SECTION 238216.13 - REFRIGERANT AIR COILS

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

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 Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Refrigerant air coils.

* + - 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: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each air coil.

Include rated capacities, operating characteristics, and pressure drops for each air coil.

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, sections, and other details, or BIM model, drawn to scale, showing the items described in this Section and coordinated with all building trades.
			1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For air coils to include in operation and maintenance manuals.
			2. FIELD CONDITIONS
				1. Altitude above Mean Sea Level: <Insert feet>.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or AVITRU. 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. PERFORMANCE REQUIREMENTS

"ASHRAE 62.1 Compliance" paragraph below may be required to comply with Project requirements or authorities having jurisdiction.

* + - * 1. ASHRAE 62.1 Compliance: Comply with applicable requirements in ASHRAE 62.1, Section 5, "Systems and Equipment," and Section 7, "Construction and Startup."
				2. Performance Ratings: Tested and rated in accordance with AHRI 410 and ASHRAE 33.

In "Minimum Working-Pressure/Temperature Ratings" paragraph below, retain or insert requirements. Pressure rating vary widely, depending on manufacturer. Consult manufacturers.

* + - * 1. Minimum Working-Pressure/Temperature Ratings: **[200 psig/300 deg F] <Insert value and temperature>**.
				2. Select cooling coils for no moisture carryover at design conditions.

If Project has more than one type or size of refrigerant coil, delete "Capacities and Characteristics" paragraph below and schedule coils on Drawings.

* + - * 1. Capacities and Characteristics:

Coil Face Dimensions:

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

Finned Width: **<Insert inches>**.

Number of Rows: **<Insert number>**.

Coating: **<Insert manufacturer; product>**.

Air Side:

Flow Rate: **<Insert cfm>**.

Finned Area Face Velocity: **<Insert fpm>**.

Static Pressure Drop: **<Insert inches wg>**.

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

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

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

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

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

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

Refrigerant Side:

Refrigerant Type: **[R-410A] [HFC-134a] <Insert type>**.

Saturated Suction Temperature: **<Insert deg F>**.

* + - 1. REFRIGERANT AIR COILS
				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:

Aerofin.

Carrier Corporation.

Coil Company, LLC.

Greenheck Fan Corporation.

RAE Coils; a division of RAE Corporation.

Super Radiator Coils.

Trane.

USA Coil & Air.

Approved equivalent.

* + - * 1. Source Limitations: Obtain refrigerant coils from single source from single manufacturer.
				2. Description: Plate fin coils constructed of staggered tubes mechanically expanded into continuous collars that are die-formed into plate fins. Coils are to be counterflow circuited and equipped with pressure-type distributors, and distributor tubes are to be of equal length, to ensure equal distribution of refrigerant to each circuit.
				3. Circuiting: **[Face] [Row] [Interlaced] [Interlaced and face control] [Indicated on Drawings] <Insert circuiting type>**.
				4. Tubes:

Material: **[Copper] <Insert material>**.

Nominal Diameter: Selected for performance indicated.

Nominal Wall Thickness: As required by performance, minimum of **[0.020 inch] [0.025 inch] [0.035 inch] <Insert dimension>** thick.

Return Bends: 180-degree bends; material**[, wall thickness,]** and nominal diameter to match tubes.

Brazing: High-temperature brazing alloy with not less than 5 percent silver.

* + - * 1. Fins:

Type: Plate.

Materials:

Retain any of "Aluminum," "Copper," and "90/10 Cupronickel" subparagraphs below. Aluminum is most common fin material for HVAC applications. Copper is used in applications with corrosive environments. Not all manufacturers offer each material option. Consult manufacturers. Indicate requirements on Drawings if materials vary by application.

Aluminum: **[0.0060 inch] [0.0075 inch] [0.0095 inch] <Insert dimension>** thick.

Copper: **[0.0060 inch] [0.0075 inch] [0.0095 inch] <Insert dimension>** thick.

90/10 Cupronickel: **[0.0060 inch] [0.0075 inch] [0.0095 inch] <Insert dimension>** thick.

**<Insert material and fin thickness>**.

* + - * 1. Spacing: Maximum **[12 fins per inch] <Insert maximum fin spacing>**.
				2. Collars: Full collars for accurate fin spacing and maximum tube contact while leaving no surface of tube exposed.
				3. Configuration: **[Flat-face fins] [Wave, corrugated, or waffle-face fins] [Fin type as required by performance requirements] <Insert fin type>**.
				4. Fin and Tube Joint: Silver brazed.
				5. Headers:
				6. Material: **[Seamless copper] <Insert material>**.
				7. Tube-to-Header Connections: Tube-to-header holes to intrude inward, so landed surface area is 3 times the core tube thickness, to provide enhanced header-to-tube joint integrity. Evenly extend tubes within the ID of the header no more than 0.12 inch.
				8. Header Top and Bottom Caps: End caps to be die-formed and installed on the ID of header, such that the landed surface area is 3 times the header wall thickness.
				9. Protect openings to prevent entry of dirt into coil.
				10. Casings and Tube Sheets:
				11. Depth: Extend coil casing and tube sheets a minimum of **[1/2 inch] <Insert dimension>** beyond face of fins on both entering and leaving sides.
				12. Materials:

Retain one of first three subparagraphs below, or all. Indicate requirements on Drawings if materials vary by application. Not all manufacturers offer each casing material type. Consult manufacturers.

