

SECTION 15761 – COILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Provide coils of size, capacity, location and type shown and scheduled on the drawings and as hereinafter specified.
- B. Coil capacities, pressure drops and selection procedures shall be certified in accordance with ARI 410 (latest edition).
- C. Furnish and install coils to make a complete and operational system.
- D. All equipment shall be new and shall be of the type, style, size and capacities as scheduled.

1.3 RELATED SECTIONS

- A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.4 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.
- B. Material standards shall be as specified or detailed hereinafter and as following:
 - 1. ARI 410 – Forced-Circulation Air-Cooling and Air-Heating Coils.
 - 2. SMACNA (DCS) – HVAC Duct Construction Standards, Metal and Flexible.
 - 3. NFPA 70 – National Electrical code.

1.5 SUBMITTALS

- A. See Section 15050 and General Conditions for Additional Requirements.
- B. Product Data: Provide typical catalog of information including arrangements.
- C. Provide ARI Calculations.
- D. Manufacturer's Instructions: Indicate installation instructions and recommendations.
- E. Provide detail drawings and each coil and recommended installations.
- F. Project Record Documents: Record actual locations of components.
- G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data and parts listings.
- H. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriter's Laboratories Inc. testing firm acceptable to the authority having jurisdiction and suitable for the purpose specified and indicated.

1.7 PRODUCT, STORAGE AND HANDLING

- A. Delivery of materials shall be made to the project by the materials supplier in accordance with the instructions to the Contractor.
- B. The Contractor shall provide adequate locked storage space and shall be responsible for all items of materials after receipt from the supplier, and shall replace all materials lost or damaged after delivery and receipt.

PART 2 - PRODUCTS

2.1 STEAM COILS

A. VIFB (Steam heating coils with internal face and bypass dampers)

1. Acceptable manufactures subject to compliance with the specifications shall be as follows:
 - a. Aerofin
 - b. Wing
 - c. Control Air
2. Coils shall have vertical tubes, directly draining condensate header, with full steam pressure at all times to ensure maximum freeze protection. Air temperatures shall be controlled by air proportioning through faces and bypasses and by modulation of the heating medium as described hereinafter.
3. On full bypass, the heating coils shall be completely enclosed by close fitting dampers to ensure minimum temperature override.
4. Coils shall have casing panels, dampers and bypass panels made of hot dip galvanized construction for maximum corrosion protection.
 - a. Provided with anti-stratification baffles.
 - b. Provided with factory mounted pneumatic operator and pilot positioners on each operator (coordinate pressure and control with ATC).
5. Steam manifolds shall be made of Schedule 40 seamless steel pipe on single row steam coils and structural steel rectangular tubing with 1/4" wall thickness on 2-row steam coils.
6. Heating tubes shall be 5/8" o.d. drawn oxygen-free copper, mechanically expanded to produce a bond with the collared aluminum fins for maximum fin efficiency and heat transfer. Top and bottom panels shall be 2-piece for maximum accessibility to tube connections, if required.
7. The entire damper assembly shall be supported on at least (2) support wheels and (8) guide wheels. The support and guide wheels shall provide exact linear motion of the dampers and perfect alignment with fixed casing panels. Support wheels shall have low friction roller bearings. Guide wheels shall have long-life sleeve bearings.
8. Coils shall have direct vertical condensate drainage from the tubes into the condensate manifold to ensure that no part of the tube will be water logged. Tubes shall enter the condensate manifold in the vertical direction. Tube expansion shall be absorbed in 90° bends at the top of each tube.

B. Steam distribution heating coils (non-freeze) shall be manufactured by:

1. Acceptable manufactures subject to compliance with the specifications shall be as follows:
 - a. Aerofin
 - b. Trane
 - c. Carrier
 - d. McQuay
 - e. York
 - f. Heat Craft
 - g. TSI
2. Coils shall consist of 16 gauge galvanized steel casing with center and end supports. To ensure structural integrity and allow for easy stacking of coils, casing channels must be constructed with the minimum of four (4) forms each or channels must be constructed from 14 gauge galvanized steel.
3. All coils shall be suitable for pressure up to 200 psig and temperature to 400°F. Coil performance shall be certified under ARI Standard 410.
4. Steam distributing coils shall have double tube construction with evenly spaced directional kinetic orifices. Orifices must create directional flow that meters steam for uniform leaving air temperature and accelerates condensate removal and increases heat transfer efficiency. Outer tube shall be 5/8" tubes with a minimum thickness of .049"
5. Fins shall be configured aluminum plate type or helical fin. Fins shall be mechanically bonded to the tubes for lasting reliability. Fins shall have a minimum thickness of 0.095".
6. Copper header: Steam defectors must be provided within supply header to ensure equal distribution of steam to each tube and direct the condensate to flow to the outlet.
7. Coils shall be installed in accordance with manufacturer's instruction. Support coil sections independent of piping on steel channel or double angle frames and secure to casings. Provide frames for maximum three coil sections. Arrange supports to avoid piercing drain pans, provide airtight seal between coil and duct or casing. Protect coils to prevent damage to fins and flanges. Comb out bent fins. Install coils level. Make connections to coils with unions and flanges.

