SECTION 421304 - FINNED TUBE HEAT EXCHANGERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Finned tube heat exchangers.

B. Referenced sections:

1. 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, required clearances for tube removal, connection sizes, locations, and type, materials of construction, tube, and tubesheet details, anchors, attachments, lifting points, taps, and drains.

C. Provide motor data sheet including enclosure type, horsepower, full load amps, and locked rotor current.

D. Provide completed TEMA data sheet including material thicknesses for shells, heads, nozzles, and all other appurtenances.

E. Provide code calculations.

F. 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.

G. 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.

H. Welder Certificates: Certify welders and welding procedures employed on Work, verifying ASME qualification within previous 12 months.

I. Test and Evaluation Reports: Submit installation certificate from equipment manufacturer's representative as described in PART 3.

J. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

K. Source Quality-Control Submittals: Indicate results of shop tests and inspections.

L. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

M. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

N. 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.

D. Perform Work according to TEMA standards.

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 ACCEPTABLE MANUFACTURERS

A. GEA Heat Exchangers

B. Alfa-Laval

C. SPX Cooling Technologies

D. Other approved equal.

2.2 DESIGN CRITERIA

A. Design, fabricate, and test equipment in accordance with the BPVC, Section VIII, Division 1, and the performance requirements on the equipment schedule.

B. Thermal design by manufacturer.

C. Surface areas specified equipment schedule, are minimum required design surface areas. Provide units with fully packed tube sheets which meet or extend specified surface areas.

D. Design heat exchangers in accordance with latest issue of TEMA standards.

E. Provide type of connection, spacing, and size of aluminum fins per manufacturer’s standards unless otherwise specified.

F. Provide rolled heat exchanger tubes in accordance with TEMA.

G. Provide motors in compliance with Section 23 05 13 – Common Motor Requirements for HVAC Equipment.

H. Select motor for non-overloading operation on all points of performance curve at design conditions. Select motor for lowest standard speed that meets the specified performance.

I. Include corrosion allowance as specified on the equipment schedule. Conform to TEMA standards for minimum allowances for exchanger classification specified (Section RCB1.5).

J. Provide lifting lugs/brackets on individual exchanger components in excess of 60 pounds in accordance with TEMA standards (Section G-7.2).

K. Provide 6 inch nozzle projections unless otherwise stated on the drawings.

2.3 FINISHES

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

2.4 ACCESSORIES

A. Equipment Nameplate:

1. The equipment shall have a stainless steel nameplate, permanently attached to the equipment at a location easily readable. The nameplate shall contain the following information:

    a. Equipment tag number.
    b. Code stamp (if applicable).
    c. National Board Number (if applicable).
    d. State Registration Number (if applicable).
    e. TEMA type.
    f. MAWP.
    g. Design temperature.
    h. Hydrotest pressure.
    i. Number of passes.
    j. Material of construction.
    k. Stress relieving, if any.
    l. Fluid circulated.

B. Special Tools and Devices:

1. Provide two complete sets of new, unused special tools and devices, including any metric wrenches required for operation and maintenance of the equipment.
2. Provide special tools and devices in a separate container clearly identified with the name of the equipment and the PO number.

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 factory prior to shipping.
b. Test exchangers at the manufacturing facility in accordance with BPVC Section VIII, Division 1.

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. Correct piping, attachment, or other signs of improper installations that cause stresses to be transferred to the heat exchangers.

C. Contractor is responsible for submittal information and coordinating final dimensions and locations of foundations, pads, anchor bolts, etc.

3.3 FIELD QUALITY CONTROL

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

END OF SECTION 421304