Vacuflo Steam Fluid Heating System

“Innovation from The Steam System Specialist”
Since 1986

THERMA FLO

Built in the USA

Manufacturing Steam & Fluid Specialty Products

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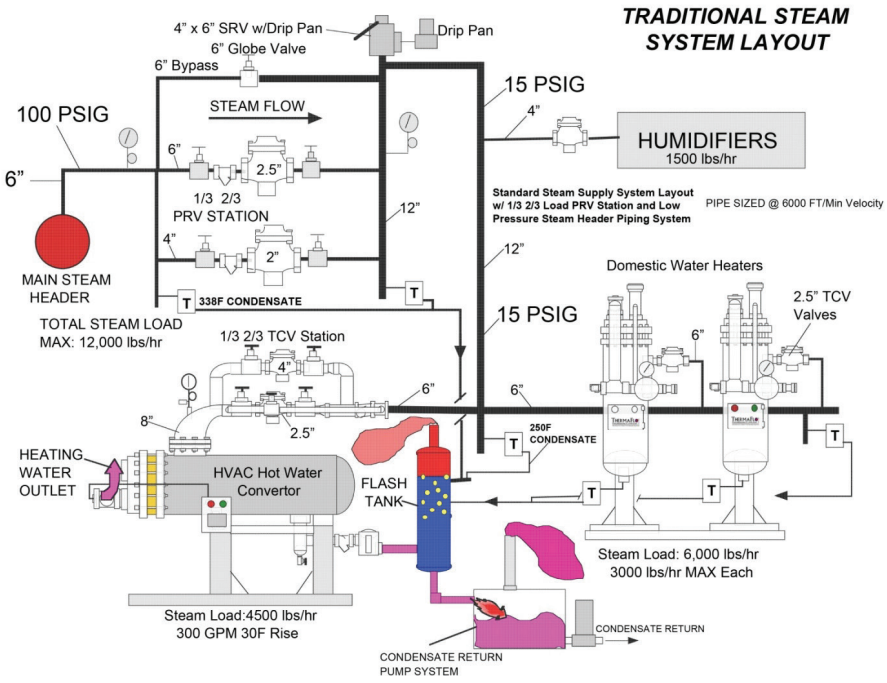
2025

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 diffusers.
- 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. Vent piping is also required for electrical pumps.
- 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.
- Vacuum Breakers are required that introduce air into the exchanger and causes internal shell, baffles, and tube corrosion.

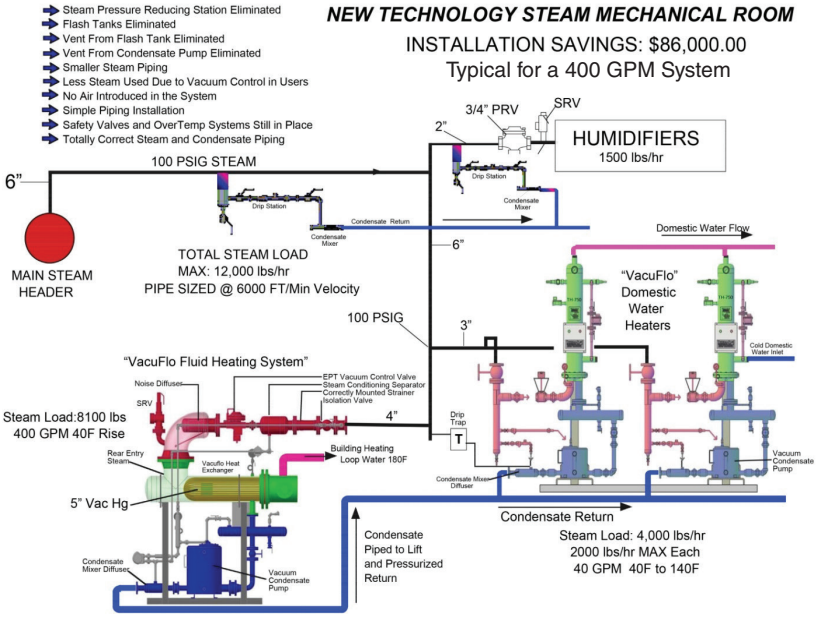


Vacuflo System

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, and a subcooling inner exchanger to save up to 18% in steam energy usage and 30% on installation cost over conventional systems. Vacuflo systems can be used for building heating or domestic water heating. Typical Yearly Energy Savings over a Convential 5,000,000 BTU System is $22,000.00 in Steam Cost at $15.00 per 1000 lbs generated plus $86,000.00 in install cost.

