

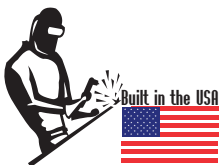
# Vacuflo Steam Fluid Heating System

**“Innovation from The Steam System Specialist”  
Since 1986**



**Manufacturing Steam & Fluid Specialty Products**

**[www.thermafloengineering.com](http://www.thermafloengineering.com)**

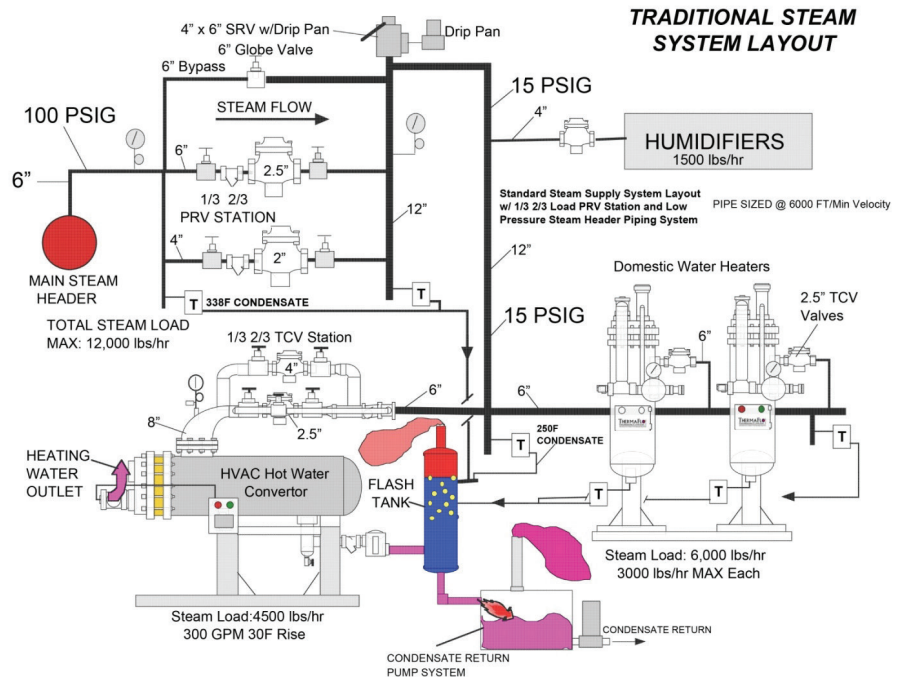


P.O. Box 70 Newberry, SC 29108  
Tel: 704.940.1228 • Fax: 704.940.1227

# Traditional Steam System

## “The Old Way”

- Steam pressure reducing stations (PRV's) cost thousands to install and take up large amounts of space in a mechanical room and often require noise diffusions.
- Flash tanks require roof penetrations and waste energy constantly.
- Central condensate return tanks and pumps are expensive to install and occupy large areas in mechanical rooms.
- Complex and expensive 1/3 & 2/3 temperature control valve stations that are large due to low inlet pressure and flow required.
- Very complex and time consuming piping install due to all of the above components to install and maintain.

