

**TH-500VX Vacuflo Steam Fired Hydronic Water Heater Specification 2023**

General: Furnish horizontal shell and tube type steam fired building heat converters as complete factory packages ready for installation with the following:

Heat exchanger shall be ASME Code constructed and stamped in accordance with Section VIII Division I, for unfired pressure vessels rated for 150 psig @ 450°F tube side and 150 psig @ 400°F shell side. Shell construction shall be carbon steel with rear back entry non impingement for steam flow on to the 18 gauge seamless tubes, heavy welded steel tube sheet, and carbon steel channel head. Tube bundle and shell shall carry a 5 year guarantee against failure.

Heat exchanger shall be pre-insulated with 2” of Airglass insulation with a removable vinyl jacket covering.

Furnish with a complete inlet Segmented 300:1 turndown steam control valve assembly to control both steam pressure to 2 psig max in the shell and outlet water temperature simultaneously. The assembly shall include an inlet isolation valve, strainer, and ASME Code stamped steam separator with float and thermostatic steam drip trap for 98% dry saturated steam, and safety relief valve installed at the modulating control valve outlet. The modulating steam control valve shall have segmented V trim construction with a soft steam seat for dead tight Class VI shutoff and electronic 8 second actuator fail safe. If the inlet steam pressure exceeds 30 psig an additional steam safety shutdown valve will be installed at the inlet steam connection. Valves shall be completely electronic operated with 300:1 flow control turndown and noise level to 82 DBA maximum.

The electronic control valve shall control the outlet water temperature and the shell internal pressure so that outlet condensate is subcooled below 200F under all flow and operating conditions and the latent heat BTUs are 970 BTUs per lb or more for maximum energy efficiency.

A secondary high pressure steam electronic steam shut down valve will be fitted at the high pressure inlet side to close if the outlet water temperature were to reach 200F and alarm as high temperature to the EMS through the EC 1000 Bacnet Touchscreen Control Panel.

The EC1000 Controller shall provide a slow ramp timed startup of the heating systems at all times to avoid water hammer and thermal shock.

The system shall be furnished with a steam operated ASME Code stamped vacuum condensate return pump system piped complete with sight glass, stainless steel check valves, motive steam line with drip trap, strainer and isolation valve, exhaust line piped in equalization to the reservoir chamber with air vent and check valve complete. The condensate system shall remove condensate under all operating conditions. Inlet steam piping shall include isolation Inlet Steam valve which shall be a 150lb cast steel gate valve. All condensate piping shall be schedule 80 & welded at all points possible and shall be vacuum rated. To allow heater operation in the event of condensate pump failure the condensate reservoir shall be piped to Thermaflo JSA Condensate cooler with alarm sized to cool the total volume of condensate produced at rated capacity of the heater from 212F to 140F. Condensate pump outlet will be fitted with a JCM Condensate mixer to blend high temperature condensate from drip trap with the lower temperature condensate from the steam operated pump to prevent water hammer in condensate discharge line.

Furnish with an EC1000 Control Panel with UL Listed Digital Bacnet microprocessor temperature pressure controller with 7” touchscreen, electric controls and high temperature safety shutdown. Controller shall have a dual function that shall control outlet temperature from the tube side and pressure to vacuum on the shell side. Condensate discharge shall not flash under any flow condition. Controller shall have a high temperature and pressure alarm and shutdown, white power on lights, red alarm lights, and shall be mounted and factory wired to the unit. The controller shall accept a 0-10 V input signal or Bacnet signal from a building automation system to set outlet water temperature as required, and shall have remote enable/disable function.

Unit shall be Thermaflo Engineering Company model TH500VX or equal 2/23