

**SECTION 22 35 00
HEAT EXCHANGERS AND FILTER PACKAGE**

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section describes the requirements for heating hot water heat exchangers and filter package.

1.2 RELATED WORK:

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- D. Section 23 07 11, HVAC AND BOILER PLANT INSULATIONS: Heater Insulation.
- E. Section 23 12 13, HYDRONIC PIPING

1.3 SUBMITTALS:

- A. Submit manufacturer's literature and data pertaining to the water heat exchanger in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. A form U-1 or other documentation stating compliance with the ASME Boiler and Pressure Vessel code.

1.4 APPLICABLE PUBLICATIONS:

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

- A. American Society of Mechanical Engineers (ASME):
 - B1.20.1-06.....Pipe Threads, General Purpose
 - B16.5-09.....Pipe Flanges and Flanged Fittings, NPS ½ through NPS 24
 - Section IV-10.....Heating Boilers
 - Section VIII-10.....Pressure Vessels Division 1

1.5 AS-BUILT DOCUMENTATION

- A. The electronic documentation and copies of the Operations and Maintenance Manual, approved submittals, shop drawings, and other closeout documentation shall be prepared by a computer software program complying with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C 794d). The manufacturer or vendor of the software used to prepare the electronic documentation shall have a Voluntary Product Accessibility Template made available for review and included

as part of the Operations and Maintenance Manual or closeout documentation. All available accessibility functions listed in the Voluntary Accessibility Template shall be enabled in the prepared electronic files. As Adobe Acrobat is a common industry format for such documentation, following the document, "Creating Accessible Adobe PDF files, A Guide for Document Authors" that is maintained and made available by Adobe free of charge is recommended."

- B. Four (4) sets of manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- C. Four (4) sets of operation and maintenance data updated to include submittal review comments shall be inserted into a three ring binder. The operations and maintenance manual shall include troubleshooting techniques and procedures for emergency situations. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.

PART 2 - PRODUCTS

2.1 HEAT EXCHANGERS:

- A. Heat exchangers shall be designed, constructed, inspected and tested in accordance with the latest edition of the following codes and standards.
- B. Design, Fabrication and Inspection: Per ASME Boiler and Pressure Vessel Codes Section VIII, Div. 1.
- C. Materials: Per ASME Boiler and Pressure Vessel Code Section II and ASTM standards.
- D. Performance of Each Heat Exchanger:

Performance	Shell Side	Tube Side
Fluid Circulated	Steam	Heating Hot Water
Total Fluid Entering	6,000 lbs/hr	804 GPM
Temperature In	260 Deg. F	140 Deg. F
Temperature Out	Factory to determine	180 Deg. F
Maximum fluid pressure drop	Factory to determine	10 psi

- E. Each heat exchanger shall be constructed of steel tube sheet, minimum ¼" nominal thick of shell with end plate, minimum 18 gage of 90/10 copper/nickel (CuNi) tubes with removable tube bundle. The shell and tube sides shall be ASME rated and designed at 125 psi of design pressure at 375 Degree F. The tube side shall be factory tested at minimum 250 psi of test pressure. The shell side shall be factory tested at 1.5 times the design pressure.
- F. Shell insulation shall comply with ASHRAE 890.1 and suitable for operating temperature. The entire shell and nozzles shall be completely surrounded except connections and controls.
- G. Factory pressure test reports and ASME U-1 certifications shall be provided to the Contracting Officer's representative (COR) for review.

2.2 HEATING HOT WATER FILTER PACKAGE:

- A. Heating Hot Water Filter Package (100-WF5): The water filter package shall consist of single bag housing and at least 5 micron rated bag filter. It shall handle minimum 90 GPM of heating hot water. The filter housing shall be rated at 150 psi of design pressure at 300 Degree F and constructed of 304 stainless steel material. The housing shall be factory hydro-tested. The external surface of the housing shall be coated with chemical resistant coating. The housing lid shall have 3-bolt swing closure with 0.25-inch NPT vent port and Viton O-ring for lid seal. Three (3) drill in-place legs shall be factory welded to the housing. The housing shall include 2-inch side inlet and 90 Degree elbow bottom outlet with NPT connection type, two (2) of 0.25-inch NPT pressure ports and one (1) 0.75-inch NPT drain port. The bag filter material shall be monofilament mesh Nylon, 5 micron size, and rated at 250 Degree F.
- B. New isolation ball valves, drain ball valves, calibrated pressure gauges (0-100 psi range), circuit setter (0-200 GPM range), dielectric unions, piping, and fittings that are associated with the water filter package shall be provided.

PART 3 - EXECUTION

3.1 FACTORY LEAKAGE TEST:

- A. Before the shipment, the heat exchanger shall be factory tested at a hydrostatic pressure of 250 psi or above for tube side of heat exchanger. The shell side shall be factory tested at 1.5 times the design pressure.

B. Before the shipment, the water filter housing shall be factory tested at a hydrostatic pressure of 150 psi or above.

C. Any failed test shall be corrected and the heat exchanger or water filter housing shall be retested at no additional cost to the VA.

3.2 INSTALLATION:

A. The heat exchanger and filter package shall be installed and connected in accordance with manufacturer's written instructions.

3.3 PERFORMANCE TEST:

A. Ensure that the heating hot water supply to heating hot water pumps will have a minimum of 180°F water flow at all times. If necessary, make all correction to balance the return water system or reset the temperature transmitter to make the system comply with design requirements.

B. Ensure that the circuit setter at the discharge side of the water filter package is set at 90 GPM water flow.

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