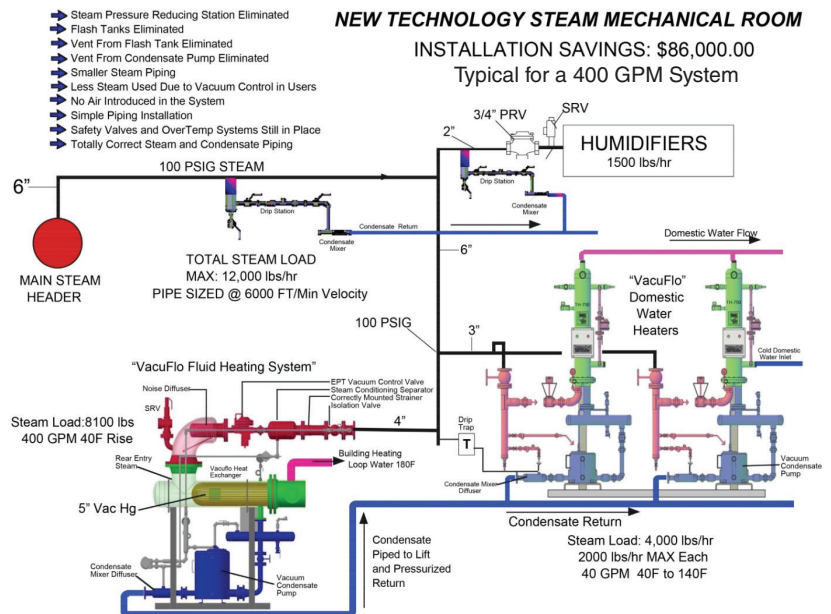


# Vacuflo System

## What is a Vacuflo System?

The Thermaflo “Vacuflo” is a unique fluid heating system that utilizes the higher latent heat BTU’s of vacuum steam to transfer energy, while saving up to 10% in steam energy usage and 30% on installation cost over conventional systems. Vacuflo systems can be used for building heating or domestic water heating.

- Eliminates the need for large pressure reducing stations and noise diffusers.
  - Eliminates the flash tank system and all roof penetration vents.
  - Eliminates the large central condensate return systems and reduces the floor space required.
  - Eliminates the large temperature control stations and future expensive maintenance.
- Simple to install complete package system with engineered components.



# Vacuflo Diagram

## HOW VACUFLO WORKS

### STAGE 2

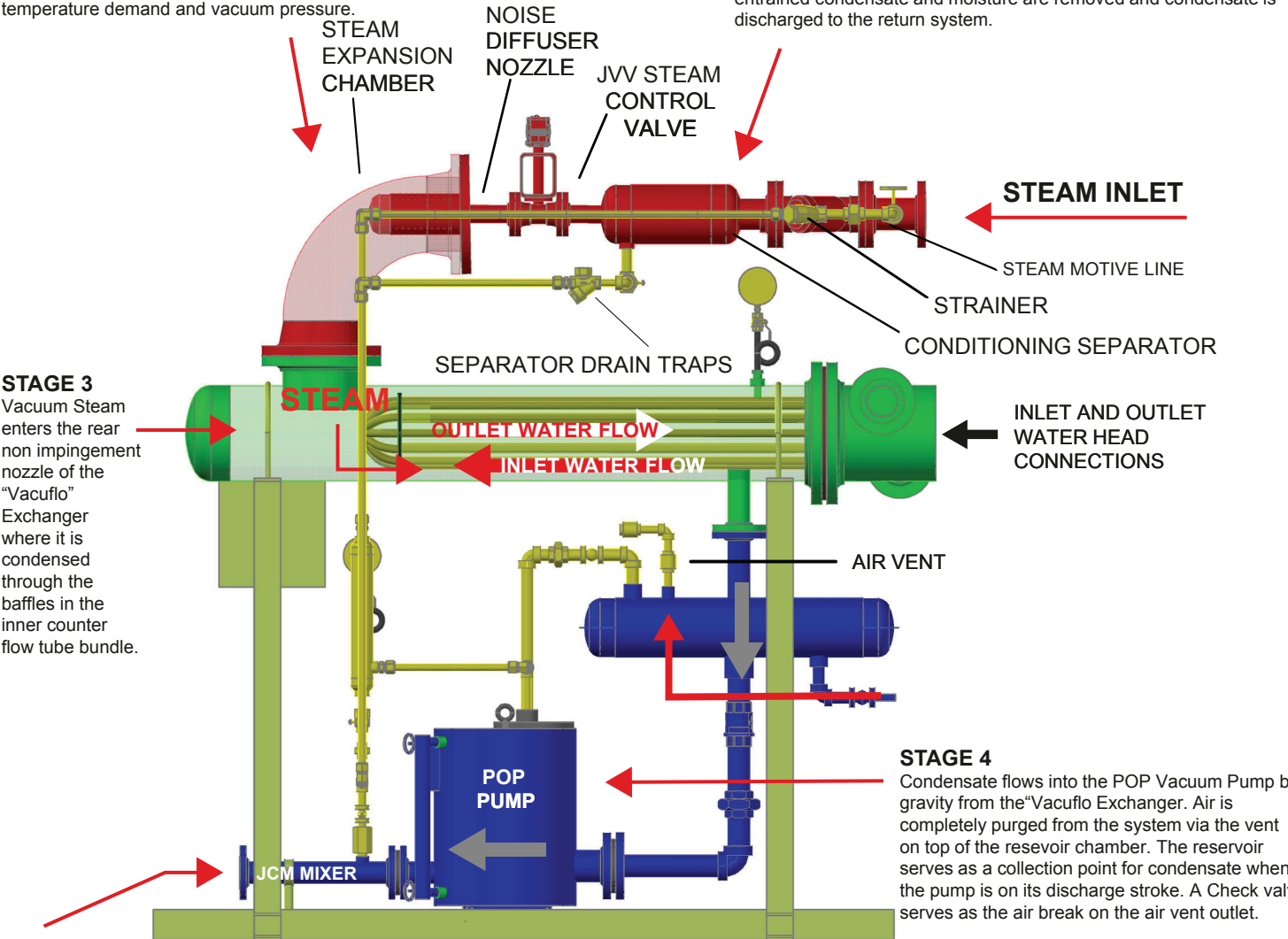
The conditioned steam flows through the BVV Steam Control Valve into the inlet diffuser nozzle.

