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The Description of the Project
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SPECIFICATION DIVISION 23

NUMBER SECTION DESCRIPTION

DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)
SECTION 235719 - PLATE TYPE LIQUID-TO-LIQUID HEAT EXCHANGER

END OF CONTENTS TABLE

2014-01-06: IMPROVED LEAD FREE REQUIRMENTS TO REFLECT U.S SAFE DRINKING WATER ACT REQUIREMENTS THAT WENT INTO EFFECT JAN. 4, 2014. D.KARLE FOR MTT.

DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING (HVAC)
SECTION 235719 - PLATE TYPE LIQUID-TO-LIQUID HEAT EXCHANGER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

INCLUDE PARAGRAPH 1.1.A AND B IN EVERY SPECIFICATION SECTION. EDIT RELATED SECTIONS 1.1.B TO MAKE IT PROJECT SPECIFIC.

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections, in particular the Related Sections listed below, apply to this Section.

B. Related Sections:

1. Section 019100/019110 - Facilities Commissioning
2. Section 221113 - Piping Materials and Methods

1.2 SUMMARY

A. Section Includes:

1. Plate style heat exchangers.

1.3 SUBMITTALS

A. Product Data: Include catalog illustrations, model, rated capacities, performance, weights, dimensions, component sizes, rough-in requirements, piping details, materials of construction, accessories, operating and maintenance clearance requirements.

B. Provide the following additional information:

1. Pipe connection size and connection type.
2. When additional frame length is specified to allow for a future capacity increase, provide substantiating “future” performance data including quantity of plates and stack depth.

C. Installation, Operation and Maintenance Manuals

1.4 QUALITY ASSURANCE

A. Manufacturers and Products: The products and manufacturers specified in this Section establish the standard of quality for the Work. Subject to compliance with all requirements, provide specified products from the manufacturers named in Part 2.

B. Reference Standards: Products in this section shall be built, tested, and installed in compliance with the specified quality assurance standards, latest editions, unless noted otherwise.

1. ANSI/AHRI Standard 400 Liquid to Liquid Heat Exchangers

DESIGNER SHOULD UNHIDE THE BELOW TEXT IF THE APPLICATION WARRANTS A U-STAMP.

2. ANSI/ASME SEC VIII Div. 1 Boiler and Pressure Vessel Code with U-1 stamp.
3. ASHRAE 90.1 Energy Standard for Buildings Except Low Rise Residential Buildings
4. National Sanitation Foundation NSF/ANSI-61 (potable drinking water) and NSF-61 Annex G (listed as ≤ 0.25% weighted average lead content) (and/or NSF/ANSI-372) and Annex F.
5. U.S Safe Drinking Water Act.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Ship all components in weather-proof wrap for storage outdoors. Protect nozzle pipe openings with heavy plastic and other durable means to ensure cleanliness and prevent damage during shipping and storage. Maintain protection during installation.

1.6 WARRANTY

A. Provide a complete warranty for parts and labor for a minimum of one year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Alpha-Laval
2. Armstrong
3. Bell and Gossett
4. Mueller
5. Tranter

2.2 PLATE HEAT EXCHANGER

A. The heat exchanger shall consist of stainless steel heat transfer plates of corrugated/chevron design, steel end plates and frame, and a metal carrying bar that allows disassembly of the plates for cleaning and seal replacement without disconnecting piping or removing plates. Provide brazed plate type when indicated. Units shall be designed for a minimum 150 PSIG working pressure at 225°F.

B. Flow through the plates shall be single pass counter flow design.

C. Heat transfer plates shall be of type 304 or 316 stainless steel with a minimum thickness of 0.40 millimeter, or as required to meet pressure requirements.

D. Heat transfer plate ports shall be double gasketed to prevent cross contamination of hot and cold side fluids.

E. Gaskets shall be of a one piece design formulated from nitrile or peroxide cured EPDM rubber for operating temperatures below 180°F, and peroxide cured EPDM for applications above 180°F.

F. Heat transfer plates shall be grooved to accept the gaskets. The gaskets shall be held in place with gasket clips to minimize movement and to provide a seal. Glued gaskets are not acceptable.

INDICATE DOUBLE WALL UNITS ON THE SCHEDULE FOR POTABLE WATER APPLICATIONS.

G. Double wall units shall include an air space between adjoining heat transfer plates to allow for any leakage to exit to atmosphere and avoid cross contamination.

H. Heat exchangers used for domestic water service shall be of lead free construction and in compliance with NSF/ANSI-61 and NSF-61 Annex G (and/or NSF/ANSI-372) and Annex F, and the U.S. Safe Drinking Water Act.

I. Provide OSHA approved splash guard, enclosing exterior of heat transfer plates and gasketed surfaces, to prevent leaks from spraying.

J. Heat transfer plate carrying bar shall be of carbon steel with zinc chromate finish, aluminum, or stainless steel.

FOR FREE COOLING APPLICATIONS, SPECIFY THAT THE HEAT EXCHANGER FRAME LENGTH ALLOW PLATES TO BE ADDED IN THE FUTURE TO BOOST CAPACITY 25% BY UN-HIDING THE HIDDEN TEXT IN THE PARAGRAPH BELOW. CONSIDER IF YOUR APPLICATION WARRANTS SPECIFYING ROOM FOR MORE THAN A 25% CAPACITY INCREASE.

