

SECTION 23 74 13 - AIR CONDITIONING/AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes

1. **KROGER DIRECT BUY PROGRAM:** Owner supplied/Contractor installed.
 - a. The Kroger Company will supply the following equipment:
 - 1) Rooftop air conditioning/air handling units with the following components and accessories:
 - a) Direct-expansion cooling.
 - b) Electric-heating coils.
 - c) Gas furnace.
 - d) Integral, space temperature controls.
 - 2) Split system cooling and heat pump units.
 - b. Comply with requirements in Division 00 Section "General Conditions."
2. Contractor supplied items:
 - a. Fasteners and other items not provided by Owner necessary for a complete installation.
3. Contractor installed items:
 - a. Rooftop air conditioning/air-handling units.
 - b. Split system cooling and heat pump units.

1.2 SUBMITTALS

- A. The Owner will provide the following submittals for the Contractor's review. The Contractor shall review and return submittals as specified in Division 00 Section "General Conditions."
1. Product Data: Manufacturer's technical data for each air conditioning/air-handling unit, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
 2. Shop Drawings: Equipment assemblies and dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - a. Wiring Diagrams: Power, signal, and control wiring.

3. Installation Manual: Manufacturers complete manual for installation of unit.

1.3 QUALITY ASSURANCE

A. ARI Compliance:

1. ARI 210/240 and ARI 340/360 for testing and rating energy efficiencies for air conditioning/air-handling units.
2. ARI 270 for testing and rating sound performance for air conditioning/air-handling units.

B. ASHRAE Compliance:

1. ASHRAE 15 for refrigerant system safety.
2. ASHRAE 33 for methods of testing cooling and heating coils.
3. ASHRAE/IESNA 90.1 for minimum efficiency of heating and cooling.

C. NFPA Compliance: NFPA 90A and NFPA 90B.

D. UL Compliance: UL 1995.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.4 WARRANTY

- #### A.
- Contractor shall be responsible for handling manufacturer warranty service during the 90 day warranty period. Contractor shall be responsible for following all warranty procedures and notifying Owner of all warranty repairs.

PART 2 - PRODUCTS

2.1 ROOFTOP AIR CONDITIONING/AIR-HANDLING UNITS (Supplied by Owner)

- #### A.
- Refer to Division 01 Section "Vendor Contact List" for contact information on air conditioning/air-handling units.

1. See Drawings for schedule of equipment.
2. Energy Management System (EMS) temperature controls are furnished by Owner and installed within the roof top units.

2.2 COOLING AND HEAT PUMP UNITS (Supplied by Owner)

- #### A.
- Refer to Division 01 Section "Vendor Contact List" for contact information on duct-free split system cooling and heat pump units.

1. See Drawings for schedule of equipment.

2.3 CONTROLS

- A. Control equipment and sequence of operation are indicated on Drawings.

2.4 ROOF CURBS

- A. Provide curbs for air conditioning/air-handling units as specified in Division 07 Section "Manufactured Curbs."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install rooftop air conditioning/air-handling units and split system cooling and heat pump units in accordance with manufacturer's installation instructions.
- B. Installation Includes:
 - 1. Curbs, provision of crane for placement of equipment, making connections to HVAC controller and initial balancing, filters and racks at time of start up and all filter changes during construction.
 - 2. Wiring including connections to HVAC controller(s), connections to smoke detectors; and testing and balancing.
 - 3. Replacement of missing and/ or damaged materials after acceptance of equipment.
 - 4. Final connection to EMS panel.
- C. Roof Curb: Install on roof structure level and secure, according to NRCA's "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts." Install air conditioning/air-handling units on curbs and coordinate roof penetrations and flashing with roof construction. Secure air conditioning/air-handling units to upper curb rail with restraint brackets, and secure curb base to roof framing or concrete base as indicated on Drawings.
- D. Install condensate drain, minimum connection size, with trap and drain as required by authorities of local jurisdiction.
- E. Install piping adjacent to air conditioning/air-handling units to allow service and maintenance.
 - 1. Gas Piping: Comply with applicable requirements in Division 23 Section "Facility Natural Gas Piping." Connect gas piping to burner, full size of gas train inlet, and connect with union and shutoff valve with sufficient clearance for burner removal and service.
- F. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
 - 1. Install ducts to termination at top of roof curb.