The JVV Value controls the steam pressure into the shell using a unique vacuum pilot, and the outlet water (fluid) with the electronic pilot.

The steam flows through the small orifices in the diffuser reducing noise and velocity into the inlet expansion chamber where the vacuum steam state begins. The JVV Control Valve system senses the pressure in the expansion nozzle and precisely modulates the steam flow to meet temperature demand and vacuum pressure.

### STAGE 1

Steam enters the steam conditioning section where it passes through the inlet strainer and into the steam conditioning separator where all entrained condensate and moisture are removed and condensate is discharged to the return system.



### STAGE 3

Vacuum Steam enters the rear non impingement nozzle of the "Vacuflo" Exchanger where it is condensed through the baffles in the inner counter flow tube bundle.

### STAGE 4

Condensate flows into the POP Vacuum Pump by gravity from the "Vacuflo Exchanger. Air is completely purged from the system via the vent on top of the resevoir chamber. The reservoir serves as a collection point for condensate when the pump is on its discharge stroke. A Check valve serves as the air break on the air vent outlet.

### STAGE 5

All condensate from the higher pressure traps is piped to the JCM Condensate Mixer where it is condensed below flash before discharge eliminating thermal hammer.

NOTE: JCM Mixers eliminate flash steam hammer in the condensate system.

# Vacuflo Details

## Standard Auxiliary Items

- Steam Conditioning Station Standard
- Inlet Steam Separator with drip trap
- Steam Safety Relief Valve
- Vacuum Pressure Gauges
- RTD Electronic Sensors

## OPTIONS

BAC/NET, Lowworks and other interfaces  
Hydronic pumping systems  
Domestic water service units  
Double wall tube construction

## Vacuflo Exchanger

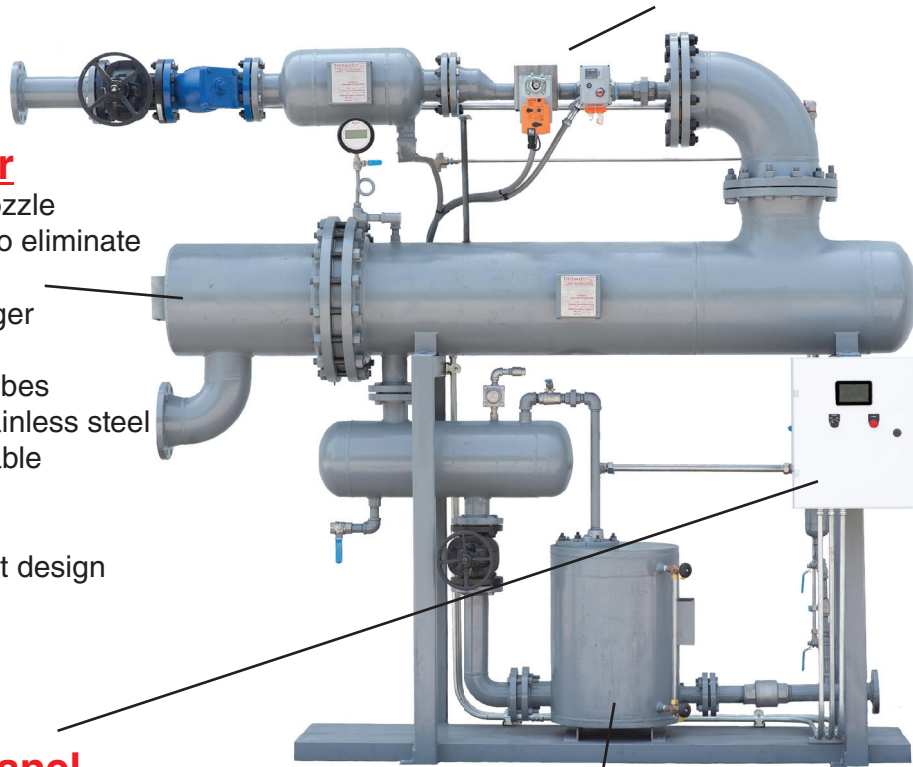
- Extended Shell Reverse Nozzle design, Rear Steam Entry to eliminate impingement on the tubes
- Vacuum rated heat exchanger
- Internal Inlet Noise Diffuser
- Heavy Seamless Copper tubes
- Copper Tubes standard, stainless steel & Cupro Nickel tubes available
- Only two gasket surfaces
- ASME Code stamped shell
- Proven U tube High Efficient design

