SECTION 238229 - RADIATORS

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

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section includes flat-pipe steel radiators.
			2. 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: For each type of product.

Include rated capacities, operating characteristics, furnished specialties, and accessories.

* + - * 1. Shop Drawings:

Include plans, elevations, sections, and details.

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

Indicate location and size of each field connection.

Retain first subparagraph below for hydronic radiators.

Indicate location and arrangement of piping valves and specialties.

Retain subparagraph below for radiators with integral controls; delete if control devices are specified in Section 230923 "Direct Digital Control (DDC) System for HVAC."

Indicate location and arrangement of integral controls and other accessories.

Retain "Samples" paragraph below for single-stage Samples, with a subordinate list if applicable. Retain "Color Samples for Initial Selection" and "Color Samples for Verification" paragraphs for two-stage Samples.

* + - * 1. Samples: For each exposed product and for each color and texture specified.
				2. Color Samples for Initial Selection: For radiators with factory-applied color finishes.
				3. Color Samples for Verification: For each type of exposed finish.

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: Floor plans 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:

Structural members, including wall construction, to which radiators will be attached.

Method of attaching radiators to building structure.

Penetrations of fire-rated wall and floor assemblies.

* + - * 1. Field quality-control reports.
1. PRODUCTS

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

* + - 1. FLAT-PIPE STEEL RADIATORS

Copy this article and re-edit for each style of flat-pipe steel radiator, or schedule on Drawings.

* + - * 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Quincy Hydronic Technology Inc.

Runtal North America, Inc.

Approved equivalent.

* + - * 1. Heating Elements: Steel, welded and formed into flat, square, steel header with minimum thickness of 0.109 inch. Include threaded piping and air-vent connections.

Retain one of three "Working Pressure" subparagraphs below.

Working Pressure: 56 psig; 0.048 inch.

Working Pressure: 85 psig; 0.058 inch.

Working Pressure: 128 psig; 0.078 inch.

If more than one configuration is required, delete subparagraphs below and schedule on Drawings.

Tube Height: **<Insert inches>.**

Tube Depth: **<Insert inches>**.

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

Number of Tubes High: **<Insert number>**.

Number of Tubes Deep: **<Insert number>**.

Room Air Temperature: **[65 deg F] <Insert temperature>**.

Heat Output: **<Insert Btu/h>**.

Average Water Temperature: **[180 deg F] <Insert temperature>**.

Temperature Drop: **[10 deg F] [20 deg F] [30 deg F] <Insert temperature>**.

Pressure Loss: **<Insert feet wg>**.

* + - * 1. Mounting: **[Wall brackets] [Floor pedestals]** with maximum spacing of 36 inches.
				2. Finish: Baked-enamel finish in manufacturer's **[standard] [custom]** color as selected by Director’s Representative.
				3. Accessories:

Steel piping covers finished to match radiator finish.

Flexible Expansion Compensation Hoses: Minimum 400-psig working pressure, and operating temperatures from 33 to 211 deg F.

Length: **[24 inches] [36 inches] <Insert dimension>**.

Minimum Diameter: Equal to connection size.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine areas to receive radiators for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
				2. Examine roughing-in for hydronic-piping connections to verify actual locations before installation of radiators.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION
				1. Install units level and plumb.
				2. Install expansion compensation hoses.
				3. Install piping covers.
			3. CONNECTIONS

Coordinate piping installations and specialty arrangements with schematics on 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. Connect radiators and components to piping according to Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties."

Install shutoff valves on inlet and outlet, and balancing valve on outlet.

* + - * 1. Install control valves as required by Section 230923.11 "Control Valves."
				2. Install piping adjacent to radiators to allow service and maintenance.
			1. FIELD QUALITY CONTROL
				1. Perform the following field tests and inspections:

Retain "Leak Test" subparagraph below for hot-water radiators.

Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

* + - * 1. Units will be considered defective if they do not pass tests and inspections.
				2. Prepare test and inspection reports.

END OF SECTION 238229