2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
3. Connect supply ducts to air conditioning/air-handling units with flexible duct connectors specified in Division 23 Section "Air Duct Accessories."

- G. Install return-air duct continuously through roof structure.
- H. Control Wiring: Electrical installer shall provide control wiring. HVAC installer shall provide final connections.

3.2 START UP SERVICE

- A. Provide an experienced service technician for start up. Ensure that all components of the rooftop units are operating properly.
1. Complete and submit the attached RTU/AHU System Test Checklist to the Owner for new roof top and air handling units.
 2. Post all RTU/AHU System Test Checklists to the Testing and Inspection folder on the project page in the Owner's Project Management Website.
- B. Owner will provide a technician for review of and inspection of balancing and will make recommendations to Contractor regarding adjustments for final balancing. Contractor will make final adjustments in response to these recommendations.
- C. If ambient temperatures prevent compressor testing at initial startup, return to site and complete testing once ambient temps are above **65 degrees F (18.3 degrees C)**.

3.3 CLEANING AND ADJUSTING

- A. Clean up work. Touch-up with matching paint all damaged factory finishes.
- B. Fully charge all rooftop equipment with refrigerant and ensure proper oil levels.
- C. Provide new filters on the day building is turned over to Owner for grand opening.

AIR CONDITIONING SYSTEM TEST CHECK LIST FORM
AIR CONDITIONING/AIR HANDLING UNIT

(Furnish a completed checklist and post to Owner's Project Management Website project page for each Rooftop Unit. Post completed start up forms under Files > Text Documents > Testing & Inspection > HVAC Test and Balance)

Inspector _____ Date _____

Kroger Store # _____ Address _____

Mfgr. of Rooftop Unit _____

Model _____ Unit Serial No. _____

Comp. #1 Serial No. _____

Comp. #2 Serial No. _____

Comp. #3 Serial No. _____

Comp. #4 Serial No. _____

Comp. #5 Serial No. _____

PRE-START-UP INSPECTION

	YES	NO
1. Proper electrical supply voltage available (insert voltage) L1 _____ L2 _____ L3 _____		
2. Adequate size disconnect switch installed.....	<input type="checkbox"/>	<input type="checkbox"/>
3. Proper size fuses	<input type="checkbox"/>	<input type="checkbox"/>
4. Proper size copper wiring to unit.....	<input type="checkbox"/>	<input type="checkbox"/>
5. All wiring inside unit connects tightly to terminals.....	<input type="checkbox"/>	<input type="checkbox"/>
6. All wiring checked for proper hook-up	<input type="checkbox"/>	<input type="checkbox"/>
7. Gas regulator installed if needed	<input type="checkbox"/>	<input type="checkbox"/>
8. Gas pressure test tap installed before unit.....	<input type="checkbox"/>	<input type="checkbox"/>
9. Gas pressure set to unit manufacturer spec..... Pressure set to _____	<input type="checkbox"/>	<input type="checkbox"/>
10. Evaporator fans turn over freely by hand	<input type="checkbox"/>	<input type="checkbox"/>
11. Evaporator fan set screw tightened on flat of shaft.....	<input type="checkbox"/>	<input type="checkbox"/>
12. System leak tested at 450 psi high side, 150 psi low side.....	<input type="checkbox"/>	<input type="checkbox"/>
13. System evacuated to 500 microns.....	<input type="checkbox"/>	<input type="checkbox"/>
14. Amount of refrigerant charged _____ lbs. in each system.....	<input type="checkbox"/>	<input type="checkbox"/>

