# 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 brazed-plate heat exchangers.

B. Heat Exchanger selections to be coordinated with the Solar Collector system manufacturer.

### 1.3 DEFINITIONS

A. TEMA: Tubular Exchanger Manufacturers Association.

### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.

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.

### 1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of shell-and-tube heat exchanger. Documentation that shell-and-tube heat exchangers comply with "TEMA Standards."

B. Heat exchanger utilized for domestic hot water heating shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

C. Source quality-control reports.

D. Field quality-control reports.

E. Sample Warranty: For manufacturer's warranty.

1.6 CLOSEOUT SUBMITTALS

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

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of 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: One year(s).

PART 2 - PRODUCTS

2.1 BRAZED-PLATE HEAT EXCHANGERS

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

1. API Heat Transfer Inc.
2. Armstrong Fluid Technology.
3. Bell & Gossett; a Xylem brand.
4. Flo Fab Inc.
5. Polaris Heat Exchangers.
6. Wessels Company.
7. Sondex by Danfoss

B. Configuration: Brazed assembly, consisting of embossed or pressed stainless steel plates brazed together and two end plates, one with threaded nozzles and one with pattern-

embossed plates. Floor-mounted heat exchangers must have factory-furnished integral legs with mounting feet.

C. Construction: Fabricate and label heat exchangers to comply with ASME Boiler and Pressure Vessel Code, Section VIII, "Pressure Vessels," Division 1.

D. End-Plate Material: Type 316 stainless steel.

E. Threaded Nozzles: Type 316 stainless steel.

F. Plate Material: Type 316 stainless steel.

G. Brazing Material: Copper or nickel.

H. Capacities and Characteristics: Refer to drawings for additional information

## 2.2 ACCESSORIES

A. Hangers and Supports:

1. Custom-built steel supports and saddles for mounting on wall

2. Supports and saddles 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. Miscellaneous Components for High-Temperature, Hot-Water Unit: Control valve, valves, thermometers, and piping. Include components fitted for electronic control.

C. Pressure-Relief Valves: Cast iron or Steel or Bronze or Brass ASME rated and stamped.

## 2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect heat exchangers in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, "Pressure Vessels," Division 1. Affix ASME International label.

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

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

D. 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 INSTALLATION OF HEAT EXCHANGER, GENERAL

A. Equipment Mounting:

1. Install floor-mounted heat exchangers on cast-in-place concrete equipment bases. Install all heat exchangers level and plumb in accordance with manufacturer's recommendations. Install floor-mounted and wall-hung steam heat exchangers at sufficient height, using sufficient length supports, to achieve required steam and condensate pipe pitch. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548.13 "Vibration Controls for HVAC."

### 3.3 INSTALLATION OF BRAZED-PLATE HEAT EXCHANGER

A. Install wall-mounted brazed-plate heat exchanger on custom-designed wall supports anchored to structure as indicated on Drawings.

B. Install floor-mounted brazed-plate heat exchangers on cast-in-place concrete equipment base and fasten legs to base.

### 3.4 PIPING CONNECTIONS

A. Comply with requirements for piping specified in Section 232113 "Hydronic Piping" and Section 232116 "Hydronic Piping Specialties." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Maintain manufacturer's recommended clearances for tube removal, service, and maintenance.

C. Install piping adjacent to heat exchangers to allow space for service and maintenance of heat exchangers. Arrange piping for easy removal of heat exchangers.

D. Install shutoff valves at heat-exchanger inlet and outlet connections.

E. Install pressure-relief valves on heat-exchanger shells where a connection has been provided on shell. When no shell pressure-relief valve connection has been provided, install pressure-relief valve on shell outlet piping before any isolation valves.

F. Install pressure-relief valves on heat-exchanger tube outlet piping before any isolation valves.

G. Pipe pressure-relief valves, full size of valve connection, to floor drain.

H. Install thermometer on each heat-exchanger fluid inlet and outlet piping. Comply with requirements for thermometers specified in Section 230519 "Meters and Gages for HVAC Piping."

I. Install pressure gauges on each heat-exchanger fluid inlet and outlet piping. Comply with requirements for pressure gauges specified in Section 230519 "Meters and Gauges for HVAC Piping."

## 3.5 CLEANING

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

B. Isolate heat exchangers from piping before flushing piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blind flanges in flanged joints to isolate equipment.

C. Flush heat-exchanger piping systems with clean water; then remove and clean or replace strainer screens before reopening flow to heat exchangers.

## 3.6 FIELD QUALITY CONTROL

A. Testing Agency, Contractor: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections with the assistance of a factory-authorized service representative:

D. Tests and Inspections:

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.

E. Heat exchanger will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

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 235700