

**SECTION 23 82 16**  
**AIR COILS**

SPEC WRITER NOTES:

1. Delete between //-- --// if not applicable to project. Also delete any other item or paragraph not applicable in the Section and renumber the paragraphs.
2. Provide the year of latest edition to each publication given in paragraph APPLICABLE PUBLICATIONS.
3. SPEC WRITER NOTE: There could be more than one type of refrigerant required for the project. Edit following paragraph and associated subparagraphs to suit project requirements for the chiller selection.
4. There may be several acceptable refrigerants, listing more than one type of acceptable refrigerants is authorized for increased competition.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. A complete listing of common acronyms and abbreviations are included in Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- B. Heating and cooling coils for air handling units and duct applications.

**1.2 RELATED WORK**

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- C. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
- D. //Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//
- E. //Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS.//
- F. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- G. //Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//
- H. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEMS for HVAC.
- I. Section 23 31 00, HVAC DUCTS AND CASINGS.
- J. Section 23 36 00, AIR TERMINAL UNITS
- K. Section 23 72 00, AIR-TO-AIR ENERGY RECOVERY EQUIPMENT.
- L. Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.
- M. Section 23 74 13, PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS.
- N. Section 23 82 00, CONVECTION HEATING AND COOLING UNITS.

### 1.3 APPLICABLE PUBLICATIONS

#### SPEC WRITER NOTES:

1. Make material requirements agree with requirements specified in the referenced Applicable Publications. Verify and update the publication list to that which applies to the project unless the reference applies to all HVAC systems. Publications that apply to all HVAC systems may not be specifically referenced in the body of the specification but shall form a part of this specification.
2. Insert the year of approved latest edition of the applications between the brackets // // and delete the brackets if applicable to this project.

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Where conflicts occur these specifications and the VHA standards will govern.
- B. Air Conditioning and Refrigeration Institute (AHRI):  
Directory of Certified Applied Air Conditioning Products  
AHRI 410-//2001//.....Forced-Circulation Air-Cooling and Air-Heating  
Coils
- C. American Society for Testing and Materials (ASTM):  
B75/75M-//2020//.....Standard Specifications for Seamless Copper  
Tube
- D. American Society of Heating, Refrigerating, and Air-Conditioning  
Engineers (ASHRAE):  
15-//2019//.....Safety Standard for Refrigeration Systems  
34-//2022//.....Designation and Classification of Refrigerants  
(ANSI)
- D. National Electric Manufacturers Association (NEMA):  
250-//2020//.....Enclosures for Electrical Equipment (1,000  
Volts Maximum)
- E. National Fire Protection Association (NFPA):  
70-//2020//.....National Electric Code
- F. Underwriters Laboratories, Inc. (UL):  
1996-//2021//.....Electric Duct Heaters
- G. Department of Veterans Affairs (VA):  
PG-18-10-//2017(R2023)// HVAC Design Manual

**1.4 SUBMITTALS**

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 23 XX XX, SECTION TITLE", with applicable paragraph identification.
- C. Manufacturer's Literature and Data Including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
  - 1. Submit type, size, arrangements, and performance details. Present application ratings in the form of tables, charts, or curves.
- D. Provide installation, operating and maintenance instructions.
- E. Certification Compliance: Evidence of listing in current AHRI Directory of Certified Applied Air Conditioning Products.
- F. Coils may be submitted with Section 23 36 00, AIR TERMINAL UNITS, Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS, Section 23 74 13, PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS, or Section 23 82 00, CONVECTION HEATING AND COOLING UNITS.

SPEC WRITER NOTE: Coordinate O&M Manual and commissioning requirements with Section 01 00 00, GENERAL REQUIREMENTS and Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS. O&M Manuals shall be submitted for content review as part of closeout documents.

- G. Complete operating and maintenance manuals including wiring diagrams, technical data sheets, information for ordering replaceable parts, and troubleshooting guide:
  - 1. Include complete list indicating all components of the systems.
  - 2. Include complete diagrams of the internal wiring for each item of equipment.
  - 3. Diagrams shall have their terminals identified to facilitate installation, operation, and maintenance.
- H. //Completed System Readiness Checklist provided by the CxA and completed by the contractor, signed by a qualified technician, and dated on the date of completion, in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

- I. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

### **1.5 QUALITY ASSURANCE**

- A. Refer to paragraph QUALITY ASSURANCE of Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- B. Unless specifically exempted by these specifications, heating and cooling coils shall be tested, rated, and certified in accordance with AHRI 410 and shall bear the AHRI certification label.
- C. Bio-Based Materials: For products designated by the USDA's Bio-Preferred Program, provide products that meet or exceed USDA recommendations for bio-based content, so long as products meet all performance requirements in this specifications section. For more information regarding the product categories covered by the Bio-Preferred Program, visit <http://www.biopreferred.gov>.
- D. Refer to Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for additional sustainable design requirements.