- | | | | |
|-----|--|--------------------------|--------------------------|
| 15. | Expansion valve bulb attached securely & insulated..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. | List suction line size Comp #1 _____ | | |
| | Comp #2 _____ | | |
| | Comp #3 _____ | | |
| | Comp #4 _____ | | |
| | Comp #5 _____ | | |
| 17. | List liquid line size Comp #1 _____ | | |
| | Comp #2 _____ | | |
| | Comp #3 _____ | | |
| | Comp #4 _____ | | |
| | Comp #5 _____ | | |
| 18. | Proper size gas piping installed | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. | No doors blocked by piping or other obstructions..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. | 2 inch high efficiency filters installed & cleaned | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. | Shipping screws removed from barometric relief damper. | <input type="checkbox"/> | <input type="checkbox"/> |
| 22. | Compressor T-stat lockout set to 38 degrees F (3.3 degrees C)..... | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. | Condensate pump installed for Mini-Split system..... | <input type="checkbox"/> | <input type="checkbox"/> |

AIR CONDITIONING SYSTEM TEST CHECK LIST FORM
AIR CONDITIONING/AIR HANDLING UNIT
START-UP CHECKS

(Furnish a completed checklist and post to Owner's Project Management Website project page for each Rooftop Unit. Post completed start up forms under Files > Text Documents > Testing & Inspection > HVAC Test and Balance)

	YES	NO
1. Unit started & stopped 3 times to check starting.	<input type="checkbox"/>	<input type="checkbox"/>
2. Evaporator fans running in correct rotation.	<input type="checkbox"/>	<input type="checkbox"/>
3. Evaporator fan RPM properly adjusted to provide required air flow against external static pressure (ductwork complete).....	<input type="checkbox"/>	<input type="checkbox"/>
4. Compressors motor current (measured).....		
Comp #1 _____ AMPS		
Comp #2 _____ AMPS		
Comp #3 _____ AMPS		
Comp #4 _____ AMPS		
Comp #5 _____ AMPS		
Condenser (measured) _____ AMPS		
Evaporator Fan (measured) _____ AMPS		
5. Each phase voltage at unit while running VOLTS		
6. Phase monitor operating with no faults	<input type="checkbox"/>	<input type="checkbox"/>
7. All sensors installed correctly		
Supply air	<input type="checkbox"/>	<input type="checkbox"/>
Modulating hot gas reheat supply air sensor if needed	<input type="checkbox"/>	<input type="checkbox"/>
Modulating gas heat supply air sensor if needed	<input type="checkbox"/>	<input type="checkbox"/>
Return air	<input type="checkbox"/>	<input type="checkbox"/>
Mixed air if present	<input type="checkbox"/>	<input type="checkbox"/>
8. Supply air temperature at full cooling Deg. F		
9. Return air temperature filter rack..... Deg. F		
10. Ambient temperature at condenser coil Deg. F		
11. Suction pressure.....		
Comp #1 _____ psig		
Comp #2 _____ psig		
Comp #3 _____ psig		
Comp #4 _____ psig		
Comp #5 _____ psig		
12. Discharge pressure.....		
Comp #1 _____ psig		
Comp #2 _____ psig		
Comp #3 _____ psig		
Comp #4 _____ psig		
Comp #5 _____ psig		

13. HPC cuts out at Comp #1 _____ psig
Comp #2 _____ psig
Comp #3 _____ psig
Comp #4 _____ psig
Comp #5 _____ psig
14. LPC cuts in at (No way to test on package units) Comp #1 _____ psig
Comp #2 _____ psig
Comp #3 _____ psig
Comp #4 _____ psig
Comp #5 _____ psig
15. LPC cuts out at (No way to test on package units) Comp #1 _____ psig
Comp #2 _____ psig
Comp #3 _____ psig
Comp #4 _____ psig
Comp #5 _____ psig
16. Smoke detector connected to shutdown points BI1 and BI2. ☐ ☐
17. Condensate overflow switch shuts unit down when tripped. ☐ ☐
18. Condensate traps installed. ☐ ☐
19. RTU wind – seismic restraint brackets installed per HSD-10. ☐ ☐
20. All penetrations sealed, including heat reclaim pipe chase. ☐ ☐
21. Outside air hood installed. ☐ ☐
22. All capillary tubes tied down to prevent rubbing. ☐ ☐
23. Unit free from rattles and vibration ☐ ☐
24. Unit clean inside and outside ☐ ☐
25. The HVAC system is installed and operates properly except for the following exceptions:

SIGNED:

Signature

Print Name

END OF SECTION 23 74 13