SECTION 23 82 00
CONVECTION HEATING AND COOLING UNITS

PART 1 - GENERAL

1.1 DESCRIPTION

Radiant ceiling panels, unit heaters, and finned-tube radiation.

1.2 RELATED WORK

A. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items, which are common to more than one section of Division 23.

B. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT: Noise requirements.

C. Section 23 21 13, HYDRONIC PIPING: Heating hot water and chilled water piping.

D. Section 23 31 00, HVAC DUCTS AND CASINGS: Ducts and flexible connectors.

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

F. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC: Flow rates adjusting and balancing.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

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. Unit heaters.
2. Cabinet unit heaters.
3. Finned-tube radiation.
4. Radiant ceiling panels.

C. Certificates:

1. Compliance with paragraph, QUALITY ASSURANCE.
2. Compliance with specified standards.

D. Operation and Maintenance Manuals: Submit in accordance with paragraph, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

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):

C. National Fire Protection Association (NFPA):

90A-02.....Standard for the Installation of Air Conditioning and Ventilating Systems

70-05.....National Electrical Code

D. Underwriters Laboratories, Inc. (UL):

181-05.....Standard for Factory-Made Air Ducts and Air Connectors

1995-05.....Heating and Cooling Equipment

1.6 GUARANTY

In accordance with FAR clause 52.246-21.

PART 2 - PRODUCTS

2.1 UNIT HEATERS

A. General: Horizontal discharge type for hot water heating medium, as indicated.

B. Casing: Steel sheet, phosphatized to resist rust and finished in baked enamel. Provide hanger supports.

C. Fan: Propeller type, direct driven by manufacturer's standard electric motor. Provide resilient mounting. Provide fan guard for horizontal discharge units.

D. Discharge Air Control:

1. Horizontal discharge: Horizontal, adjustable louvers.
2. Vertical discharge: Radial louver diffuser.

E. Hot Water Coil: Aluminum fins bonded to seamless copper tubing by mechanical expansion of the tubing, designed for 517 kPa (75 psig) steam working pressure.

2.2 CABINET UNIT HEATERS

A. General: Vertical or horizontal type for hot water heating medium, as indicated.

B. Cabinet: Not less than 1.3 mm (l8 gage) steel with front panel for vertical units and hinged front panel for horizontal units. Finish on exposed cabinet shall be factory-baked enamel in manufacturer's standard color as selected by the Architect. Provide 76 mm (3-inch) high sub-base for vertical floor mounted units.

C. Fan: Centrifugal blower, direct driven by a single phase, two-speed, electric motor with inherent overload protection. Provide resilient motor/fan mount.

D. Filter: Manufacturer's standard, one inch thick, throwaway type.

E. Hot Water Coil: Aluminum fins bonded to seamless copper tubing by mechanical expansion of the tubing, designed for 517 kPa (75 psi) steam working pressure.

F. Factory Mounted Controls: Manual fan starter and three-position (low, high and off) fan speed switch.

2.3 RADIANT CEILING PANELS:

A. Provide complete extruded linear and modular radiant panel ceiling systems in all areas as scheduled and detailed on the drawings and as specified.

B. Provide wall channels and support angles required to frame the ceiling openings. The ceiling openings shall provide for necessary expansion and contraction of ceiling panels. Install panels in finished openings and provide support steel and panel support channels. Cross channels shall be located on not more than thirty (30) inch centers.

C. The linear radiant ceiling panels shall consist of extruded V-grooved aluminum faceplate, 0.500" I.D. copper tubes and 1 inch thick fiberglass insulating blanket. The panels shall consist of interlocking extruded sections with galvanized steel channel cross braces attached by plated steel assembly clips. The copper tubing shall be mechanically bonded into an extruded aluminum saddle so that the tube is an intimate engagement with the saddles and provides efficient heat transfer. Furnish blank filler pieces at corners and other locations shown or required to form a continuous line. Panels shall be field cut, mitered and installed to conform with architectural features of ceilings and panel layout shown on drawings.

D. Each preassembled panel shall be factory painted white. The assembled panel consisting of individual sections shall be delivered to the job site and tagged for each location. Assembled panels shall be arranged for wall-to-wall installation or ceiling opening sizes and arrangement as noted on the drawings. Dimensions on drawings are for active length only and do not represent the full radiant panel length required for opening or wall-to-wall dimensions.

E. The non-radiant matching linear panels shall be fastened to the active radiant panels and shall provide a continuous surface. Cutting,

mitering, suspending and fitting of the radiant panels shall be performed in accordance with the requirements of the panel manufacturer. These matching inactive panels shall be same color, texture and finish as the active linear radiant heating panels.

F. The modular ceiling panels shall be 2 feet by 4 feet in size designed to be installed in a lay-in acoustical tile ceiling. Panels fabricated of .040 inch thick nonperforated aluminum face plate with .500 inch O.D. serpentined copper tubing metallurigically bonded to the face plate. Also included shall be 1 inch thick, 3/4 PCF density glass fiber acoustical pad. Panel face plates shall be factory painted white. Where scheduled, custom painted of colors selected by the Architect and factory silk-screening to match adjacent acoustical ceiling tile pattern shall be provided. Coordinate requirements with the General Contractor. Submit samples of silk-screened patterns to the Architect for approval.

G. Hangers shall be installed as recommended by the manufacturer.

H. Interconnecting of radiant panels shall consist of .500" I.D. Type L soft copper tubing

PART 3 - EXECUTION

3.1 INSTALLATION

A. Work shall be installed as shown and according to the manufacturer’s diagrams and recommendations.

B. Handle and install units in accordance with manufacturer's written instructions.

C. Support units rigidly so they remain stationary at all times. Cross-bracing or other means of stiffening shall be provided as necessary. Method of support shall be such that distortion and malfunction of units cannot occur.

D. Install 3-inch thick fiberglass blanket insulation above hydronic radiant panels.

3.2 OPERATIONAL TEST

Refer to Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

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