Stainless steel, **[Type 304] <Insert type>**, No. 2D finish.

Galvanized steel, G90 coating.

Copper.

Aluminum.

* + - * 1. Top and Bottom Casings:

Flange face minimum of **[**1-1/2 inches**] <Insert dimension>**; double-flange edge for rigidity and ease of removal with secondary flange face minimum of **[1/2 inch] <Insert dimension>**.

Thickness: Minimum of **[16 gauge] [14 gauge] [12 gauge]** thick.

* + - * 1. End Tube Sheets:

Tube sheet holes rolled to prevent chaffing of tubes during thermal expansion and contraction.

Flange face minimum of **[1-1/2 inches] <Insert dimension>**.

Thickness: Minimum of **[16 gauge] [14 gauge] [12 gauge]** thick.

Intermediate Tube Sheets:

Tube sheet holes rolled to prevent chaffing of tubes during thermal expansion and contraction.

Space intermediate tube sheets a maximum of **[48 inches] <Insert dimension>** o.c. and locate to provide equal spacing between tube sheet across coil tube length.

Flange face minimum of **[1/2 inch] <Insert dimension>**.

Thickness: Minimum of **[16 gauge] <Insert thickness>** thick.

* + - * 1. Holes: Include number, size, and location of holes in casing and end tube sheets required for coil installation.
				2. Hardware: Use hex-head bolts, nuts, and washers constructed of **[Type 304] [or] [Type 316]** stainless steel.
				3. Nameplate: Aluminum or stainless steel nameplate with brass or stainless steel chain for each coil, with the following data engraved or embossed:

Retain any of first 12 subparagraphs below.

Manufacturer name, address, telephone number, and website address.

Manufacturer model number.

Serial number.

Manufacturing date.

Coil identification (indicated on Drawings).

Coil fin length.

Coil fin height.

Coil weight with fluid/without fluid.

Coil casing material and thickness.

Coil fin material and thickness.

Coil tube material and thickness.

Coil header material and thickness.

**<Insert requirements>**.

Retain first paragraph below if corrosion-resistant coating is required and is specified in Section 230546 "Coatings for HVAC." If retaining below, consult coil manufacturers to confirm that the coatings included in the referenced Section are available as a factory-applied coating.

* + - * 1. Comply with Section 230546 "Coatings for HVAC" for corrosion-resistant coating. See Drawings for coils requiring a corrosion-resistant coating.

In "Coating" paragraph below, second option refers to coating performance in "Corrosion-Resistant Coating" subparagraph in Part 2 "Materials" Article.

* + - * 1. Coating: **[None] [Corrosion resistant] <Insert manufacturer; product name>**.
			1. MATERIALS
				1. Aluminum: ASTM B209.
				2. Copper Sheet: ASTM B152.
				3. Copper Tube: ASTM B75 annealed temper or ASTM B280 drawn temper.
				4. Galvanized Steel: ASTM A653.
				5. Stainless Steel: ASTM A240.
				6. Steel: ASTM A53.

Retain "Corrosion-Resistant Coating" paragraph below if corrosion-resistant coating is required and is specified in this Section. Indicate coils requiring coating on Drawings.

* + - * 1. Corrosion-Resistant Coating: Coat with a corrosion-resistant coating capable of withstanding a **[3000] <Insert time>**-hour salt-spray test in accordance with ASTM B117.

Standards:

ASTM B117 for salt spray.

ASTM D2794 for minimum impact resistance of 100 in lb.

ASTM D3359 for cross-hatch adhesion of 5B.

Application: **[Immersion] [Spray]**.

Thickness: **[1 mil] <Insert value>**.

Gloss: Minimum gloss of 60 on a 60-degree meter.

* + - 1. SOURCE QUALITY CONTROL

Consult coil manufacturers for available test pressures.

* + - * 1. Refrigerant Coils: Factory tested using dry nitrogen while coil is completely submerged underwater to design pressure indicated, but not less than **[400-psig] <Insert pressure>** internal pressure.
				2. Coils to display a tag with inspector's identification as proof of testing.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine ducts, plenums, and casings to receive air coils for compliance with requirements for installation tolerances and other conditions affecting coil performance.
				2. Examine roughing-in for piping systems to verify actual locations of piping connections before coil installation.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION
				1. Install coils level and plumb.
				2. Install coils in metal ducts and casings constructed in accordance with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."
				3. Install [galvanized-steel] [stainless steel] drain pan under each cooling coil.

Construct drain pans with connection for drain; insulated and complying with ASHRAE 62.1.

Construct drain pans to extend beyond coil length and width and to connect to condensate trap and drainage.

Extend drain pan upstream and downstream from coil face.

Extend drain pan under coil headers and exposed supply piping.

* + - * 1. Straighten bent fins on air coils.
				2. Clean coils using materials and methods recommended in writing by manufacturers, and clean inside of casings and enclosures to remove dust and debris.
			1. PIPING CONNECTIONS

Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified for refrigerant piping systems.

* + - * 1. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
				2. Install piping adjacent to coils to allow service and maintenance.
				3. Connect refrigerant piping according to Section 232300 "Refrigerant Piping.”

END OF SECTION 238216.13