

1. GENERAL

1.1 Scope

- .1 Air cooled refrigerant condensing unit package.
- .2 Refrigerant piping and accessories.
- .3 Controls.
- .4 Charge of refrigerant and oil.
- .5 Start-up and commissioning

1.2 Quality Assurance

- .1 Conform to current requirements of CSA, UL, Provincial and Municipal Codes.
- .2 Materials in contact with refrigerant shall be corrosion resistant.
- .3 Units shall be product of manufacturer regularly engaged in production of refrigeration units and who issues complete catalogue data on such products.
- .4 Air cooled condensing units shall be of same make as the air handling unit.

1.3 Submittals

- .1 Submit with shop drawings, schematic layouts showing condensing units, cooling coils, refrigerant piping and accessories required for complete system, including equipment weights and detailed performance data, with full wiring diagram for power and controls.
- .2 Submit complete pipe sizing data.

1.4 Start-up and Testing

- .1 Supply initial charge of refrigerant and oil for each refrigeration system. Losses of oil or refrigerant prior to acceptance of equipment or due to defects covered under guarantee shall be replaced. Supply to the City, one complete charge of lubricating oil in addition to that placed in the system.
- .2 Charge the system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.
- .3 Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.
- .4 Provide cooling season start-up, winter season shut-down for first year of operation and submit report to Contract Administrator.

- .5 Inspect and test for refrigerant leaks every 3 months during first year of operation.

2. PRODUCTS

2.1 Type

- .1 Units shall be self-contained, packaged, factory assembled and prewired suitable for outdoor use consisting of casing, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, screens.

2.2 Cabinet

- .1 The cabinet shall be constructed entirely of G90 galvanized steel with the exterior fabricated of 18 gauge or heavier material.
- .2 A walk-in compartment shall contain the electric control panel. The compartment shall be provided with a fluorescent light fixture. The light shall be controlled by a wall switch and shall be energized regardless of the main power switch.
- .3 Unit specific colour coded wiring diagrams shall match the unit colour coded wiring and shall be provided in both point to point and ladder form.
- .4 Diagrams shall be laminated in plastic and permanently affixed inside the control compartment.

2.3 Access Doors

- .1 Provide hinged man sized access doors. Door construction to be the same as casing, provide minimum two (2) latches per door openable from both sides. Doors to be sealed with neoprene gasketing (foam gasket not acceptable). Door hinge to be continuous stainless steel hinges. Door sizes to be 750 mm (30 in) x 1800 mm (72 in) or as limited by height.

2.4 Finish

- .1 The paint finish shall be capable of withstanding at least 20 hours, with no visible corrosive effects, when tested in a salt spray and fog atmosphere in accordance with ASTM B117-95 test procedure.
- .2 The unit exterior colour shall be grey in colour.

2.5 Compressors

- .1 Compressors shall be scroll type tandem arrangement with internal thermal overload protection and mounted on the compressor manufacturer's recommended rubber vibration isolators. Each pair of tandem compressors shall have independent refrigerant circuits.
- .2 All units shall be multiple stages with a minimum of 2 stages of capacity control.

- .3 Compressors shall be mounted in an isolated walk-in compartment.
- .4 Compressors shall be isolated from the base pan and supply air to avoid any transmission of noise from the compressor into the building area.
- .5 System shall be equipped with thermostatic expansion valve type refrigerant flow control.
- .6 System shall be equipped with automatic reset low pressure and manual reset high pressure refrigerant controls.
- .7 Unit shall be equipped with Schrader type service fittings on both the high side and low pressure sides of the system.
- .8 Unit shall be equipped with replaceable core refrigerant liquid line driers with isolation valves.
- .9 Hot gas bypass shall be provided on the first refrigerant circuit.
- .10 All circuits shall be equipped with liquid line sight glasses.
- .11 Unit shall be equipped with a 5 minutes anti-short cycle delay timer for each stage.
- .12 Unit shall be equipped with 20 second between stage delay timers for each stage.
- .13 First stage cooling shall be provided to allow operation in low ambient to 0°F.
- .14 Each compressor shall be equipped with suction and discharge service valves.

2.6 Condenser Coils

- .1 The condenser coils, facing out, shall be protected by a sheet of perforated metal.
- .2 The condensing section shall be equipped vertical discharge axial flow direct drive 1170 RPM fans with all aluminum construction and adjustable blade pitch. Direct drive fans shall be directly connected to and supported by the motor shaft. Motor bearings have external lubrication connections.
- .3 The condenser coils shall be sloped to protect the coils from damage.
- .4 Condenser coils shall be copper tubes with aluminum fins mechanically bonded to the tubes.
- .5 Condenser coils to be sized for a minimum of 10°F of refrigerant sub-cooling.
- .6 To conserve energy, condenser fans shall be cycled off when not required based on outdoor temperature.

2.7 Power

- .1 Unit shall be provided with a factory installed and wired internal disconnect.

- .2 Unit shall be provided with phase and brown-out protection to shut down all motors in the unit if the phases are more than 10% out of balance on voltage, or the voltage is more than 10% under design voltage or on phase reversal.
- .3 Unit shall be provided with a factory installed and wired 115 volt, 15 amp ground fault service receptacle.

3. EXECUTION

3.1 Performance

- .1 Refer to equipment schedules.

END OF SECTION