### **1.6 AS-BUILT DOCUMENTATION**

- A. Comply with requirements in paragraph AS-BUILT DOCUMENTATION of Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

## **PART 2 - PRODUCTS**

### **2.1 HEATING AND COOLING COILS**

- A. Conform to ASTM B75/75M and AHRI 410.
- B. Tubes: Minimum 16 mm (0.625 inch) tube diameter; Seamless copper tubing.
- C. Fins: 0.1397 mm (0.0055 inch) aluminum or 0.1143 mm (0.0045 inch) copper mechanically bonded or soldered or helically wound around tubing.
- D. Headers: Copper, welded steel or cast-iron. Provide seamless copper tubing or resistance welded steel tube for volatile refrigerant coils.
- E. "U" Bends, Where Used: Machine die-formed, silver brazed to tube ends.
- F. Coil Casing: 1.6 mm (16 gauge) galvanized steel with tube supports at 1219 mm (48 inch) maximum spacing. Construct casing to eliminate air bypass and moisture carry-over. Provide duct connection flanges.
- G. Pressures kPa (PSIG):

Pressure	Water Coil		Refrigerant Coil
Test	2070 (300)		2070 (300)
Working	1380 (200)		1724 (250)

- H. Protection: Unless protected by the coil casing, provide cardboard, plywood, or plastic material at the factory to protect tube and finned surfaces during shipping and construction activities.
- I. Vents and Drain: Coils that are not vented or drainable by the piping system shall have capped vent/drain connections extended through coil casing.

## 2.2 REHEAT COILS, DUCT MOUNTED

- A. The coils shall be continuous circuit booster type for hot water as shown in contract documents. Use the same coil material as listed in paragraph HEATING AND COOLING COILS.

## 2.3 WATER COILS, INCLUDING GLYCOL-WATER

- A. Use the same coil material as listed in paragraph HEATING AND COOLING COILS.
- B. Drainable Type (Self-Draining, Self-Venting); Manufacturer Standard:
1. Cooling, all types.
  2. Heating or preheat.
  3. Runaround energy recovery. AHRI certification of capacity adjustment is waived. See Section 23 72 00, AIR-TO-AIR ENERGY RECOVERY EQUIPMENT.
- C. Cleanable Tube Type; Manufacturer Standard:
1. Well water applications.
  2. Wastewater applications.

## 2.4 VOLATILE REFRIGERANT COILS

- A. Continuous circuit, straight tubes, dry expansion type equipped with multi-port distribution header, less expansion valve.
- B. Minimum 16 mm (5/8 inch) tube diameter.

SPEC WRITER NOTE: Refrigerant must be an EPA approved refrigerant listed in <https://www.epa.gov/snap/>.

- C. Use refrigerant type //\_\_\_\_//. EPA approved refrigerants are listed at <https://www.epa.gov/snap/>. Submit proposed refrigerant for government approval.

## 2.5 ELECTRIC HEATING COILS

- A. Standards: AHRI 410 is not applicable. Electric coils shall meet the requirements of the NFPA 70 (NEC Article 250)// and UL 1996//.
- B. General: Aluminized steel frame, spot welded. Duct mounted units shall be flanged or slip-in design with built-in terminal box completely factory wired to terminals. Control panels for coils in air handling units shall be built-in or remote in NEMA 1 enclosure.
- C. Coils: Open type, 80 percent nickel, 20 percent chromium resistance wire, insulated by floating ceramic bushings and supported in aluminized steel brackets spaced on 100 mm (4 inch) maximum centers. Coils shall be mechanically crimped in stainless-steel terminals which are insulated from the frame with high temperature molded phenolic bushings.
- D. Over Temperature Protection:
  - 1. Primary System: Automatic reset thermal cutout.
  - 2. Secondary System: Load-carrying manual reset thermal cutout factory wired in series with each heater stage.
- E. Overcurrent Protection: Comply with UL and NEC.

SPEC WRITER NOTE: Specify mercury type contactors when quiet operation (reheat coil above ceiling) is required.

- F. Contactors: Disconnecting magnetic type, (when required), except for duct mounted reheat coils contractors shall be disconnecting mercury type.
- G. Airflow Interlock: Diaphragm operated differential airflow pressure switch.

SPEC WRITER NOTE: Verify that temperature controls are shown in the contract documents. Include these temperature controls in Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

- H. Leaving air temperature control for electric coils mounted in air handling units shall be //3// //6// //10// //18// step control driven by a unit mounted modulating thermostat.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. If an installation is unsatisfactory to the COR, the contractor shall correct the installation at no additional cost or time to the Government.

- B. Follow coil manufacturer's instructions for handling, cleaning, installation, and piping connections.
- C. Comb fins, if damaged. Eliminate air bypass or leakage at coil sections.

### **3.2 STARTUP AND TESTING**

- A. Perform tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.
- B. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.
- C. //The CxA will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and CxA. Provide a minimum of 10 working days prior to startup and testing.//

### **3.3 //COMMISSIONING**

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.
- B. Components provided under this section of the specification will be tested as part of a larger system.//

### **3.4 DEMONSTRATION AND TRAINING**

- A. Provide services of manufacturer's technical representative for //4//  
// // hour//s// to instruct VA personnel responsible in operation and maintenance of the system.
- B. //Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS.//

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