SECTION 238233 - CONVECTORS

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 **[hydronic] [steam] [electric]** convectors.
			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.

Include details and dimensions of custom-fabricated enclosures.

Indicate location and size of each field connection.

Retain first subparagraph below for hydronic and steam convectors.

Indicate location and arrangement of piping valves and specialties.

Retain first subparagraph below for convectors 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.

Include enclosure joints, corner pieces, access doors, and other accessories.

Retain subparagraph below for electric convectors.

Include diagrams for power, signal, and control wiring.

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 units 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 convectors will be attached.

Method of attaching convectors to building structure.

Penetrations of fire-rated wall and floor assemblies.

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

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. ELECTRIC CONVECTORS

Copy this article and re-edit for each style of convector, 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:

Chromalox, Inc.

INDEECO.

Markel Products; TPI Corporation.

Marley Engineered Products.

Ouellet Canada Inc.

Stelpro Design Inc.

Approved equivalent.

* + - * 1. Description: Factory-packaged units constructed according to UL 499, UL 1030, and UL 2021.

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.

* + - * 1. Heating Elements: Nickel-chromium-wire heating element enclosed in metallic sheath mechanically bonded to fins, with high-temperature cutout and sensor running the full length of element. Element supports shall eliminate thermal expansion noise.

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

Volts: **<Insert value>**.

Phase: **<Insert value>**.

Hertz: **<Insert value>**.

Heat Output: **[300] [500] [750] [1000] [1250] [1500] [1750] [2000] [2250] [2500] <Insert number>** W.

* + - * 1. Front and Top Panel: Minimum **[0.0528-inch-] [0.0677-inch-] <Insert dimension>** thick steel with exposed corners rounded; removable front panels with tamper-resistant fasteners braced and reinforced for stiffness.
				2. Wall-Mounted Back and End Panels: Minimum 0.0428-inch- thick steel.
				3. Floor-Mounted Pedestals: Conceal conduit for power and control wiring at maximum 36-inch spacing. Pedestal-mounted back panel shall be solid panel matching front panel.
				4. Support Brackets: Locate at maximum 36-inch spacing to support front panel and element.
				5. Insulation: 1/2-inch- thick, fibrous glass on inside of the back of the enclosure.
				6. Finish: Baked-enamel finish in manufacturer's **[standard] [custom]** color as selected by Director’s Representative.
				7. Damper: Knob-operated internal damper.
				8. Access Doors: Factory made, permanently hinged with tamper-resistant fastener, minimum size 6 by 7 inches, integral with enclosure.
				9. Enclosure Style: **[Sloped] [Flat]** top.

Retain features required for Project in subparagraphs below.

Front Inlet Grille: Punched louver; painted to match enclosure.

Front Inlet Grille: Extruded-aluminum linear bar grille; pencil-proof bar spacing.

Mill-finish aluminum.

Anodized finish, color as selected by Director’s Representative from manufacturer's **[standard] [custom]** colors.

Painted to match enclosure.

**[Top] [Front]** Outlet Grille: Punched louver; painted to match enclosure.

**[Top] [Front]** Outlet Grille: Extruded-aluminum linear bar grille; pencil-proof bar spacing.

Mill-finish aluminum.

Anodized finish, color as selected by Director’s Representative from manufacturer's **[standard] [custom]** colors.

Painted to match enclosure.

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

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

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

Retain "Unit Controls" paragraph below for integral control device; delete if control devices are specified in Section 230923 "Direct Digital Control (DDC) System for HVAC."

* + - * 1. Unit Controls: Integral **[line-voltage thermostat with minimum range of 60 to 90 deg F] [low-voltage relay and control transformer for remote thermostat]**.
				2. Accessories: Integral disconnect switch, recessing flanges finished to match enclosure or overlapping front cover for fully recessed units, and rubber gaskets to seal cabinet at wall.
			1. **[HOT-WATER] [STEAM]** CONVECTORS

Copy this article and re-edit for each style of convector, 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:

Engineered Air.

[Rosemex Products](http://www.specagent.com/Lookup?uid=123457074645).

Slant/Fin Corp.

