SECTION 235700 - HEAT EXCHANGERS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes plate heat exchangers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
   2. For plate heat exchangers, include indication that the selection and calculated capacities are per AHRI 400 requirements and indicate that the unit furnished will be AHRI 400 certified.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Design Calculations: Calculate requirements for selecting seismic restraints and for designing bases.
   2. Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Equipment room, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Tube-removal space.
   2. Structural members to which heat exchangers will be attached.

B. Source quality-control reports.
C. Field quality-control reports.

D. Sample Warranty: For manufacturer's warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For heat exchangers to include in emergency, operation, and maintenance manuals.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of domestic-water heat exchangers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including heat exchanger, storage tank, and supports.
   b. Faulty operation of controls.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

   a. Plate, Heat Exchangers:

      1) Brazed-Plate Type: Ten year(s).
      2) Plate-and-Frame Type: Ten year(s).

PART 2 - PRODUCTS

2.1 GASKETED-PLATE HEAT EXCHANGERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Danfoss
   2. Alfa Laval Inc.
   3. API Heat Transfer Inc.
   4. APV; a brand of SPX Corporation.
   5. ITT Corporation; Bell & Gossett.
7. TACO Incorporated.

B. For units that fall within AHRI 400 standard criteria, provide certified units (no exceptions even if manufacturer is listed above).

C. Configuration: Freestanding assembly consisting of frame support, top and bottom carrying and guide bars, fixed and movable end plates, tie rods, individually removable plates, and one-piece gaskets.

D. Construction: Fabricate and label heat exchangers to comply with ASME Boiler and Pressure Vessel Code, Section VIII, "Pressure Vessels," Division 1.
   1. Working pressure: 300 psi.

E. Frame:
   1. Capacity to accommodate a minimum 20 percent additional plates.
   2. Painted carbon steel with provisions for anchoring to support.

F. Top and Bottom Carrying and Guide Bars: Painted carbon steel, aluminum, or stainless steel.

G. End-Plate Material: Painted carbon steel.

H. Tie Rods and Nuts: Steel or stainless steel.

I. Plate Material: 0.031 inch thick before stamping; Type 316L stainless steel.

Glue-free gaskets are mechanically held in place by plates on both sides of each gasket.

J. Gasket Materials: Nitrile rubber.

Retain "Glue" Subparagraph below for glued gaskets.

K. Piping Connections: Factory fabricated of materials compatible with heat-exchanger shell. Attach tappings to shell before testing and labeling.
   1. NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
   2. NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.

L. Enclose plates in solid stainless-steel removable shroud.

M. Capacities and Characteristics: As scheduled on Drawings.
2.2 ACCESSORIES

A. Hangers and Supports:
   1. Custom, steel supports for mounting on floor.
   2. Field-fabricated steel supports to ensure both horizontal and vertical support of heat exchanger. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Shroud: Aluminum sheet.

C. Miscellaneous Components for Steam Unit: Strainers, steam-control valve, steam trap, valves, pressure gage, thermometer, and piping.

D. Pressure Relief Valves: ASME rated and stamped.
   1. Pressure relief valve setting: As scheduled on Drawings.

2.3 SOURCE QUALITY CONTROL

A. If the plate heat exchangers fall within AHRI 400 standards, then the plate heat exchanger must be AHRI 400 certified and labeled.


C. Hydrostatically test heat exchangers to minimum of one and one-half times pressure rating before shipment.

D. Heat exchangers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas for compliance with requirements for installation tolerances and for structural rigidity, strength, anchors, and other conditions affecting performance of heat exchangers.

B. Examine roughing-in for heat-exchanger piping to verify actual locations of piping connections before equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 GASKETED-PLATE HEAT-EXCHANGER INSTALLATION
   A. Install metal shroud over installed gasketed-plate heat exchanger according to manufacturer's written instructions.

3.3 BRAZED-PLATE HEAT-EXCHANGER INSTALLATION
   A. Install brazed-plate heat exchanger on custom-designed wall supports anchored to structure as indicated on Drawings.

3.4 CONNECTIONS
   A. Comply with requirements for piping specified in other Section 232113 "Hydronic Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
   B. Comply with requirements for steam and condensate piping specified in Section 232213 "Steam and Condensate Heating Piping."
   C. Maintain manufacturer's recommended clearances for tube removal, service, and maintenance.
   D. Install piping adjacent to heat exchangers to allow space for service and maintenance of heat exchangers. Arrange piping for easy removal of heat exchangers.
   E. Install shutoff valves at heat-exchanger inlet and outlet connections.
   F. Install relief valves on heat-exchanger heated-fluid connection and install pipe relief valves, full size of valve connection, to floor drain.
   G. Install vacuum breaker at heat-exchanger steam inlet connection.
   H. Install hose end valve to drain shell.
   I. Install thermometer on heat-exchanger inlet and outlet piping, and install thermometer on heating-fluid inlet and outlet piping. Comply with requirements for thermometers specified in Section 230519 "Meters and Gages for HVAC Piping."
   J. Install pressure gages on heat-exchanger and heating-fluid piping. Comply with requirements for pressure gages specified in Section 230519 "Meters and Gages for HVAC Piping."

3.5 FIELD QUALITY CONTROL
   A. Perform the following tests and inspections with the assistance of a in accordance with factory-authorized service representative instructions:
1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Heat exchanger will be considered defective if it does not pass tests and inspections.
C. Prepare test and inspection reports.

3.6 CLEANING
A. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

3.7 DEMONSTRATION
A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain heat exchangers.

END OF SECTION