**This Prefunctional Checklist should be completed as part of startup and initial checkout of the equipment in preparation for Functional Performance testing.**

|  |  |
| --- | --- |
| PC: | **23 90 00** |
| **ITEM:** | **Refrigerant Piping System** |
| **ID:** |  |
| **AREA SERVED:** |  |

Form Filled Out By:

|  |  |  |
| --- | --- | --- |
|  | Name & Company | Date |
| GC |  |  |
| MC |  |  |
| EC |  |  |
| BC |  |  |
| CC |  |  |
| OR |  |  |
| A/E |  |  |
| CA |  |  |

GC = General Contractor; MC = Mechanical Contractor; EC = Electrical Contractor; RMCS = Refrigerant Management Control System Contractor, OR = Owner Representative; A/E = Architect/Engineer; CA = Commissioning Agent

XX = No Initials Required

# DOCUMENTATION VERIFICATION

Check if OK. Enter note number if deficient.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **GC** | **MC** | **EC** | **RMCS** | **OR** | **A/E** | **CA** |
| Product information submitted |  |  |  |  |  |  |  |
| Shop drawings submitted |  |  |  |  |  |  |  |
| Manufacturer’s installation instructions submitted |  |  |  |  |  |  |  |

# MODEL VERIFICATION

Fill in requested information.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Specified | **Submitted**  | **Installed** |
| Refrigerant type | R-407A |  |  |
| Copper Tubing/Piping Type | Type “L” Hard-drawn marked “ACR” |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# INSTALLATION VERIFICATION

This checklist does not take the place of the manufacturer’s recommended checkout and startup procedures or report**.**

Check if OK. Enter Outstanding Item Note number if deficient.