2.2 IN-DUCT HOT WATER HEATING COILS

A. Acceptable manufacturers subject to compliance with the specifications shall be as follows:

1. Trane
2. Aerofin
3. Heat Craft
4. TSI

- B. Water heating coil shall be of the extended surface type, constructed of copper tubing minimum 5/8" o.d., 0.035" thick, and having plate fins of aluminum extending at right angles to the tubes.
- C. Tubes shall be pressure bonded into the fin collars by expanding the tubes. No solder bonding shall be used. All copper-to-copper joints shall be made with high temperature silver brazing material.
- D. Plate fins shall be corrugated. Fins shall be spaced no closer than (12) per inch integral spacing collars that cover the tube surface.
- E. Hot water coils shall be tested for 250 psig, maximum 300°F, and 400 psig air pressure under water.
- F. Access doors shall be installed upstream and downstream of coil for cleaning access.

2.3 COOLING COILS

- A. Acceptable manufacturers subject to compliance with the specification shall be as follows:
 - 1. Aerofin
 - 2. Carrier
 - 3. York
 - 4. Trane
 - 5. McQuay
 - 6. Heat Craft
 - 7. TSI
- B. Primary surface shall be round seamless 0.025" thick, 5/8" o.d. copper tubes on 1 1/2" centers, staggered in the direction of airflow. All joints shall be brazed. Tube bends shall be 0.035" thick.
- C. Secondary surface shall consist of aluminum plate type fins for higher capacity and structural strength. Spinal fins will not be acceptable. Fins shall have a minimum thickness of 0.095" with full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer with a maximum (10) fins per inch. Bare copper tube shall not be visible between fins. Fins shall have no openings punched in them so as to accumulate lint and dirt. Tubes shall be mechanically expanded into fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Tubes that have been expanded through the use of hydraulic expansion methods will not be acceptable.
- D. Casing and tube supports shall be constructed of stainless steel with 3/8" diameter bolt holes for mounting on 8" centers. Casing shall be a minimum of 16 gauge stainless steel, reinforced flange of a minimum of 1 1/2" deep flange.

- E. Coil header shall be of copper materials using seamless copper tubing with intruded tube holes to permit expansion and contraction without creating undue stress or strain. Coil size shall be determined by coil manufacturer based upon the most efficient coil circuiting. Vent connections at the highest point to ensure proper venting and drain connections shall be provided at the lowest point to ensure complete drainage and prevent freeze-up.
- F. Coil connections shall be red brass or copper.
- G. Coils shall have foam sealing strip located between casing channels and fins along top and bottom to arrest air bypass and water carryover.
- H. The complete coil core shall be pressure tested with 315 lbs. air pressure under warm water and shall be suitable for operation at 250 psig working pressure. Individual tube test and core tests before installation of headers will not be considered acceptable. Cooling coils shall be circuiting for drainability and for service without removing individual plugs from each tube. Use of internal restrictive devices to obtain turbulent flow will not be acceptable since they prevent complete draining of the coil.
- I. The manufacturer shall furnish coil capacities as outlined in the tabulation. Capacities shall be verified with an ARI approved computer selection method.
- J. The unit manufacturer shall provide separate drains from pan under each coil section. Drains from multiple, stacked coil pans shall be routed individually to drain outlet, not cascaded from one coil pan to the next lower pan.
- K. Cooling coils shall be mounted to allow removal of any coil individually without disturbing any other coils.
- L. Drain pans and support members shall be stainless steel. Coil drain pans shall allow for condensate removal upstream or downstream of all coils including recirculation units.
- M. Each individual coil module shall have a limited height of up to 36".
- N. Coils shall be fully drainable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coils shall be installed in accordance with manufacturer recommendations, Contract Drawings, and specifications.
- B. Coils shall be installed such that coils can be completely drainable.
- C. Coils shall be installed so as to ensure easy accessibility for service or removal and replacement of control valves, shut-off valves, strainers and coils.

- D. Each coil shall have a vent at the high point.
- E. Provide union at each coil connection.

3.2 CLEANING

- A. After construction is completed, including painting, clean exposed surfaces of units.

END OF SECTION