

SECTION 237413 - ROOFTOP AIR CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. Division 23 – Section 230513 “Common Motor Requirements for HVAC Equipment”

1.3 SUMMARY

- A. Related Sections include the following:
 - 1. Division 23 Section “Basic Mechanical Requirements” for temporary use or Mechanical Equipment.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's technical data for each model indicated, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
- B. Operation and Maintenance Data: For rooftop air conditioners to include in emergency, operation, and maintenance manuals.
- C. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of rooftop air conditioners and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- B. 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.
- C. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Code for Mechanical Refrigeration."
- D. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1-2015, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- E. ARI Certification: Units shall be ARI certified and listed.
- F. ARI Compliance for Units with Capacities Less Than 135,000 Btuh: Rate rooftop air-conditioner capacity according to ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment."

1. Sound Power Level Ratings: Comply with ARI 270, "Sound Rating of Outdoor Unitary Equipment."
- G. ARI Compliance for Units with Capacities 135,000 Btuh and More: Rate rooftop air-conditioner capacity according to ARI 340/360, "Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment."
 1. Sound Power Level Ratings: Comply with ARI 270, "Sound Rating of Outdoor Unitary Equipment."

1.6 COORDINATION

- A. Coordinate size, location, and installation of rooftop air-conditioner manufacturer's roof curbs and equipment supports with roof installer.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of rooftop air conditioners that fail in materials or workmanship within specified warranty period.
 1. Warranty Period for Compressors (Parts Only): Manufacturer's standard, but not less than five years from date of Substantial Completion.
 2. Extended Warranty: One-year labor and material on all components.

PART 2 - PRODUCTS

2.1 ROOFTOP AIR CONDITIONERS

General:

- Precedent unit cooling capacities, heating capacities, and efficiencies are certified to the following standards: – 3 to 5ton units: AHRI Standard 210/240.– 6to25tonunits: AHRI Standard 340/360.
- Gas Heating Units: ANSI Z21.47 and 10 CFR Part 431 for Commercial Warm Air.
- Convertible airflow.
- Factory assembled, internally wired, fully charged, and 100 percent run tested to verify cooling operation, fan and blower rotation, and control sequence.
- cULus listed and classified in accordance with Central Cooling Air Conditioners.

Casing:

- Zinc coated, heavy gauge, galvanized steel.
- Weather resistant pre-painted metal with galvanized substrate.
- MeetsASTMB117,672 hour salt spray test.
- Removable single side maintenance access panels.
- Exposed vertical panels and top covers in the indoor air section insulated with a cleanable foil-faced, fire-retardant permanent, odorless glass fiber material.
- Base pan with no penetrations within the perimeter of the curb other than the raised 1-inch downflow supply/return openings to provide an added water integrity precaution, if the condensate drain backs up.
- Base of the unit insulated with 1/8-inch, foil-faced, closed-cell insulation.

Microchannel Coils:

- Optimal heat transfer performance with small ports, and metallurgical tube-to-fin bond.
- Compact all-aluminum microchannel coils.
- Aluminum brazed structure.
- Coils leak tested at the factory to verify the pressure integrity.

Compressors:

- All units have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps.
- Suction gas-cooled motor with voltage utilization range of plus or minus 10 percent of unit nameplate voltage.
- Internal overloads standard with scroll compressors.
- Crank case heaters are standard on all compressors.
- Dual compressors (6 to 25 ton units only).
- Cooling stages available: 6 to 17.5 ton units – three. 20 and 25 ton units – four.

Filters:

- 2 inch MERV 13 filters.

Gas Heating Section:

- Compact cabinet features a tubular heat exchanger in low, medium and high heat capacities.
- Corrosion-resistant aluminized steel tubes and burners are standard on all models.
- Induced draft combustion blower is used to pull the combustion products through the firing tubes.
- Heater uses a direct spark ignition (DSI) system and a flame sensor as a safety device to validate the flame.
- Units are suitable for use with natural gas or propane (field-installed kit).