## EC1000 Control Panel

- NEMA 4 UL 508 Constructed
- Electronic "Touchscreen" PID controller
- Controller High Temp Shutdown
- Building Management Interface
- BACNet Interface Standard

## JVV Control Valve

- Segmented V Steam Control Valve featuring 100:1 flow range eliminating 1/3 2/3 split range control valve stations, additional safety steam shutdown valve standard on all systems. Safety Valves installed as option.
- Controls outlet water temperature and vacuum pressure in the shell simultaneously
- Electronic high speed actuator fails closed and interfaces with energy management systems for temperature reset and remote on-off
- Accepts up to 150 psig inlet steam pressures



## Vacuum Pump

- 150psig ASME Code Body
- Stainless Steel single compression mechanism
- Specifically designed for vacuum steam service to avoid "Steam Locking"
- Complete with sight glass and stainless steel check valves

## Thermaflo Vacuflo Benefits

Manufactured to Industrial Standards to meet & exceed the demands of everyday hot water heating requirements.

Reduces total installation cost by 30% over a conventional system.

Reduces the amount of steam required to heat the water using vacuum steam and eliminates waste of atmospheric vented flash systems.

Provides accurate temperature control over a wide flow range using the EC 800 control Panel that offers an interface with BAS for remote monitor & alarms.

Vacuflo uses an Electronic control systems that totally eliminates pneumatic valves.

Provides a failsafe system with adjustable high temperature limit setting.

Provides a complete steam conditioning and condensate return system to reduce total maintenance for many years.

Reduces by 50% the total content of valves, fittings, connections and hardware in the system therefore reducing total maintenance and reduces ownership cost.

## Thermaflo Difference

Factory steam testing of the complete system, unlike other manufacturers who do not offer test on live steam.

Thermaflo holds the ASME “U” stamp certification and has a certified Hartford Quality Program for materials and welders.

Vacuflo is a complete “Tried and True” Design for many years of service.

Thermaflo controls the design & manufacture of each Vacuflo unit to provide highest quality components and long life.

