controls contractor, EC = electrical contractor, GC = general contractor, MC = mechanical contractor, SC = sheet metal contractor, TAB = test and balance contractor, ____ = _____.

**Approvals.** This filled-out checklist has been reviewed. Its completion is approved with the exceptions noted below.

| | | | |
|---|---|---|---|
| _____ Commissioning Agent | _____ Date | _____ Owner's Representative | _____ Date |

## 2. Requested documentation submitted

Notes:

Check if Okay. Enter comment or note number if deficient.

| Check | Equip Tag-> | | | | | | Contr. |
|---|---|---|---|---|---|---|---|
| Manufacturer's cut sheets | | | | | | | |
| Performance data (fan curves, coil data, etc.) | | | | | | | |
| Installation and startup manual and plan | | | | | | | |
| Sequences and control strategies | | | | | | | |
| O&M manuals | | | | | | | |

- ***Documentation complete as per contract documents for given trade ....._____ YES _____ NO***

## 3. Model verification

[Contr = _____]

1 = as specified, 2 = as submitted, 3 = as installed. Check if Okay. Enter note number if deficient.

| Equip Tag---> | | | | | | |
|---|---|---|---|---|---|---|
| Manuf. | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| Model | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| Serial # | 3 | | | | | |
| Capacity | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| Volts/Ph/A | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| Min. OSAT | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |

- ***The equipment installed matches the specifications for given trade ....._____ YES _____ NO***

## 4. Installation Checks

Check if Okay. Enter comment or note number if deficient.

| Check | Equip Tag-> | | | | | | Contr. |
|---|---|---|---|---|---|---|---|
| **GENERAL INSTALLATION** | | | | | | | |
| Permanent labels affixed, including for fans | | | | | | | |
| Casing condition good: no dents, leaks, door gaskets installed | | | | | | | |
| All coils are clean and fins are in good condition | | | | | | | |
| Vibration isolation bolts loosened | | | | | | | |
| Maintenance access acceptable for unit and components | | | | | | | |
| Clean up of equipment completed per contract documents | | | | | | | |
| | | | | | | | |
| **PRE-START REQUIREMENTS** | | | | | | | |
| **Piping and Coils** | | | | | | | |

Notes:

Check if Okay. Enter comment or note number if deficient.

| Check Equip Tag-> | | | | | | Contr. |
|---|---|---|---|---|---|---|
| Refrigerant piping sized according to mf'rs literature | | | | | | |
| Refrigerant piping in good condition and suction insulated | | | | | | |
| Liquid line solenoid valve located at evaporator coil, as required | | | | | | |
| Compressor, liquid and suction line service valves open | | | | | | |
| | | | | | | |
| **Site Charging** | | | | | | |
| Refrigerant lines evacuated and dehydrated per mf'r recommendations | | | | | | |
| Refrigerant charged by strictly using mf'r recommended procedures and accurate instruments. | | | | | | |
| Charging method used:<br>Outside air temperature during charging:_____ | | | | | | |
| Final charging points are within 2°F liquid line or within 10psig head pressure (depending on method used) of optimal.<br>Attach charging chart with final points marked with this report, including all calculations to determine optimal subcooling point. | | | | | | |
| Leak checks made with leak detector around compressor, condenser, evaporator, TXVs, solenoid valves, filter driers and fusible plugs and other piping fittings. All leaks repaired. | | | | | | |
| Refrigerant sight glass clear of bubbles (if OSAT>70F) | | | | | | |
| Moisture indicator shows no moisture | | | | | | |
| **Compressor and Condenser** | | | | | | |
| Correct oil level (check site glass during operation, if available) | | | | | | |
| Adequate clearance for airflow around condenser | | | | | | |
| Crankcase heater (if applicable) energized long enough for startup | | | | | | |
| | | | | | | |
| **Electrical and Controls** | | | | | | |
| Proper power supply for unit | | | | | | |
| Power disconnects in place and labeled | | | | | | |
| All electric connections tight | | | | | | |
| Proper grounding installed for components and unit | | | | | | |
| Indoor unit operable and providing design air flow | | | | | | |
| Circuit protection sized and installed properly | | | | | | |
| Control system interlocks hooked up and functional | | | | | | |

