

SECTION 23 62 00 - PACKAGED COMPRESSOR AND CONDENSER UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes air cooled condensing units.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Wiring diagrams.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. 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.
- B. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Code for Mechanical Refrigeration."
 - 1. Units shall be designed to operate with HCFC-free refrigerants.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of condensing units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period (Compressor Only): Five years from date of Substantial Completion.
 - 2. Warranty Period (Condenser Coil Only): Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONDENSING UNITS, AIR COOLED, 1 TO 5 TONS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
 - 1. Carrier Corporation; Carrier Air Conditioning Div.
 - 2. Lennox Industries Inc.
 - 3. Rheem Manufacturing Air Conditioning Div.
 - 4. Trane Co. (The); Worldwide Applied Systems Group.
 - 5. York International Corp.
- B. Description: Factory assembled and tested, consisting of compressor, condenser coil, fan, motors, refrigerant reservoir, and operating controls.
- C. Compressor: Scroll, hermetically sealed, with rubber vibration isolators.
 - 1. Motor: [**Single**] [**Two**] speed, and includes thermal and current sensitive overload devices, start capacitor, relay, and contactor.
 - 2. Two-Speed Compressor: Include manual reset, high pressure switch and automatic reset, low-pressure switch.
 - 3. Accumulator: Suction tube.
 - 4. Refrigerant Charge: [**R-407C**] [**R-410A**].
- D. Condenser Coil: Seamless copper tube, aluminum fin coil; circuited for integral liquid subcooler, with removable drain pan and brass service valves with service ports.
- E. Condenser Fan: Direct drive, aluminum propeller fan; with permanently lubricated, totally enclosed fan motor with thermal overload protection [**and ball bearings**].
- F. Accessories:
 - 1. Coastal Filter: Mesh screen to protect condenser coil from salt damage.
 - 2. Crankcase heater.
 - 3. Cycle Protector: Automatic-reset timer to prevent rapid compressor cycling.
 - 4. Electronic programmable thermostat to control condensing unit and evaporator fan.
 - 5. Evaporator Freeze Thermostat: Temperature actuated switch that stops unit when evaporator reaches freezing temperature.
 - 6. Filter dryer.
 - 7. High Pressure Switch: Automatic-reset switch cycles compressor off on high refrigerant pressure.
 - 8. Liquid-line solenoid.
 - 9. Low Ambient Controller: Cycles condenser fan to permit operation down to 0 deg F.
 - 10. Low-Pressure Switch: Automatic reset switch cycles compressor off on low refrigerant pressure.
 - 11. PE mounting base to provide a permanent foundation.
 - 12. Precharged and insulated suction and liquid tubing.
 - 13. Sound Hood: Wraps around sound attenuation cover for compressor.

14. Thermostatic expansion valve.
 15. Time-Delay Relay: Continues operation of evaporator fan after compressor shuts off.
- G. Unit Casing: Galvanized steel, finished with baked enamel; with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Mount service valves, fittings, and gage ports on exterior of casing.
- H. Verification of Performance: Rate condensing units according to ARI 210/240.

2.2 CONDENSING UNITS, AIR COOLED, 6 TO 120 TONS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
1. Carrier Corporation; Carrier Air Conditioning Div.
 2. Engineered Air.
 3. Lennox Industries Inc.
 4. McQuay International.
 5. Rheem Manufacturing Air Conditioning Div.
 6. Trane Co. (The); Worldwide Applied Systems Group.
 7. York International Corp.
- B. Description: Factory assembled and tested, air cooled; consisting of casing, compressors, condenser coils, condenser fans and motors, and unit controls.
- C. Compressor: Hermetic or semi-hermetic compressor designed for service with crankcase sight glass, crankcase heater, and backseating service access valves on suction and discharge ports.
1. Capacity Control: **[Cylinder unloading] [Hot-gas bypass]**.
 2. Refrigerant Charge: **[R-407C] [R-410A] [HFC-134a]**.
- D. Condenser Coil: Seamless copper-tube, aluminum-fin coil, including subcooling circuit and backseating liquid line service access valve. Factory pressure test coils, then dehydrate by drawing a vacuum and fill with a holding charge of nitrogen or refrigerant.
- E. Condenser Fans: Propeller type vertical discharge; either directly or belt driven. Include the following:
1. Permanently lubricated ball-bearing motors.
 2. Separate motor for each fan.
 3. Dynamically and statically balanced fan assemblies.
- F. Operating and safety controls include the following:
1. Manual reset, high-pressure cutout switches.
 2. Automatic reset, low-pressure cutout switches.
 3. Low oil pressure cutout switch.
 4. Compressor winding thermostat cutout switch.
 5. Three leg, compressor overload protection.

6. Control transformer.
7. Magnetic contactors for compressor and condenser fan motors.
8. Timer to prevent excessive compressor cycling.

G. Accessories:

1. Electronic programmable thermostat to control condensing unit and evaporator fan.
2. Low Ambient Controller: Cycles condenser fan to permit operation down to 0 deg F.
3. Gage Panel: Package with refrigerant circuit suction and discharge gages.
4. Hot gas bypass kit.
5. Part winding start timing relay, circuit breakers, and contactors.

H. Unit Casings: Designed for outdoor installation with weather protection for components and controls and with removable panels for required access to compressors, controls, condenser fans, motors, and drives. Additional features include the following:

1. Steel, galvanized or zinc coated, for exposed casing surfaces; treated and finished with manufacturer's standard paint coating.
2. Perimeter base rail with forklift slots and lifting holes to facilitate rigging.
3. Gasketed control panel door.
4. Nonfused disconnect switch, factory mounted and wired, for single external electrical power connection.
5. Condenser coil hail guard to protect coil from physical damage.

I. Verification of Performance: Rate condensing units according to ARI 340/360.

2.3 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate condensing units according to **[ARI 210/240]** **[ARI 340/360]**.

1. Coefficient of Performance: Equal to or greater than prescribed by Seattle Energy Code.
2. Energy-Efficiency Ratio: Equal to or greater than prescribed by Seattle Energy Code.

B. Testing Requirements: Factory test sound power level ratings according to ARI 270.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.
- B. Install condensing units on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for Mechanical" and concrete materials and installation requirements are specified in Division 03 Section "Cast-In Place Concrete."

- C. Install roof-mounting units on equipment supports specified in Division 07.
- D. Maintain manufacturer's recommended clearances for service and maintenance.
- E. Connect refrigerant piping to air cooled condensing units; maintain required access to unit. Install furnished field-mounted accessories. Refrigerant piping and specialties are specified in Division 23 Section "Refrigerant Piping."

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform electrical test and visual and mechanical inspection.
 - 2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 5. Verify proper airflow over coils.
- B. Remove and replace malfunctioning condensing units and retest as specified above.

END OF SECTION 23 62 00