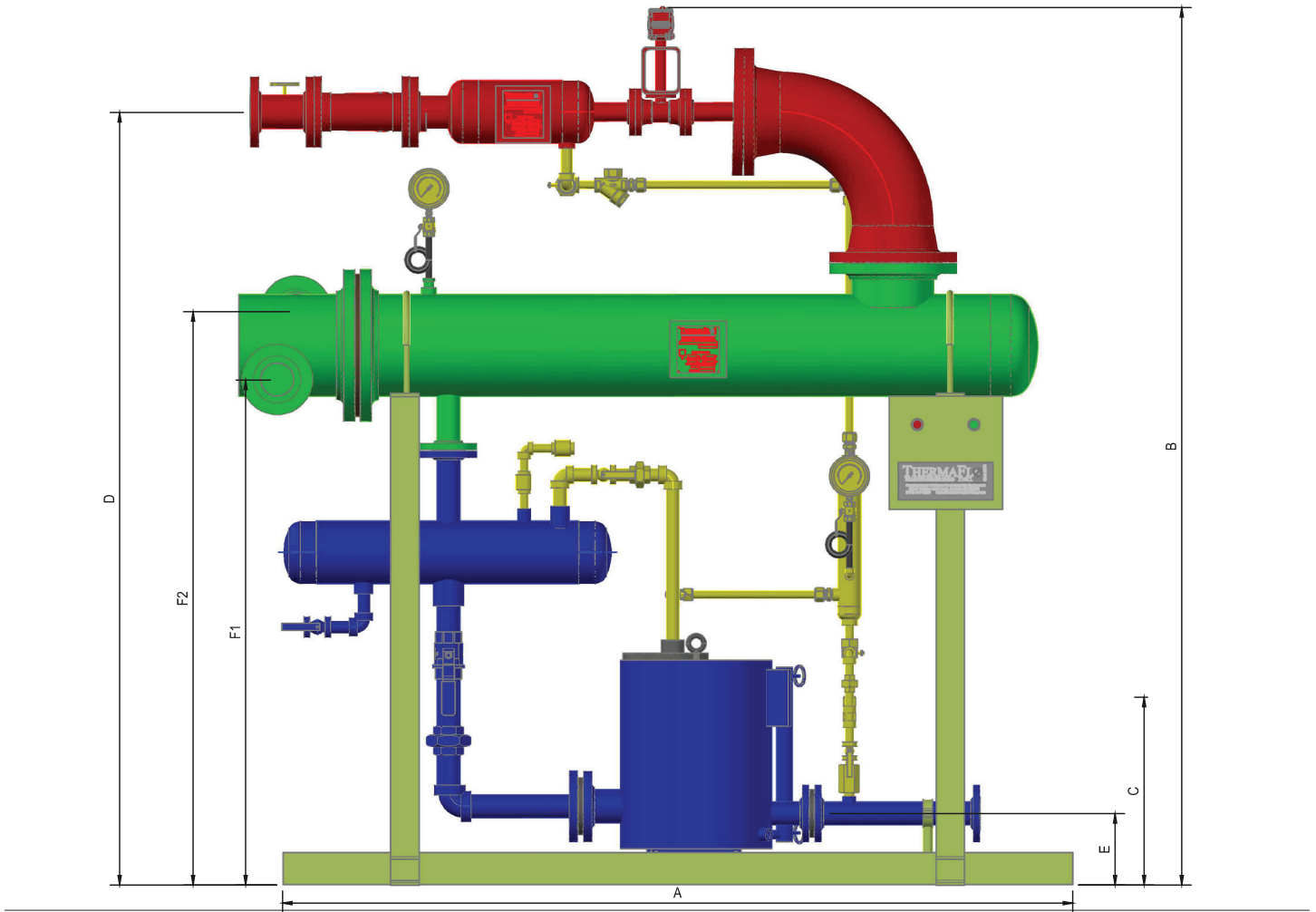
Over 35 years of steam experience.

## JVV V-Ball Control Valve



100:1 Rangeability • Fully Electronic

# Vacuflo Dimensions & Capacities



Dimensions	A	B	C	D	E	F	G
	Length	Height	Width	Steam Inlet	Cond Out	Water inlet	Tube Pull
TH500VX-805	97"	80"	24"	70"	7.75"	48"	48"
TH500VX-1005	106"	96"	24"	80"	7.75"	51"	48"
TH500VX-1205	106"	96"	24"	82"	7.75"	51"	48"
TH500VX-1405	126"	96"	24"	86"	7.75"	60"	60"
TH500VX-1605	132"	96"	36"	90"	7.75"	60"	60"
TH500VX-1805	138"	104"	36"	96"	7.75"	75"	60"
TH500VX-1806	138"	104"	36"	96"	7.75"	75"	72"
TH500VX-2006	144"	108"	36"	104"	7.75"	75"	72"

Connections Measured from Finished Floor.

Note: See sizing on chart on page 7

# Standard Vacuflo Packages

## VACUFLO FLUID HEATER SELECTION CHART

Saturated Steam Supply Pressure 15 - 150 psig.

