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**SECTION 23 83 00**  
**RADIANT HEATING AND COOLING UNITS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Hydronic radiant panel heaters.

**1.2 RELATED REQUIREMENTS**

- A. Section 23 09 13 - Instrumentation and Control Devices for HVAC.
- B. Section 23 21 13 - Hydronic Piping.
- C. Section 23 21 14 - Hydronic Specialties.

**1.3 REFERENCE STANDARDS**

- A. ASHRAE Std 138 - Method of Testing for Rating Ceiling Panels for Sensible Heating and Cooling 2021.
- B. ASTM B75/B75M - Standard Specification for Seamless Copper Tube 2020.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023.
- D. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing 2023.
- E. ASTM F1281 - Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe 2023.

**1.4 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

**1.5 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Listed manufacturers and series are for reference only and do not promote any single product. Series are provided for reference, and should not be used as an ordering model number. Accessories and options may be custom components purchased separately.
- C. Product Data: Provide manufacturer's most current catalog data sheet for equipment indicating rough-in size, finish, and accessories. Manufacturer's data sheets on each item of equipment and device, shall be clearly marked up to identify the items, accessories and options to be used on the project.
  - 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.
  - 2. Include mounting brackets, control panels, thermostat and options.
  - 3. Include wiring diagrams: Power, signal and control wiring.
  - 4. Radiant Heaters (23 83 00 - 001 - A)
- D. Product Data: Provide data for ceiling panel heaters.
- E. Manufacturer's Installation Instructions: Indicate installation instructions and recommendations.
- F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions of equipment and controls, installation instructions, maintenance and repair data, and parts listings.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Successful completion of five installations of similar type and scope. Provide from the factory a full-time representative to supervise the complete design, detailing, coordination, installation, and commissioning of the hydronic radiant system.

- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer or an authorized representative who is trained and approved by manufacturer, with minimum 5 years experience on projects of similar size and complexity.
- C. Source Limitations: Obtain listed system components through one source from a single manufacturer as an integrated system for single source responsibility and full compatibility.
- D. Certified Sizing Calculations: Manufacturer shall certify system sizing calculations.
- E. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- F. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

## **1.7 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

## **PART 2 PRODUCTS**

### **2.1 HYDRONIC RADIANT PANEL HEATERS**

- A. Manufacturers:
  - 1. Price Industries.
  - 2. Sterling.
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Comply with ISO 9001 or ASTM C635/C635M.
- C. Ceiling Panels: Constructed of modular aluminum extrusions with interlocking edges; manufactured and assembled to sizes and configurations indicated.
- D. Pipe Coil: Incorporate extruded void into which continuous 1/2 inch copper pipe is rolled and thermally bonded. Provide return bends for two water connections to each panel.
- E. Modular Radiant Ceiling Panels: Heat sinks located behind panel, transfer heat between copper tubes and panel face, and radiate heat to zone.
  - 1. Water Tubes:
    - a. ASTM B75/B75M copper tubing, 1/2 inch minimum nominal diameter.
    - b. Water Connections:
      - 1) Suitable for solder, compression fittings, push-on fittings, or threaded connection.
      - 2) Protect with removable seals. Prevent introduction of dirt and dust during shipping.
  - 2. Heat Sink Construction:
    - a. Mechanically fasten extruded aluminum and copper pipe to heat sink.
    - b. Provide non-hardening heat transfer paste between tubing, heat sink, and panel.
  - 3. Finish:
    - a. Apply polyester paint or manufacture's standard finish.
    - b. Color: As selected by Architect from manufacturer's standard range.
    - c. Maintain optimal radiative properties, durability, and cleanability.
  - 4. Water Pressure Drop and Heating Output Data: Derive from factory testing in accordance with ASHRAE Std 138 or DIN EN 14037, Parts 2 and 3.
  - 5. Accessories:
    - a. 12 inch stainless steel braided hose with isolation ball valves for supply and return connections.

- F. Heating Capacity: As indicated, based on 180 degrees F average water temperature, 70 degrees F space temperature.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Hydronic Radiant Ceiling Panel Heaters:
1. Examine areas to receive radiant heating units for compliance with requirements for installation tolerances and other conditions affecting performance.
  2. Ensure surfaces in contact with radiant heating panels are free of burrs and sharp protrusions.
  3. Ensure surfaces are level and plumb.
  4. Proceed with installation only after unsatisfactory conditions are corrected.

#### **3.2 PREPARATION**

- A. Clean all surfaces prior to installation.

#### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's recommendations.
- B. Hydronic Radiant Ceiling Panel Heaters:
1. Install level and plumb.
  2. Suspend from structure.
  3. Support in grid-type suspended ceiling using grid as support element as follows:
    - a. Install a minimum of four ceiling support system rods or wires for each panel, located not more than 6 inches from panel corners.
    - b. Fasten support clips to panel and to ceiling grid members at or near each panel corner with clips designed for the application.
    - c. Install at least one independent support rod or wire from structure to tab on panel with breaking strength of the weight of panel at a safety factor of 3.
  4. Unless otherwise indicated, install shutoff valve and union or flange at each connection.
    - a. Provide tamper-proof, balancing valve with memory stop on return piping.
    - b. Provide float operated automatic air vents with stop valve.

#### **3.4 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Hydronic Radiant Ceiling Panel Heaters:
1. Inspect for damage to finish.
  2. Repair damaged finish to match original finish.
  3. Perform the following field tests, inspections, and prepare test reports:
    - a. Leak Test:
      - 1) After installation, fill water tubes, and test for leaks.
      - 2) Repair leaks and retest until no leaks exist.
    - b. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
    - c. Test and adjust controls and safeties.
  4. Remove and replace damaged and malfunctioning controls and equipment and retest as specified above.

**3.5 CLEANING**

- A. Radiant Ceiling Panel Heaters: Remove paint splatters, other spots, dirt, and debris.

**3.6 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals.
- B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
- C. Demonstrate Operation of Controls for the following Equipment:
  - 1. Hydronic Radiant Ceiling Panel Heaters.

**3.7 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION 23 83 00**