Indoor Fan:

- Direct drive forward curve fan design– A.0 cabinet.
- Direct drive plenum fan design– B.0, C.0, D.0, and D.1 cabinets.
- Plenum fan design– backward-curved fan wheel along with an external rotor direct drive variable speed indoor motor.
- Motors are electronically protected.
- Variable speed direct drive motors are high efficiency.

Through-the-Base Electrical with Disconnect Switch:

- 3-pole, molded case, disconnect switch with provisions for through-the-base electrical connections.
- Disconnect switch installed within unit in a watertight enclosure.
- Wiring provided from the switch to the unit high voltage terminal block.
- Switch cULus agency recognized.

Note: Disconnect switch sized per NEC and cULus guidelines but does not replace unit overcurrent Protection.

Standard Economizer:

- Available with or without barometric relief.
- Fully modulating 0 to 100 percent motor and dampers, minimum position setting, preset linkage, wiring harness with plug, spring return actuator and fixed dry bulb control.
- Barometric relief provides a pressure-operated, gravity-closing damper.
- Barometric relief prevents entrance of outside air during the equipment off cycle.

Motorized Outside Air Damper:

- Once set, when indoor fan starts, outdoor air dampers open to set position.

- When indoor fan shuts down, damper fully closes.

Roof Curb:

- Designed to connect with the unit's downflow supply and return.
- Provides support and a watertight installation when installed properly.
- Allows field-fabricated rectangular supply/return ductwork to be connected directly to the curb.
- Curb shipped knocked down for field assembly.
- Includes wood nailer strips.

Leak Detection Sensors:

Unit shall be furnished with a leak detection system from the factory when a circuit refrigerant charge exceeds 3.91 lbs. The leak detection system shall consist of one or more refrigerant detection sensors. When the system detects a leak, the unit controller shall initiate mitigation actions.

Approved Manufacturers:

1. Trane
2. Carrier
3. Johnson Controls
4. Daikin

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb, maintaining manufacturer's recommended clearances. Any slope must be toward side where condensate drain is connected.
- B. Curb Support: Install roof curb 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 and secure rooftop air conditioners on curbs and coordinate roof penetrations and flashing with roof construction. Secure units to curb support with anchor bolts.

3.2 CONNECTIONS

- A. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
 1. Do not cut out decking under roof curb.
 2. Connect supply ducts to rooftop unit with flexible duct connectors specified in Division 23 Section "Duct Accessories."
- B. Electrical System Connections: Comply with applicable requirements in Division 26 for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

- A. A manufacturer trained service technician shall perform the following field quality-control tests and inspections to verify proper operation.

1. After installing rooftop air conditioners and after electrical circuitry has been energized, test units for compliance with requirements.
 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Remove malfunctioning units, replace them with new units, and retest as specified above.

3.4 STARTUP SERVICE

- A. Complete installation and startup checks according to manufacturer's written instructions and do the following:
1. Inspect for visible damage to unit casing.
 2. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
 3. Inspect internal insulation.
 4. Verify that labels are clearly visible.
 5. Verify that clearances have been provided for servicing.
 6. Verify that controls are connected and operable.
 7. Verify that clean filters are installed.
 8. Clean outside coil and inspect for construction debris.
 9. Adjust vibration isolators.
 10. Lubricate bearings on fan.
 11. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
 12. Adjust fan belts to proper alignment and tension.
 13. Start unit according to manufacturer's written instructions.
 14. Inspect and record performance of interlocks and protective devices; verify sequences.
 15. Operate unit for an initial period as recommended or required by manufacturer.
 16. Adjust and inspect high-temperature limits.
 17. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
 18. After startup and performance testing, change filters, lubricate bearings and adjust belt tension.

3.5 DEMONSTRATION

- A. Factory-trained service representative to train Owner's maintenance personnel to adjust, operate, and maintain rooftop air conditioners. Refer to Division 1 Section "Closeout Procedures or Demonstration and Training."

END OF SECTION 237413