PART 1 - GENERAL

1.1 APPLICABLE REQUIREMENTS

A. All work to be furnished and installed under this section shall comply with all the requirements of General Conditions, Supplemental Conditions, Division 01 - General Requirements, Section 230500 - Basic HVAC Materials and Methods, and other Sections in Division 23 specified herein.

1.2 SCOPE

A. All work to be furnished and installed under this Section shall comply with all the requirements of Division 01, and shall include, but not necessarily be limited to, the following:
1. Shell and tube heat exchangers (convertors).
2. Plate type heat exchanger.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 230500: Basic HVAC Materials and Methods

B. Section 230593: Testing, Adjusting and Balancing

C. Section 230700: Mechanical Insulation

D. Section 230900: Building Automation System (BAS) Controls

E. Section 232123: Pumps and Hydronic Specialties

F. Section 233113: Air Distribution

G. Section 233412: Air Handling Equipment

H. Division 26: Electrical

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Provide systems that are the standard product of an equipment manufacturer regularly engaged in the production of such units who issues complete catalog information on such products. Units shall not be fabricated by the Contractor.

B. Codes and Standards: Provide components and pumps conforming to the requirements of the latest addition of the following:
1. American Society of Mechanical Engineers (ASME): Boiler and Pressure Vessel Code
   a. Section VIII D1 -Rules for Construction of Pressure Vessels including Addendums
   b. Section VIII D2 - Rules for Construction of Pressure Vessels including Addendums
   c. Section IX - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators

including Addendums
d. B31.1 - Power Piping
2. National Electrical Manufacturers Association (NEMA): Provide electrical components that comply with NEMA Standards.
3. National Fire Protection Association (NFPA):
a. (CEC) - California electrical Code

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for units showing dimensions, weights (shipping, installed, and operating), capacities, ratings, performance with operating point clearly indicated, motor electrical characteristics, finishes of materials, and installation instructions.

B. Shop Drawings: Submit manufacturer's shop drawings indicating dimensions, weight (shipping, operating), required clearances, methods of assembly of components, and location and size of each field connection.

C. Maintenance Data: Submit maintenance instructions, including instructions for lubrication, tube replacement, motor and drive replacement, and spare parts lists. Include this data, product data, shop drawings, and wiring diagrams in operating and maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver units to the site in containers with manufacturer's stamp or label affixed.

B. Store and protect units against dirt, water, chemical, and mechanical damage. Do not install damaged units - remove from project site.

C. Rigging: Comply with the manufacturer's rigging and installation instructions.

1.7 WARRANTY

A. Provide general one-year (12 months) warranty. The warranty shall include parts, labor, travel costs, and living expenses incurred by the manufacturer to provide factory authorized service.

PART 2 - PRODUCTS

2.1 SHELL AND TUBE HEAT EXCHANGER (CONVERTER)

A. General:
1. Furnish and install shell and tube type steam to hot water heat exchanger of capacity and size. Installation in accordance with manufacturer's recommendations.

B. Type:
1. Shell and tube, U-bend removable tube bundle, steam in shell, water in tubes. Equipped with mounting legs.

C. Materials:
1. Shell - steel.

2. Tubes - 3/4" OD copper.
3. Heads - cast iron or steel.
4. Tube sheets - steel.
5. Tube supports - steel.

D. Construction:
1. Form No. U-1. The ASME "U" symbol should also be stamped on the heat exchanger. In addition, each unit is registered with the National Board of Boiler and Pressure Vessel Inspectors.

E. Installation:
1. The steam supply line shall be adequately sized and equipped with a steam control valve. The steam control valve shall be actuated by a thermal control element in the hot water line from the exchanger.
2. Exchanger shall have adequate condensate return line equipped with proper trap for steam system.
3. Exchanger shall be equipped with proper vacuum breaker and/or vent as required.

F. Manufacturer: Bell & Gossett or approved equal by Taco.

~~2.2 PLATE TYPE HEAT EXCHANGER~~

~~A. General:~~
~~1. Furnish and install plate type heat exchanger of capacity and size. Install in accordance with manufacturer's recommendations.~~
~~2. Heat exchanger selections shall be verified by the manufacturer to provide required heat transfer surface area for specified capacity and pressure drop conditions.~~

~~B. Channel Plates:~~
~~1. Corrugated channel plates shall be type stainless steel.~~

~~C. Gaskets:~~
~~1. Channel plate ports to be double gasketed to prevent mixing or cross-contamination of hot side and cold side fluids. Gaskets to be Nitrile.~~

~~D. Carrying Bars:~~
~~1. Channel plate carrying bars to be stainless steel.~~

~~E. Frame Plates & Pressure Plates:~~
~~1. Fixed frame plates and movable pressure plates to be corrosion resistant epoxy painted carbon steel.~~

~~F. Connections:~~
~~1. Piping connections 2" and smaller to be stainless steel NPT nozzles.~~
~~2. Piping connections 4" and larger to be studded port design to accept ANSI flange connections.~~
~~3. Connection ports to be integral to the frame or pressure plate.~~

~~G. Splash Guards:~~
~~1. Finished units to be provided with OSHA required, formed aluminum splash guards to enclose exterior channel plate and gasket surfaces.~~

~~H. Design Pressure/Temperature:~~

~~1. Units to be designed for minimum 150 psig working pressure. Assembled units to be hydrostatically tested at 1.5 times full differential design pressure.~~

~~I. Construction:~~

~~1. The ASME "U" symbol should also be stamped on the heat exchanger. The manufacturer must be registered with the National Board.~~

~~J. Manufacturer:~~

~~1. Heat exchangers shall be Bell and Gossett, Alfa Laval, or equal.~~

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment, unless otherwise shown or noted on the Drawings, is to be installed in accordance with industry standards and manufacturer's recommended installation instructions.

B. Provide vibration isolation, inertia bases, seismic snubbers, flexible pipe connections, etc, as specified in related specification sections.

C. Mechanical contractor to assist testing and balancing contractor in verifying correct pump rotation and system operation.

D. Flush and clean equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls.

E. Contractor to coordinate all electrical requirements with electrical contractor.

3.2 MANUFACTURER'S START-UP SERVICES

A. The manufacturer shall provide start-up service in the form of a factory trained service technician. The service technician shall verify correct installation, verify pump systems mounting, verify piping installation, verify control wiring, verify power wiring, and check for proper operation. The service technician shall provide final adjustments to meet the specified performance requirements. Fully staffed parts and service personnel shall be within four hours travel from the job site.

END OF SECTION