- ***The checklist items of Part 4 are all successfully completed for given trade.___ YES ___ NO***

## 5. Operational Checks (These augment mfr's list. This is not the functional performance testing.)

Check if Okay. Enter comment or note number if deficient.

| Check Equip Tag-> | | | | | | Contr. |
|---|---|---|---|---|---|---|

Notes:

Check if Okay. Enter comment or note number if deficient.

| Check Equip Tag-> | | | | | | Contr. |
|---|---|---|---|---|---|---|
| Condenser fan rotation correct | | | | | | |
| Measure line to line voltage phase imbalance for 1/3 of the compressors:<br>Compressor 1 Phase: (%Imbalance = 100 x (avg. - lowest) / avg.) Record in cell, all three phase voltages. Imbalance less than 2%? | | | | | | |
| Compressor 2 Phase: (%Imbalance = 100 x (avg. - lowest) / avg.) Record in cell, all three phase voltages. Imbalance less than 2%? | | | | | | |
| Record full load running amps for each compressor. _____rated FL amps x _____srvc factor = _____ (Max amps). Running less than max? | | | | | | |
| Fans > 5 Hp Phase Checks:<br>(%Imbalance = 100 x (avg. - lowest) / avg.)<br>Record all 3 voltages in cell. Imbalance less than 2%? | | | | | | |
| Record full load running amps for each fan. _____rated FL amps x _____srvc factor = _____ (Max amps). Running less than max? | | | | | | |
| No unusual noise or vibration during operation (condenser fan & compressor) | | | | | | |
| Adjust the space temperature controls to cause a call for cooling. Verify that compressor starts and that supply air is cooled as expected. | | | | | | |
| After 15 minutes of operation, record the readings in the following table. | | | | | | |
| Remove the call for cooling. Observe that compressor cycles off. | | | | | | |
| Crankcase heater remains on when unit cycles off (if required) | | | | | | |
| Startup report completed with this checklist attached | | | | | | |
| Safeties installed and safe operating ranges for this equipment provided to the commissioning agent | | | | | | |
| Functional test procedures for this equipment reviewed and approved by installing contractor | | | | | | |
| Specified sequences of operation and operating schedules have been implemented with all variations documented | | | | | | |
| Specified point-to-point checks have been completed and documentation record submitted for this system | | | | | | |

- ***The checklist items of Part 5 are all successfully completed for given trade.___ YES ___ NO***

Notes:

## Operational Record

| | | | | | |
|---|---|---|---|---|---|
| Indoor fan speed | _____ | Discharge pressure | _____ | Evap entering air WB | _____ |
| Condenser fan speed | _____ | Discharge line temp | _____ | Evap leaving air DB | _____ |
| Oil pressure (optional) | _____ | Entering cond. air temp. | _____ | Evap leaving air WB | _____ |
| Suction pressure | _____ | Leaving cond. air temp. | _____ | Compressor amps | _____ |
| Suction line temp. | _____ | Evap. entering air DB | _____ | (L1 / L2 / L3) | |

## 6. Sensor and Actuator Calibration [ ]

All field-installed temperature, relative humidity, CO, $CO_2$ and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated using the methods and tolerances given in the Calibration and Leak-by Test Procedures document. All test instruments shall have had a certified calibration within the last 12 months: Y/N_____. Sensors installed *in* the unit at the factory with calibration certification provided need not be field calibrated.

| Sensor or Actuator & Location | Loc-ation OK | **1st** Gage or BAS Value | Instr. Meas'd Value | **Final** Gage or BAS Value | Pass Y/N? |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Sensor & Location | Loc-ation OK | **1st** Gage or BAS Value | Instr. Meas'd Value | **Final** Gage or BAS Value | Pass Y/N? |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Gage reading = reading of the permanent gage on the equipment. BAS = building automation system. Instr. = testing instrument. Visual = actual observation. The Contractor's own sensor check-out sheets may be used in lieu of the above, if the same recording fields are included and the referenced procedures are followed.

- ***All sensors and actuators are calibrated within required tolerances .....___ YES ___ NO***

**-- END OF CHECKLIST--**

Notes: