SECTION 11 78 13
MORTUARY REFRIGERATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Refrigerators for Autopsy. Refer to architectural drawings for dimensions and arrangement of units.

B. Refer to the architectural drawings for refrigeration equipment schedules and installation details.

C. Refer to Section 23 23 00, REFRIGERANT PIPING, for piping and insulation.

D. Refer to electrical drawings for lighting.

E. Section includes mortuary equipment; connection to utilities; remote monitoring of temperature via LAN, service fittings and outlets.

1.2 RELATED WORK

A. Quarry tile floor: Section 09 30 13, CERAMIC TILING.

C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

D. Section 23 23 00, REFRIGERANT PIPING.

E. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

1.3 QUALITY ASSURANCE

Safety Standard: ASHRAE 15, describe requirements for refrigerant containing parts.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Condensing units, with mounting rack where required.
2. Unit coolers.
3. Temperature controls and alarms.
4. Temperature recorders for mortuary refrigerators.
5. Mortuary walk-in ventilation accessories.
6. Diagrams and details of piping, wiring and controls.

C. Operating Test Data.

D. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Submit with description of equipment operation, adjusting, and testing required Identify system maintenance requirements, servicing cycles, and lubrication types required.

E. Product Data: Submit description of equipment to include dimensions and construction, equipment capacities, utility and service requirements and locations, and weights, hardware, door and panel construction, accessories and materials.

F. Manufacturer's Installation Instructions: Submit installation requirements.

H. Warranty: Submit Manufacturer's warranty information.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. Air-Conditioning and Refrigeration Institute (ARI):

420-00.....Unit Coolers for Refrigeration.

520-04.....Performance Rating of Positive Displacement Condensing Units.

C. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):

15-10.....Safety Standard for Refrigeration Systems

PART 2 - PRODUCTS

2.0 MANUFACTURES

Provide products as manufactured by Mortech Manufacturing 411 North Aerojet Avenue, Azusa, CA 91702, www.mortechmfg.com (phone 800-410-0100), or approved equal

2.1 CONDENSING UNITS

A. Comply with ARI Standard 520. Air cooled, water cooled or combination air/water cooled type as shown, motor driven integral compressor, motor starter, condenser, receiver, common base, and safety/operational controls. Receiver capacity shall be not less than 125 percent of system refrigerant charge. For units racked one above the other and for units installed in a closet, provide a factory fabricated steel rack extending approximately 1150 mm (45 inches) above the floor. For larger freezers provide two condensing units and unit coolers with independent refrigeration systems as shown. Do not locate compressors on top of refrigerator or freezers.

B. Provide positive oil lubrication and oil level indicating device for each compressor. Provide water regulating valve for water cooled unit.

C. Compressor Motor: Squirrel cage induction type of ample size for continuous operating at maximum compressor performance indicated.

Provide inherent (Klixon) protection, in compressor terminal box, for each phase of motor.

D. Pressure Switches: Automatic reset low pressure switch, and automatic or manual reset high pressure cutout.

E. Air Cooled Condensing Units:

1. High efficiency type piped and automatically controlled to operate at lower head pressures during low ambient temperature conditions, designed and weather-proofed for outdoor installation, to operate satisfactorily at winter ambient temperatures down to 38 degrees (F), and be provided with crankcase and receiver heaters.
2. The condenser fans shall be driven by permanent split capacitor motors.

2.2 UNIT COOLERS

A. Comply with ARI Standard 420. Units shall be UL listed, forced-ventilation type integral defrosting, internal or external refrigerant distributor, single or multiple fans and motors, drip-pan, deflectors, aluminum or baked-enamel steel housing, hangers, and all accessories.

B. Motors: Permanent split capacitor type in accordance with Section 11 05 12, General Motor Requirements for Equipment. Provide motors with thermal overload protection. Provide manual starting switch.

C. Drain Pans: Galvanized sheet steel. Provide additional drain pans under uncovered refrigerant connections, and interconnect them with main drain pan. For freezer units provide electrically heated drain pan.

D. Defrost Provision:

1. Refrigerators: Defrost shall occur during compressor off cycle with evaporator fan running continuously.

E. Mortech Model 1036-R105 Three Body Refrigeration Cooler Unit:

1. Features:
   a. Outside Dimensions: 96.5″ X 40″ X 110.5″
   b. Pre-fabricated modular panel construction.
   c. Exterior Finish: Front only- .032 type 304 stainless steel with a No. 4 finish. Top sides, and back – .040 gauge stucco embossed aluminum.
   d. Panels: 4″ thick panels with tongue and groove configuration with foamed-in-place compression gasket on interior and exterior of all male edges for airtight and vapor proof seams.

e. Insulation: 4 inch, foamed-in-place polyurethane insulation with an in-place density of (2.2 lbs. per cubic foot), UL listed; Class 1 non CFC with a K factor of .12.

f. Panel Locking Devices: Steel cam-action locking devices firmly anchored in each panel. Cam-locks to be placed at exact matching locations on the tongue and groove side to ensure compression of perimeter gasket in a uniform manner. No lag down panels acceptable.

g. Doors:(3) 84″ X 22″ Stainless Steel doors, flush-mounted with plastic frame and magnet gasket to include:

   1.) (2) spring assisted hinges.

   2.) Pull handle with cylinder lock and safety release.

   3.) Perimeter door heaters per door.

h. Floor: 4″ thick insulated cam-up floor with ¾″ CDX plywood reinforcement

   1.) Floor: .032 gauge smooth aluminum.

i. Standard Accessories: Shall include but not limited to the following items.

   1.)Pre-wired compact fluorescent vapor proof light fixture with flush mounted light switch with digital thermometer. All conduit and wiring concealed in panels.

   2.)Plywood backing in wall panels necessary to secure mounted racking system for body telescopic system.

k. Condensing Unit: Air cooled condensing unit supplied with all “in-line” parts and controls including sight glass, drier, and vibration eliminator.

l. Evaporator Coil: Supplied to match and balance with the condensing
unit.

m. Rack System: Full width conveyor rollers fabricated of stainless steel and aluminum construction.

n. Trays: (3) 18-gauge type 304 Stainless Steel with No. 4 finish.

o. Exhaust ventilation provision: None required

F. **Mortech Model 1036-R109 Six Body Refrigeration Cooler Unit:**

1. Features:

   a. Outside Dimensions: 73″ X 97″ X 109.5″

   b. Pre-fabricated modular panel construction.

   c. Exterior Finish: Front only- .032 type 304 stainless steel with a No. 4 finish. Top sides, and back – .040 gauge stucco embossed aluminum.

   d. Panels: 4″ thick panels with tongue and groove configuration with foamed-in-place compression gasket on interior and exterior of all male edges for airtight and vapor proof seams.

   e. Insulation: 4 inch, foamed-in-place polyurethane insulation with an in-place density of (2.2 lbs. per cubic foot), UL listed; Class 1 non CFC with a K factor of .12.

   f. Panel Locking Devices: Steel cam-action locking devices firmly anchored in each panel. Cam-locks to be placed at exact matching locations on the tongue and groove side to ensure compression of perimeter gasket in a uniform manner. No lag down panels acceptable.

   g. Doors: 6) 27″ X 22″ Stainless Steel doors, flush-mounted with plastic frame and magnet gasket to include:

      1.) (2) spring assisted hinges.
      2.) Pull handle with cylinder lock and safety release.
      3.) Perimeter door heaters per door.

   h. Floor: 4″ thick insulated cam-up floor with ¾″ CDX plywood reinforcement

      1.) Floor: .032 gauge smooth aluminum.

   i. Standard Accessories: Shall include but not limited to the following items.
      1.) Pre-wired compact fluorescent vapor proof light fixture with flush mounted light switch with digital thermometer. All conduit and wiring concealed in panels.
      2.) Plywood backing in wall panels necessary to secure mounted racking system for body telescopic system.

   k. Condensing Unit: Air cooled condensing unit supplied with all “in-line” parts and controls including sight glass, drier, and vibration eliminator.

   l. Evaporator Coil: Supplied to match and balance with the condensing
      unit.

   m. Rack System: Full width conveyor rollers fabricated of stainless steel and aluminum construction.

n. Removable Trays: (6) 18-gauge type 304 Stainless Steel with No. 4 finish.

o. Exhaust ventilation provision: None required

G. **Mortech Model 1036-R112 Nine Body Refrigeration Cooler Unit:**

1. Features:

a. Outside Dimensions: 108″ X 97″ X 109.5″

b. Pre-fabricated modular panel construction.

c. Exterior Finish: Front only- .032 type 304 stainless steel with a No. 4 finish. Top sides, and back – .040 gauge stucco embossed aluminum.