Sterling HVAC Products; a Mestek company.

Trane.

Approved equivalent.

* + - * 1. Heating Elements: Seamless copper tubing mechanically expanded into evenly spaced aluminum fins and rolled into cast-**[iron] [or] [brass]** headers with inlet/outlet and air vent; steel side plates and supports. Factory-pressure-test element at minimum 100 psig.

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

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

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

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

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

Retain first four subparagraphs below for hot-water convector.

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

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>**.

Retain two subparagraphs below for steam convector.

Heat Output: **<Insert sq. ft. EDR>**.

Entering Steam Pressure: **[1 psig] <Insert value>**.

* + - * 1. Front and Top Panel: Minimum **[0.0528-inch-] [0.0677-inch-] <Insert dimension>** thick steel with exposed corners rounded; removable front panels with tamper-resistant fasteners braced and reinforced for stiffness.
				2. Wall-Mounted Back and End Panels: Minimum 0.0428-inch- thick steel.
				3. Floor-Mounted Pedestals: Conceal conduit for power and control wiring at maximum 36-inch spacing. Pedestal-mounted back panel shall be solid panel matching front panel.
				4. Support Brackets: Locate at maximum 36-inch spacing to support front panel and element.
				5. Insulation: 1/2-inch- thick, fibrous glass on inside of the back of the enclosure.
				6. Finish: Baked-enamel finish in manufacturer's **[standard] [custom]** color as selected by Director’s Representative.
				7. Damper: Knob-operated internal damper.

Units with operable front panels may not require access doors.

* + - * 1. Access Doors: Factory made, permanently hinged with tamper-resistant fastener, minimum size 6 by 7 inches, integral with enclosure.
				2. Enclosure Style: **[Sloped] [Flat]** top.

Retain features required for Project in subparagraphs below.

Front Inlet Grille: Punched louver; painted to match enclosure.

Front Inlet Grille: Extruded-aluminum linear bar grille; pencil-proof bar spacing.

Mill-finish aluminum.

Anodized finish, color as selected by Architect from manufacturer's **[standard] [custom]** colors.

Painted to match enclosure.

**[Top] [Front]** Outlet Grille: Punched louver; painted to match enclosure.

**[Top] [Front]** Outlet Grille: Extruded-aluminum linear bar grille; pencil-proof bar spacing.

Mill-finish aluminum.

Anodized finish, color as selected by Director’s Representative from manufacturer's **[standard] [custom]** colors.

Painted to match enclosure.

Enclosure dimensions in three subparagraphs below include end pockets for controls and piping.

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

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

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

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

Retain three paragraphs below for hot-water or steam convectors.

* + - * 1. Install valves within reach of access door provided in enclosure.
				2. Install air-seal gasket between wall and recessed flanges or front cover of fully recessed unit.
				3. Install piping within pedestals for freestanding units.
			1. 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.

Retain first five paragraphs below for hot-water or steam piping.

* + - * 1. Piping installation requirements are specified in **[Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties."] [Section 232213 "Steam and Condensate Heating Piping" and Section 232216 "Steam and Condensate Heating Piping Specialties."]** Drawings indicate general arrangement of piping, fittings, and specialties.
				2. Connect hot-water convectors 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. Connect steam convectors and components to piping according to Section 232213 "Steam and Condensate Heating Piping" and Section 232216 "Steam and Condensate Heating Piping Specialties."

Install shutoff valve on inlet; install strainer, steam trap, and shutoff valve on outlet.

* + - * 1. Install control valves as required by Section 230923.11 "Control Valves."
				2. Install piping adjacent to convectors to allow service and maintenance.

Retain two paragraphs below for electric convectors.

* + - * 1. Ground electric convectors according to Section 260526 "Grounding and Bonding for Electrical Systems."
				2. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
			1. FIELD QUALITY CONTROL
				1. Perform the following field tests and inspections:

Retain "Leak Test" subparagraph below for hot-water or steam convectors.

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

Retain "Operational Test" subparagraph below for electric convectors.

Operational Test: After electrical circuitry has been energized, start convectors to confirm proper operation.

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

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

END OF SECTION 238233