K. Fixed frame plates, frame, and movable pressure plates shall be corrosion resistant epoxy painted carbon steel. Provide zinc plated carbon steel or stainless steel bolting system (“tie-rods”) to compress plate pack. No special tools shall be required to assemble or disassemble the heat exchanger. Provide a frame length that will allow for additional plates to be added to provide a 25 percent increase in exchanger capacity at the scheduled inlet and outlet temperatures.

L. Connections 2.5 inches and smaller shall be alloy nozzles with NPT threaded ends meeting ASME B1.20.1. Connections 3 inches and larger shall be alloy nozzles with flanged ends meeting ASME B16.5 for steel and stainless-steel flanges, and meeting ASME B16.24 for copper and copper-alloy flanges (provide connections that match the connecting pipe material). Alternatively for connections 3” and above, provide studded ports that allow proper sealing to the same flange types specified for nozzles. Connections shall be integral to the frame or pressure plate; inlet and outlet connections shall be on the same side of the heat exchanger. Maximum velocity through nozzle or studded port shall be 25 feet per second at scheduled flow rates. The heat exchanger connections shall be labeled to indicate fluid type and flow direction.

DESIGNER SHOULD UNHIDE THE BELOW TEXT IF THE APPLICATION WARRANTS A U-STAMP.

M. Unit shall be designed, constructed, and tested in accordance with all applicable ASME Code Rules and shall have a manufacturer's data report for pressure vessels, form No. U-1. Form U-1 shall be furnished to the engineer for the owner upon request. An authorized inspector, holding a National Board commission, certifying that construction conforms to the latest ASME Code for pressure vessels must sign this form. The ASME "U" symbol shall be stamped on the heat exchanger. In addition, each unit shall be registered with the National Board of Boiler and Pressure Vessel Inspectors.

N. The plate heat exchanger shall be shipped to the site as a completely assembled unit.

O. Where indicated provide heat exchanger of alternate materials of construction as noted on schedule and drawings.

THE INSULATION JACKET SPECIFIED BELOW IS APPROPRIATE FOR THE OPERATING RANGE ANTICIPATED TO BE MOST TYPICAL FOR U-M APPLICATIONS (40°F-105°F, I.E. "FREE COOLING") AND TO MIMIC ASHRAE 90.1-2010 ENERGY CODE REQUIREMENTS. IF THE HX IS USED IN AN APPLICATION AT TEMP.S SIGNIFICANTLY HIGHER OR LOWER THAN THIS RANGE, REVISE ACCORDINGLY (FOR APPROPRIATE THICKNESS AND "C" VALUES, ASHRAE 90.1 PIPE INSULATION THICKNESS REQUIREMENTS MAY BE CONSULTED FOR GUIDANCE). IF CONDENSATION IS A CONCERN, DELETE THE BELOW AND REQUIRE FLEXIBLE CLOSED CELL INSULATION, E.G. ARMAFLEX.

2.3 HEAT EXCHANGER INSULATION JACKET

A. Heat exchanger shall include a 1" thick insulation blanket system with jacket designed specifically to fit the heat exchanger overall size and nozzle openings. The blanket shall cover both end plates, the entire plate pack (below the plate pack compression bolts) and any nozzle carrying fluid ≤ 60°F or ≥ 105°F. The blanket shall be removable by the use of Velcro® or wire tie fasteners. Insulation blanket shall have a maximum conductivity of 0.27 btu inch/h ft^2 °F. The jacket shall be PTFE Teflon impregnated fiberglass cloth.

2.4 SOURCE QUALITY CONTROL

A. The heat exchanger shall be pressure tested at the factory prior to shipment. Provide a report of the results of the pressure test, certified with a signature of an officer of the manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Prior to installation, store units protected from weather, dirt, water, construction debris, and physical damage. Nozzle ends must be sealed water tight at all times to prevent freezing damage. Support stored units at points as required by manufacturer.

B. Examine roughing-in for equipment support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting equipment performance, maintenance, and operations. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not lift heat exchanger by nozzle connections.

B. Install in strict compliance with manufacturer's installation instructions and Related Sections. Maintain manufacturer's recommended clearances for service and maintenance.

C. Support piping connecting to the heat exchanger fully independent of the heat exchanger connections.

D. Install isolation valves, pressure gauges and thermometers in piping at each nozzle connection. Install air vents in piping at each top nozzle connection and drains on the bottom connections.

E. Install insulation after all pressure testing is complete.

F. During system cleaning and flushing, protect the heat exchanger as described in Related Sections.

3.3 TEMPORARY SERVICE

A. Start units for temporary use only with the expressed written permission of the Project Manager and in compliance with the requirements of the Contract Documents.

B. Units shall not be put into temporary service prior to the entire chilled water and condenser water system being flushed and cleaned per Related Section, and after such flushing and cleaning is approved by the Commissioning Authority.

C. Prior to placement into temporary service perform manufacturer's pre-start protocols.

D. Commission equipment prior to putting into temporary service to the extent required by the Commissioning Authority. Re-perform all commissioning activities prior to Owner acceptance, even if previously commissioned to prepare for temporary service.

3.4 COMMISSIONING

A. Perform commissioning activities in accordance with Related Sections.

END OF SECTION 235719