Model #	Water			BTU Capacity MBh	Steam		Condensate ③= Outlet
	②= Inlet / Outlet	GPM	PD/psi		lbs/hr	①= Inlet	
TH500VX-805	3" NPT	150	1.1	2,205	2274	4" Flg	2" Flg
TH500VX-1005	3" NPT	200	0.7	2,940	3032	6" Flg	2" Flg
TH500VX-1205	4" FLG	300	0.7	4,411	4548	6" Flg	2" Flg
TH500VX-1405	6" Flg	400	0.8	5,881	6064	6" Flg	3" Flg
TH500VX-1605	6" Flg	500	1.2	7,351	7592	8" Flg	3" Flg
TH500VX-1805	6" Flg	600	0.6	8,822	9110	8" Flg	3" Flg
TH500VX-1806	6" Flg	800	1.1	11,763	12,104	10" Flg	4" Flg
TH500VX-2006	6" Flg	1000	1.1	14,703	15,130	10" Flg	4" Flg

Model #	30% Glycol / Water			BTU Capacity MBh	Steam		Condensate ③= Outlet
	②= Inlet / Outlet	GPM	PD/psi		lbs/hr	①= Inlet	
TH500VX-805	3" NPT	150	1.1	2,205	2274	4" Flg	2" Flg
TH500VX-1005	3" NPT	200	0.7	2,940	3032	6" Flg	2" Flg
TH500VX-1205	4" FLG	300	0.7	4,411	4548	6" Flg	2" Flg
TH500VX-1405	6" Flg	400	0.8	5,881	6064	6" Flg	3" Flg
TH500VX-1605	6" Flg	500	1.2	7,351	7592	8" Flg	3" Flg
TH500VX-1805	6" Flg	600	0.6	8,822	9110	8" Flg	3" Flg
TH500VX-1806	6" Flg	800	1.1	11,763	12,104	10" Flg	4" Flg
TH500VX-2006	6" Flg	1000	1.1	14,703	15,130	10" Flg	4" Flg

Select model based on GPM flow & BTU/hr less than max capacity listed.

Example: 2,646 MBH Load = 180 GPM EWT 150F - LWT 180F

Model TH500VX-1005 = 2,940 MBH > 2,645 & 180 GPM > 200 GPM

Note: Contact Thermaflo Engineering for thermal data sheet for your exact application.

## TH-500VX "Vacuflo" Steam Fired Converter Water Heater Specification

General: Furnish horizontal 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 @ 375°F tube side and full vacuum to 150 psig @ 375°F shell side. Shell construction shall be carbon steel with rear steam entry to completely avoid tube impingement upon entry, 18 gauge seamless copper tubes, steel tube sheet, and cast iron or fabricated steel head.

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

Furnish with a steam safety relief valve ASME Code stamped on the shell.

Furnish with a complete inlet steam control valve assembly to control both steam pressure to a vacuum in the shell and outlet water temperature simultaneously. The assembly shall include an inlet isolation valve, strainer, bypass with globe valve, and steam separator with steam drip trap.

The steam control valve shall have single seated balanced trim construction with a soft steam seat for dead tight Class VI shutoff. Valve shall be electric operated with 100:1 flow control turndown and noise level to 82 DBA maximum.

Furnish with a steam-operated vacuum rated condensate return pump, closed loop configuration with no vent to atmosphere, reservoir chamber, inlet and outlet check valves, inlet and outlet isolation valves, exhaust piping with air vent, and complete motive steam piping with steam accumulator & drip trap. 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 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 EC800 Control Panel with UL Listed Digital microprocessor temperature pressure controller with 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 1 psig on the shell side. Condensate discharge shall not flash under any flow condition. Controller shall have a high temperature 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 4-20 ma input signal from a building automation system to set outlet water temperature as required, and shall have remote enable/disable function. Controller also can take up to three run permissive inputs and will have R485, or Modbus communications capability.

Unit shall be Thermaflo Engineering Company model TH500VX or equal.

9/22/2017

Thermaflo Engineering Inc. was formed in 1986 to provide our customers with packaged steam system solutions.

Over 25 years of hands on field experience enables us to meet the customers needs with standard and custom equipment that is simple, yet reliable, yielding many years of fit and forget service. Our standard design Water Heaters, Clean Steam Generators, Deaerators, and Feed Water Systems can be shipped quickly, while incorporating exclusive unique features that make Thermaflo Engineering systems "SECOND TO NONE IN FIELD RELIABILITY."



All Products Proudly  
Built And Assembled  
In The United States.