

SECTION 421302 - PLATE AND FRAME HEAT EXCHANGERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Plate and frame heat exchangers.
- B. Referenced sections:
 - 1. Section 230700 – HVAC and Piping Systems Insulation.
 - 2. Section 430520 - Common Work Results for Liquid Handling Equipment.

1.2 COORDINATION

- A. Coordinate Work of this Section with Work of other Sections.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate heat exchanger dimensions, materials of construction, plates, and gasket details, anchors, attachments, lifting points, taps, and drains.
- C. Provide material thicknesses for end plates, plates, nozzles, and all other appurtenances.
- D. Provide code calculations.
- E. Provide Anchor bolt criteria, including quantity, material, diameter, length, and required embedment depth. Provide anchor bolt template for bolts that are required to be cast-in-place.
- F. Manufacturer's Certificate:
 - 1. Certify that exchangers and appurtenances meet or exceed specified requirements.
 - 2. Submit certified list of exchanger installations storing same liquid and concentration, in service for period of not less than five years.
- G. Welder Certificates: Certify welders and welding procedures employed on Work, verifying ASME qualification within previous 12 months.
- H. Test and Evaluation Reports: Submit installation certificate from equipment manufacturer's representative as described in PART 3.
- I. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- J. Source Quality-Control Submittals: Indicate results of shop tests and inspections.

- K. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- L. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.
- M. Qualifications Statements:
 - 1. Submit qualifications for manufacturer, installer, and licensed professional.
 - 2. Submit manufacturer's approval of installer.
 - 3. Welder Certificates: Submit welder certification of compliance with ASME BPVC-IX.

1.4 QUALITY ASSURANCE

- A. Perform Work according to ASME BPVC-IX for welding materials and procedures.
- B. Provide heat exchangers registered with National Board of Boiler and Pressure Vessel Inspectors.
- C. Materials in Contact with Potable Water: Certified to NSF Standards 61 and 372.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Welders: ASME qualified within previous 12 months for employed weld types.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver, store, and handle equipment as follows:
 - 1. Use methods which prevent damage, deterioration, and other loss during shipping and temporary on-site storage.
 - 2. Protect heat exchanger connections and openings with temporary blind flanges with gaskets or pipe plugs, for threaded connections, to prevent damage of the sealing surfaces or contamination of the heat exchanger internals.
 - 3. Provide instructions for proper unpacking.
- C. Prior to shipping, perform final cleaning of internal and external surfaces after manufacturing and testing operations have been completed.
- D. Deliver loose parts in boxed plywood containers and ship as a unit with equipment.
- E. Inspect equipment when delivered to ensure equipment is undamaged and complies with specified requirements.

- F. Store equipment in a manner which facilitates inspection and measurement of quantity. Protect stored products from loss by exposure to rain, wind-driven dust, and other similar phenomena.

1.7 WARRANTY

- A. Furnish five-year manufacturer's warranty for shell and tube heat exchangers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Bell and Gossett.
- 2. Taco Comfort Solutions.
- 3. Alfa Laval.
- 4. Owner approved equal.

2.2 DESIGN CRITERIA

- A. Design, fabricate, and test equipment in accordance with the BPVC, Section VIII, Division 1.
- B. Design equipment per the requirements on the equipment schedule
- C. Thermal design by manufacturer.
- D. Design heat exchangers to allow for the future addition of plates for an increased hot-side heating capacity of 50 percent.
- E. Design plate and carrying box to permit the removal of any plate in the plate pack without the need to remove any other plates.
- F. Plate and frame heat exchangers to include:
 - 1. Fixed end cover.
 - 2. Multiple plates.
 - 3. Movable end cover.
 - 4. Carrying bars and compression bolts.
 - 5. Gasket for heat transfer area and portholes.
 - 6. One-piece molded gaskets.
 - 7. Plate pack covered with metal shroud in accordance with OSHA standards.
 - 8. Provide lifting lugs as required for installation and maintenance.
- G. Paint heat exchanger using manufacturer's standard painting system.

2.3 FINISHES

- A. Paint heat exchanger using manufacturer's standard painting system.

2.4 FABRICATION

- A. Permanently mark plates to identify plate material.
- B. Completely fit-up and assemble heat exchangers in manufacturer's shop.
- C. Provide permanently attached equipment identification nameplate. At a minimum include the following:
 - 1. Equipment model number.
 - 2. Serial number.
 - 3. Materials of construction.
 - 4. Number of plates provided and maximum number of plates.

2.5 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Provide shop inspection and testing of completed assembly.
- C. Factory Testing:
 - 1. Hydrostatic Testing:
 - a. Test exchangers at the manufacturing facility in accordance with BPVC Section VIII, Division 1.
 - b. Use water that does not contain more than 100 ppm of chlorine.
 - c. Drain and thoroughly dry exchangers immediately after testing.
- D. Owner Inspection:
 - 1. Make in progress and completed vessels available for inspection at manufacturer's factory at any point of fabrication.
 - 2. Notify Owner at least seven days before inspection is allowed.
- E. Owner Witnessing:
 - 1. Allow witnessing of factory inspections and test at manufacturer's test facility.
 - 2. Notify Owner at least seven days before inspections and tests are scheduled.
- F. Certificate of Compliance:
 - 1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017300 - Execution: Requirements for installation examination.
- B. Verify layout and orientation of exchanger accessories and piping connections.

3.2 INSTALLATION

- A. Install exchangers plumb and level.
- B. Piping:
 - 1. Connect piping to heat exchanger.

3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

END OF SECTION 421302