SECTION 238213 - VALANCE HEATING AND COOLING UNITS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. Section Includes:

Electric radiant heaters.

Hydronic heating and cooling panels.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: Include rated capacities, specialties, and accessories for each product indicated.
				5. Shop Drawings:

Include plans, elevations, sections, details, and attachments to other work. Detail equipment assemblies and suspension and attachment.

Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Retain subparagraph below if equipment includes wiring.

Include diagrams for power, signal, and control wiring.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For units with factory-applied color finishes.
				2. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

Radiant Heater Finishes: **[4 by 4 inches] <Insert size>**.

Radiant Panel Finishes: **[12 by 12 inches] <Insert size>**.

Retain "Coordination Drawings" paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

* + - * 1. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

Revise subparagraphs below to suit Project.

Suspended ceiling components.

Structural members to which heaters and suspension systems will be attached.

Size and location of initial access modules for acoustical tile.

Items penetrating finished ceiling, including the following:

Lighting fixtures.

Air outlets and inlets.

Speakers.

Sprinklers.

Access panels.

**<Insert item>**.

Perimeter moldings.

Retain "Seismic Qualification Certificates" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 230548 "Vibration and Seismic Controls for HVAC." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Certificates: Submit certification that suspended radiant heaters and panels, accessories, and components will withstand seismic forces defined in Section 230548 "Vibration and Seismic Controls for HVAC." Include the following:

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Retain first subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Option is used for essential facilities where equipment must operate immediately after an earthquake.

The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified**[and the unit will be fully operational after the seismic event]**."

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

* + - * 1. Field quality-control reports.
			1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For electric radiant heaters to include in emergency, operation, and maintenance manuals.
1. PRODUCTS

See Editing Instruction No. 1 in the Evaluations for cautions about named manufacturers and products.

* + - 1. ELECTRIC RADIANT HEATERS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=3608) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Berko; Marley Engineered Products](http://www.specagent.com/Lookup?uid=123456945639).

[Chromalox, Inc](http://www.specagent.com/Lookup?uid=123456945640).

[Fostoria Industries, Inc](http://www.specagent.com/Lookup?uid=123456945643).

[Markel Products; TPI Corporation](http://www.specagent.com/Lookup?uid=123456945641).

[QMark; Marley Engineered Products](http://www.specagent.com/Lookup?uid=123456945642).

Approved equivalent.

Retain "Quartz Lamp Heating Elements," "Quartz Tube Heating Elements," or "Metal-Sheathed Heating Elements" paragraph below. If more than one type of heating element is required, indicate each type in a schedule on Drawings.

* + - * 1. Quartz Lamp Heating Elements: Coiled tungsten-wire heating element enclosed in clear quartz tube.
				2. Quartz Tube Heating Elements: Nickel-chromium-wire heating element enclosed in quartz tube.
				3. Metal-Sheathed Heating Elements: Nickel-chromium-wire heating element embedded in magnesium oxide powder enclosed in metal sheath. Comply with UL 1030.

In first paragraph below, retain UL 499 for supplemental heating applications requiring humidity control; retain UL 2021 for comfort heating applications. Retain all three options if both applications are required.

* + - * 1. Comply with **[UL 499] [and] [UL 2021]**.
				2. Enclosures: **[Aluminized] [Stainless] [Painted]**-steel housing with anodized-aluminum reflector.

Retain "Finish" subparagraph below for painted enclosures.

Finish: Baked-enamel finish in manufacturer's **[standard] [custom]** paint color as selected by Architect.

* + - * 1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

Retain "Unit Controls" paragraph below for integral control device if control devices are not specified in Section 230923 "Direct Digital Control (DDC) System for HVAC."

* + - * 1. Unit Controls:

Retain one or more of three subparagraphs below. If more than one type of control device is required, indicate each type in a schedule on Drawings.

Line-voltage thermostat.

Enclosed contactor for remote thermostat.

Snow and ice detector with moisture sensor and integral temperature sensor.

If Project has more than one type or size of electric radiant heater, delete "Capacities and Characteristics" paragraph below and schedule heaters on Drawings.

* + - * 1. Capacities and Characteristics:

Enclosure Length: **<Insert inches>**.

Mounting Height: **<Insert feet>**.

Heating Capacity: **<Insert kilowatts>**.

Radiation Pattern: **[30] [60] [90] <Insert number> [symmetric] [asymmetric]**-degree-included angle.

Electrical Characteristics for Single-Point Connection:

Volts: **<Insert value>**.

Phase: **<Insert value>**.

Hertz: **<Insert value>**.

Full-Load Amperes: **<Insert value>**.

Minimum Circuit Ampacity: **<Insert value>**.

Maximum Overcurrent Protection: **<Insert amperage>**.

* + - 1. HYDRONIC HEATING**[ AND COOLING]** PANELS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=3610) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Aero Tech Mfg](http://www.specagent.com/Lookup?uid=123456945651).

[AIRTEX Radiant Systems](http://www.specagent.com/Lookup?uid=123456945647).

[Rosemex Products](http://www.specagent.com/Lookup?uid=123456945648).

[Twa Panel Systems, Inc](http://www.specagent.com/Lookup?uid=123456945650).

Approved equivalent.