| **No** | **Checks** | **GC** | **MC** | **EC** | **RMCS** | **OR** | **A/E** | **CA** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Copper tubing/Piping is type “L” hard-drawn marked “ACR” |  |  |  |  |  |  |  |
| 2 | Tubing/Piping is capped and sealed |  |  |  |  |  |  |  |
| 3 | Confirm the refrigerant piping size (liquid line & Suction line) for each branch is correct |  |  |  |  |  |  |  |
| 4 | Confirm installed piping route is direct as possible, with a minimum number of joints, elbows, and fittings |  |  |  |  |  |  |  |
| 5 | Verify Ells are long radius type and no 45 degree elbows are used |  |  |  |  |  |  |  |
| 6 | Verify inert gas (dry nitrogen) fills pipe and fittings during brazing to prevent scale formation |  |  |  |  |  |  |  |
| 7 | Visually check joints and fitting for trace amount of oils which may indicate leaks. |  |  |  |  |  |  |  |
| 8 | Refrigerant piping is insulated with the proper size insulation *(Example: Low Temperature Suction Line:1” min insulation, Medium Temperature Suction Line ¾” min insulation, insulate all lines to coils including heat exchanges. Liquid lines shall be insulated with min. ½” insulation)* |  |  |  |  |  |  |  |
| 9 | Confirm all suction lines are sloped toward refrigeration mechanical center at a minimum of 1” per 20 feet |  |  |  |  |  |  |  |
| 10 | Verify refrigeration piping is supported at the proper spacing based on refrigerate pipe size*. (Example: ½, 5/8 &7/8” OD = Maximum pipe support spacing 5 feet span)* |  |  |  |  |  |  |  |
| 11 | Verify drain pans are installed under refrigerant piping |  |  |  |  |  |  |  |
| 12 | Confirm drain pans are properly sloped to drain fitting. |  |  |  |  |  |  |  |
| 13 | Confirm drain fitting is piped to floor drain |  |  |  |  |  |  |  |
| 14 | Condensate drain lines are properly sized |  |  |  |  |  |  |  |
| 15 | Condensate drain lines are properly supported |  |  |  |  |  |  |  |
| 16 | Condensate drain lines are properly sloped. |  |  |  |  |  |  |  |
| 17 | Condensate drain lines are properly insulated. |  |  |  |  |  |  |  |
| 18 | Condensate lines are properly routed to drain locations. Confirm lines do not cross door openings |  |  |  |  |  |  |  |
| 19 | All coils are clean and fins are in good condition |  |  |  |  |  |  |  |
| 20 | Confirm airflow to coils is not restricted |  |  |  |  |  |  |  |
| 21 | Confirm coils are accessible for cleaning and maintenance |  |  |  |  |  |  |  |
| 22 | Confirm installed components such as valves, site glass, dries, service ports, etc. are located in accessible locations to allow for service and inspection. |  |  |  |  |  |  |  |
| 23 | Confirm unions are installed to allow removal of solenoid valves, pressure-regulating valves, and expansion valves and at connections to compressors and evaporators |  |  |  |  |  |  |  |
| 24 | Confirm filter drier is installed in the main liquid lines leaving the receiver and before the metering device |  |  |  |  |  |  |  |
| 25 | Confirm a moisture indicator sight-glass is installed in the liquid line preceding the liquid manifold. |  |  |  |  |  |  |  |
|  | Thermostatic Expansion Valve (TEV) |  |  |  |  |  |  |  |
| 26 | TEV Sensing Bulb – Confirm the TEV sensing bulb is securely installed on the suction line to measure suction line temperature. Sensing bulb measurement should not be effected by refrigerant oil or ambient temperature |  |  |  |  |  |  |  |
| 27 | TEV Sensing Bulb – Confirm sensing bulb is properly insulated to prevent warmer ambient temperature from effect sensing bulb temperature measurement |  |  |  |  |  |  |  |
| 28 | TEV – Confirm valve is accessible for super heat setting adjustments. |  |  |  |  |  |  |  |
| 29 | TEV – Confirm it is connected to RMCS |  |  |  |  |  |  |  |
|  | **Evaporator Pressure Regulator Valve (EPR)** |  |  |  |  |  |  |  |
| 30 | Confirm the EPR Valve is accessible for adjustment and/or replacement |  |  |  |  |  |  |  |
| 31 | Confirm the EPR’s Schrader valve port is accessible to allow gage readings to be taken on the evaporator side of the valve. |  |  |  |  |  |  |  |
|  | **Electronic Expansion Valve (EEV)** |  |  |  |  |  |  |  |
| 32 | Schrader valve located at the outlet of the evaporator coil is accessible so upstream pressure can be measured with a gauge |  |  |  |  |  |  |  |
| 33 | EEV – Confirm connection to RMCS |  |  |  |  |  |  |  |
|  | **Solenoid Valve** |  |  |  |  |  |  |  |
| 34 | Confirm the solenoid valve is mounted in the correct direction *(The valve should have an arrow to indicate direction of flow)* |  |  |  |  |  |  |  |
| 35 | Confirm the solenoid valve is located in the proper position (*Make sure valve is not installed on its side or upside down)* |  |  |  |  |  |  |  |
| 36 | Verify the solenoid valve is the correct type for the application and location *(NO or NC)* |  |  |  |  |  |  |  |
| 37 | Verify the solenoid valve is accessible for service and/or replacement |  |  |  |  |  |  |  |
|  | **Receiver** |  |  |  |  |  |  |  |
| 38 | Confirm receiver is installed lower than the condenser so the refrigerant has an incentive to flow into it naturally |  |  |  |  |  |  |  |
| 39 | Confirm King Valve on receiver is in the proper position to allow refrigerant flow out of the receiver |  |  |  |  |  |  |  |
| 40 | Each receiver shall have an analog liquid level sensor connected to RMCS |  |  |  |  |  |  |  |
| 41 | Confirm current transducers are installed for each compressor system and the transducers are connected to the RMCS system |  |  |  |  |  |  |  |
| 42 | Confirm Suction service valve is accessible *(gauges can be attached to ports, valve can be open and closed easily for service)* |  |  |  |  |  |  |  |
| 43 | Confirm each compressor has a suction filter with a replaceable core, with felt element, brass housing, and Schrader valve. |  |  |  |  |  |  |  |
| 44 | Confirm Discharge service valve is accessible *(gauges can be attached to ports, valve can be open and closed easily for service)* |  |  |  |  |  |  |  |
| 45 | Confirm compressors located in cold climates where the ambient temperature can be below 50 degrees F are equipped with a crankcase oil heater that is fused and wired through auxiliary contacts. |  |  |  |  |  |  |  |
|  | Defrost Control |  |  |  |  |  |  |  |
| 46 | For cases and walk in boxes with discharge air temperature greater than 32 Deg F – defrost shall be off cycle all other shall be defrost by electric that is time initiated and temperature terminated with time fail safe. Defrost shall be controlled through the RMCS |  |  |  |  |  |  |  |
|  | TESTING |  |  |  |  |  |  |  |
| 47 | Piping Pressure Test has been completed successfully and report submitted |  |  |  |  |  |  |  |
| 48 | Evacuation Test has been completed successfully and report submitted |  |  |  |  |  |  |  |
| 49 | Electronic Leak Test has been completed successfully and report submitted |  |  |  |  |  |  |  |
| 50 | Performance Testing has been successfully completed and test reports have been submitted |  |  |  |  |  |  |  |

# OUTSTANDING ITEMS

Note outstanding items in table below. Use numbers referenced above.

|  |  |  |
| --- | --- | --- |
| Resolved(Initial / Date) | **Note** | Description |
|  | **1.** |  |
|  | **2.** |  |
|  | **3.** |  |
|  | **4.** |  |
|  | **5.** |  |
|  | **6.** |  |
|  | **7.** |  |
|  | **8.** |  |
|  | **9.** |  |
|  | **10.** |  |

# FIELD NOTES

Fill in as appropriate.

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| --- |
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|  |
|  |

# SIGN OFF

System / Equipment have been installed in accordance with the Contract Documents and is ready for Functional Testing.

|  |  |  |
| --- | --- | --- |
|  | **Signature** | **Date** |
| **Contractor’s Representative** |  |  |
| **A /E Representative** |  |  |
| **Commissioning Agent** |  |  |
| **Owner’s Representative** |  |  |

##### END OF CHECKLIST