SECTION 23 82 16
AIR COILS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Heating and cooling coils for air handling unit and duct applications

1.2 RELATED WORK

A. Section 23 05 10, COMMON WORK RESULTS FOR BOILER PLANT and STEAM GENERATION.
B. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
C. Section 23 31 00, HVAC DUCTS AND CASINGS
D. Section 23 36 00, AIR TERMINAL UNITS: Reheat coils for VAV/CV terminals.
E. Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.
F. Section 23 82 00, CONVECTION HEATING AND COOLING UNITS
G. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training.
H. Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS

1.3 QUALITY ASSURANCE

A. Refer to paragraph, QUALITY ASSURANCE, 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 Standard 4l0 and shall bear the AHRI certification label.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
B. Manufacturer's Literature and Data for Heating and Cooling Coils: Submit type, size, arrangements and performance details. Present application ratings in the form of tables, charts or curves.
C. Provide installation, operating and maintenance instructions.
D. Certification Compliance: Evidence of listing in current ARI Directory of Certified Applied Air Conditioning Products.
E. Coils may be submitted with Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS, Section 23 36 00, AIR TERMINAL UNITS, or Section 23 82 00, CONVECTION HEATING AND COOLING UNITS.
F. Completed System Readiness Checklists provided by the Commissioning Agent 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.

1.5 APPLICABLE PUBLICATIONS

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.

B. Air Conditioning and Refrigeration Institute (AHRI):
Directory of Certified Applied Air Conditioning Products
AHRI 410-01.....Forced-Circulation Air-Cooling and Air-Heating Coils

C. American Society for Testing and Materials (ASTM):
B75/75M-02.....Standard Specifications for Seamless Copper Tube

D. National Fire Protection Association (NFPA):
70-11.....National Electric Code

E. National Electric Manufacturers Association (NEMA):
250-11.....Enclosures for Electrical Equipment (1,000 Volts Maximum)

F. Underwriters Laboratories, Inc. (UL):
1996-09.....Electric Duct Heaters

PART 2 - PRODUCTS

2.1 HEATING AND COOLING COILS

A. Conform to ASTM B75 and AHRI 410.

B. Tubes: Minimum 16 mm (0.625 inch) tube diameter; Seamless copper tubing with 0.035 wall thickness.

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.
   1. Extended surface fins shall be continuous configured plates of .010” aluminum with non-telescoping die formed spacing collars spaced at 8 fins per inch and that completely cover the tube.

D. Headers: Copper. Provide seamless copper tubing.

E. "U" Bends, Where Used: Machine die-formed, silver brazed to tube ends.

F. Coil Casing: Coil casings shall be fabricated from galvanized steel with intermediate tube supports for additional support of the fin tube assembly. Casing end tube sheets shall be minimum 16 gauge material and have die formed collars which allow thermal expansion and contraction of the finned core while preventing wear of each tube’s outer surface. Top and bottom casing channels shall be minimum 16 gauge material and have a second break in the sheet metal turned in for additional strength and to allow coils to be stacked. Casing components shall be assembled using minimum .25” self locking nuts and bolts. Use of self-tapping sheet-metal screws shall not be permitted. Construct casing to eliminate air bypass and moisture carry-over. Provide duct connection flanges.

G. Brazed Joint Construction: All copper and copper alloy joints shall be hand brazed with brazing material containing a minimum of 5% silver. Brazed joints involving any steel shall be hand brazed material containing a minimum of 30% silver. Oven brazing or any brazing method employing the brazing material in pre-proportioned rings is not acceptable. Rolled tube joints are not acceptable except where otherwise specified.

H. Pressures kPa (PSIG):

Pressure	Water Coil	Refrigerant Coil
Test	2070 (300)	2070 (300)
Working	1380 (200)	1725 (250)

I. 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.

J. Vents and Drain: Coils that are not vented or drainable by the piping system shall have capped vent/drain connections extended through coil casing.

K. Cooling Coil Condensate Drain Pan: Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.

2.2 REHEAT COILS, DUCT MOUNTED

A. The coils shall be continuous circuit booster type for hot water as shown on drawings. Use the same coil material as listed in Paragraphs 2.1.

2.3 WATER COILS

A. Use the same coil material as listed in Paragraphs 2.1.

B. Drainable Type (Self Draining, Self Venting); Manufacturer standard:

1. Cooling, all types.
2. Heating or preheat.

C. Cleanable Tube Type; manufacturer standard:

1. Water coils in system are subject to design temperatures below freezing shall be completely self draining by utilizing non-trapping circuiting and auxiliary drain headers on the return bends. The finned core shall be installed in a pre-pitched casing that when installed level shll drain any liquid in the coil tubes out through the auxiliary drain headers.
2. To provide access to the interior of each tube for cleaning, each tube shall have a removable plug located on the supply connection end (alternate end opposite the supply connection, or both ends) of the

coil. Plugs shall be of brass with a nitrile O-ring and be easily removed to permit insertion of cleaning tools.

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.

C. Designed for EPA approved refrigerants.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow coil manufacturer's instructions for handling, cleaning, installation and piping connections.

B. Comb fins, if damaged. Eliminate air bypass or leakage at coil sections.

3.2 STARTUP AND TESTING

A. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the Resident Engineer and Commissioning Agent. Provide a minimum of 7 days prior notice.

3.3 COMMISSIONING

A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.

B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

3.4 DEMONSTRATION AND TRAINING

A. Provide services of manufacturer’s technical representative for four hours to instruct VA personnel in operation and maintenance of units.

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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