d. Panels: 4″ thick panels with tongue and groove configuration with foamed-in-place compression gasket on interior and exterior of all male edges for airtight and vapor proof seams.

e. Insulation: 4 inch, foamed-in-place polyurethane insulation with an in-place density of (2.2 lbs. per cubic foot), UL listed; Class 1 non CFC with a K factor of .12.

f. Panel Locking Devices: Steel cam-action locking devices firmly anchored in each panel. Cam-locks to be placed at exact matching locations on the tongue and groove side to ensure compression of perimeter gasket in a uniform manner. No lag down panels acceptable.

g. Doors: (9) 27″ X 22″ Stainless Steel doors, flush-mounted with plastic frame and magnet gasket to include:

1.) (2) spring assisted hinges.
2.) Pull handle with cylinder lock and safety release.
3.) Perimeter door heaters per door.

h. Floor: 4″ thick insulated cam-up floor with ¾″ CDX plywood reinforcement

1.) Floor: .032 gauge smooth aluminum.

i. Standard Accessories: Shall include but not limited to the following items.
1.)Pre-wired compact fluorescent vapor proof light fixture with flush mounted light switch with digital thermometer. All conduit and wiring concealed in panels.
2.)Plywood backing in wall panels necessary to secure mounted racking system for body telescopic system.

k. Condensing Unit: Air cooled condensing unit supplied with all “in-line” parts and controls including sight glass, drier, and vibration eliminator.

l. Evaporator Coil: Supplied to match and balance with the condensing unit.

m. Rack System: Full width conveyor rollers fabricated of stainless steel and aluminum construction.

n. Removable Trays: (9) 18-gauge type 304 Stainless Steel with No. 4 finish.

o. Exhaust ventilation provision: None required

2.3 PIPING, PIPE INSULATION, AND REFRIGERANT AND OIL CHARGES

Refer to Section 23 23 00, REFRIGERANT PIPING.

2.4 EQUIPMENT IDENTIFICATION REQUIREMENTS

A. Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

B. Identify all refrigeration equipment and alarm devices.

C. Provide remote temperature monitoring through wide area network for all refrigerator units.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install refrigeration equipment as described in the respective manufacturer's instructions. Make panel joints tight and seal all panel penetrations to prevent condensation or frosting.

1. Unit cooler: NSF approval requires that the unit be suspended at 90 mm (3-1/2 inches) minimum distance below the ceiling to allow cleaning the top of the unit cooler.
2. To the extent feasible, mount pipe, conduit, and instrumentation on the exterior and pass thru neatly drilled penetrations to the lights or other devices.

B. Piping, Pipe Insulation and Refrigerant: Provide in accordance with Section 23 23 00, REFRIGERANT PIPING.

C. Controls Installation: As specified in Section 23 09 23, Direct-Digital Controls Systems for HVAC.

3.2 REFRIGERATOR START-UP, AND PERFORMANCE TESTS AND INSTRUCTIONS

A. Start-up Temperature Reduction: On start-up, reset the room thermostats daily for a maximum temperature drop of 8 degrees, on C scale (15 degrees on F scale per day down to 2 degrees C (36 degrees F), and a

maximum of 6 degrees on C scale, (10 degrees on F scale) per day between 2 degrees C (36 degrees F) and final operating temperature.

B. Perform test in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Operate each system and record conditions hourly for eight hours. Submit the following information:

1. Station, Building and System Identification, Contractor, Date and Time.
2. Compressor nameplate data: Make, model, horsepower, RPM, refrigerant and charge in pounds.
3. Compressor operation: Approximate percentage running time, pressure gage readings, actual amps (starting and running), condenser water temperature in and out, or condenser entering air temperature.
4. Room temperatures.
5. Defrost and drain functions of unit coolers. Demonstrate alarm functions.

C. By arrangement with the Resident Engineer, 24 hours in advance, use the start-up and test period for required operation and maintenance instructions to VA personnel in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

3.3 EXAMINATION

A. Verify that all rough ins, anchors, and supports are accurately placed before installation commences.

3.4 INSTALLATION

A. Install in accordance with standards required by authority having jurisdiction.

B. Anchor equipment securely in place.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

D. Touch up minor damaged surfaces caused during installation. Replace damaged components.

E. Drain location for condensate piping within 10 ft. outside of body cooler unit.

3.5 ADJUSTING

A. Adjust operating equipment to efficient operation.

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