* + - * 1. Description: **[Modular] [Linear]** sheet-metal panel with serpentine water piping, suitable for **[lay-in installation flush with T-bar ceiling grid] [surface mounting] [recessed mounting]**.

Panels: Minimum **[0.0336-inch- thick, galvanized-steel] [0.0396-inch- thick, aluminum]** sheet.

Backing Insulation: Minimum **[1-inch-] [2-inch-] <Insert dimension>** thick, mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C612, Type IA or Type IB with factory-applied jacket.

Retain one of three "Exposed-Side Panel Finish" subparagraphs below. If more than one type of finish is required, indicate each type in a schedule on Drawings.

Exposed-Side Panel Finish: Apply silk-screened finish to match appearance of acoustical ceiling tiles selected by Architect.

Exposed-Side Panel Finish: Factory prime coated, ready for field painting.

Exposed-Side Panel Finish: Baked-enamel finish in manufacturer's **[standard] [custom]** paint color as selected by Architect.

Factory Piping: **[ASTM B88, Type L] [ASTM B88, Type M]** copper tube with ASME B16.22 wrought-copper fittings and brazed joints. Piping shall be mechanically bonded to panel.

Retain "Surface-Mounted Trim" subparagraph below for surface-mounted panels.

Surface-Mounted Trim: Sheet metal with baked-enamel finish in manufacturer's **[standard] [custom]** paint color as selected by Architect.

Retain "Accessories" subparagraph below for linear panels only.

Accessories:

**[5-inch] [6-inch] [8-inch]** panel with drape track recess.

5-inch male bullnose panel.

5-inch female bullnose panel.

4-inch male corner panel.

4-inch female corner panel.

Inside corner panel.

1/2-inch filler panel.

If Project has more than one type or size of hydronic heating and cooling panel, delete "Capacities and Characteristics" paragraph below and schedule panels on Drawings.

* + - * 1. Capacities and Characteristics:

Nominal Panel Size: **[24 by 24 inches] [24 by 36 inches] [24 by 48 inches] [24 by 60 inches] <Insert dimensions>**.

Piping Inlet and Outlet: **[NPS 1/2] <Insert pipe size>**.

Heating:

Capacity: **<Insert Btu/h>**.

Room Temperature: **<Insert deg F>**.

Entering-Water Temperature: **<Insert deg F>**.

Average Water Temperature: **<Insert deg F>**.

Water Flow: **<Insert gpm>**.

Water-Side Pressure Loss: **<Insert psig>**.

Cooling:

Sensible Capacity: **<Insert Btu/h>**.

Dry-Bulb Room Temperature: **<Insert deg F>**.

Wet-Bulb Room Temperature: **<Insert deg F>**.

Entering-Water Temperature: **<Insert deg F>**.

Average Water Temperature: **<Insert deg F>**.

Water Flow: **<Insert gpm>**.

Water-Side Pressure Loss: **<Insert psig>**.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas to receive radiant heating and cooling units for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
				2. Examine roughing-in for **[hydronic piping] [electrical]** connections to verify actual locations before radiant heating and cooling unit installation.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION
				1. Install radiant heating and cooling units level and plumb.
				2. Suspend radiant heaters from structure.

Revise first paragraph below for other types of construction that penetrate or are supported by ceilings.

* + - * 1. Coordinate layout and installation of radiant heaters and suspension-system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, communications system, security system, and partition assemblies.
				2. Support for Radiant Heating and Cooling Panels in or on Grid-Type Suspended Ceilings: Use grid as a support element.

Install a minimum of four ceiling support-system rods or wires for each panel. Locate not more than 6 inches from panel corners.

Support Clips: Fasten to panel and to ceiling grid members at or near each panel corner with clips designed for the application.

Panels of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans, or center in acoustical panel and support panels independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

Retain subparagraph below if Project is in a seismic area.

Install at least one independent support rod or wire from structure to a tab on panel. Wire or rod shall have breaking strength of the weight of panel at a safety factor of three.

To comply with requirements of the Americans with Disabilities Act, verify mounting height in paragraph below with authorities having jurisdiction. Verify locations of thermostats with Drawings and room details before installation.

* + - * 1. Install devices **[48 inches] [60 inches] <Insert dimension>** above finished floor.
			1. CONNECTIONS

Retain first three paragraphs below for hydronic heating and cooling panels. Coordinate piping installations and specialty arrangements with Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Piping installation requirements are specified in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.
				2. Unless otherwise indicated, install shutoff valve and union or flange at each connection.
				3. Install piping adjacent to unit to allow service and maintenance.
				4. Ground electric units according to Section 260526 "Grounding and Bonding for Electrical Systems."
				5. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
			1. FIELD QUALITY CONTROL
				1. Perform the following tests and inspections **[ with the Company Field Advisor per OGS Spec Section 014216]**:

Retain first subparagraph below if units have electric heat.

Operate electric heating elements through each stage to verify proper operation and electrical connections.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and units.

* + - * 1. Remove and replace malfunctioning units and retest as specified above.
				2. After installing panels, inspect unit cabinet for damage to finish. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
				3. Prepare test and inspection reports.
			1. DEMONSTRATION
				1. Engage Company Field Advisor per OGS Spec Section 014216 to train Facility’s maintenance personnel to adjust, operate, and maintain radiant heaters and panels.

END OF SECTION 238213