- Eliminates the need for large complex pressure reducing stations and noise diffusers. Unique steam diffuser produces 99% quality steam.
- Eliminates the flash tank system and all roof penetration vents and Flash Steam.
- Eliminates the large central condensate return systems and reduces the floor space required.
- Condensate is not subjected to air that turns corossive and destroys condensate piping.
- Eliminates the Large 1/3 2/3 TCV Valve Stations. Vacuum breakers and large isolation valves, strainers, and piping.
- Simple to install complete package system with engineered components. Saves the installer 30% over conventional systems.



Vacuflo Diagram

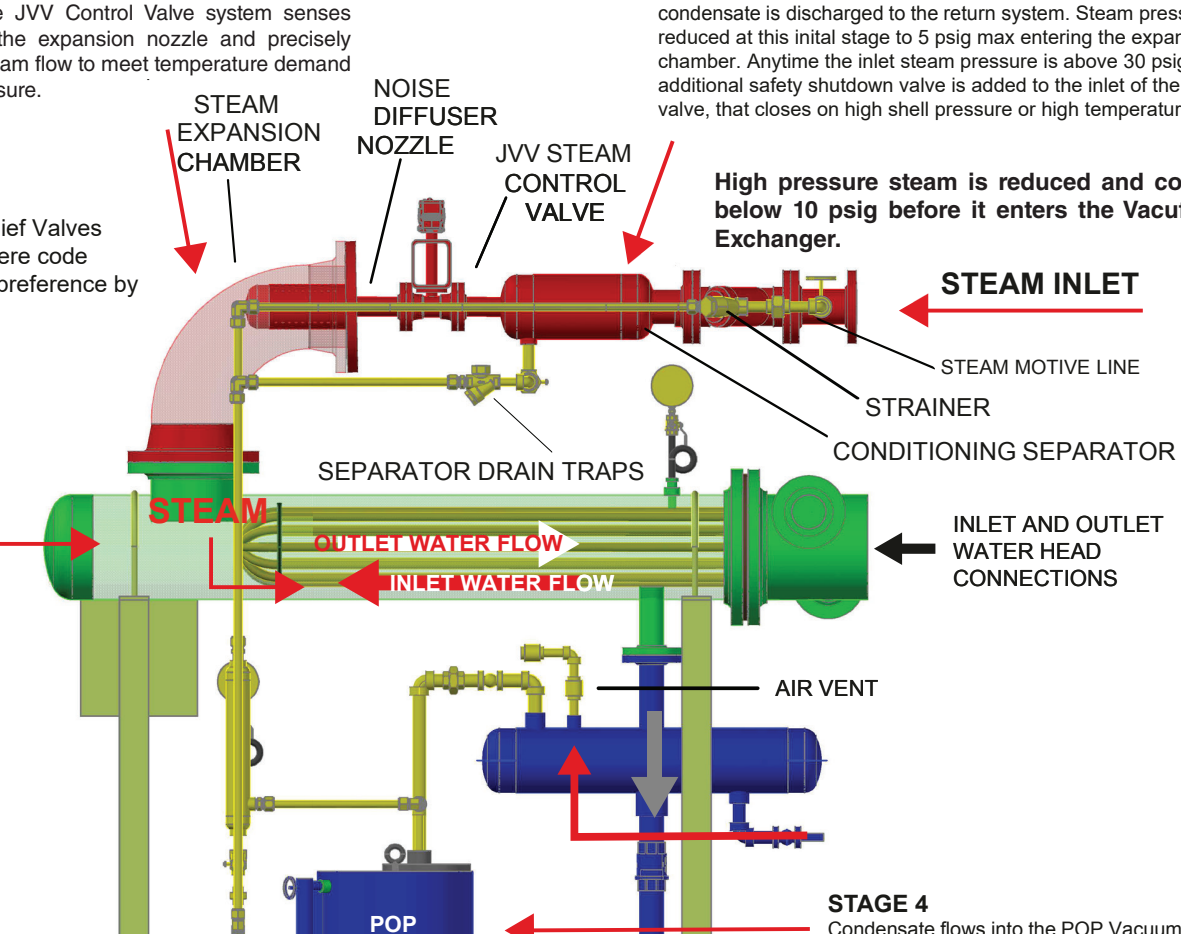
HOW VACUFLO WORKS

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. Steam pressure is reduced at this inital stage to 5 psig max entering the expansion chamber. Anytime the inlet steam pressure is above 30 psig an additional safety shutdown valve is added to the inlet of the JVV valve, that closes on high shell pressure or high temperature outlet.

STAGE 2

The conditioned steam flows through the JVV Steam Control Valve into the inlet diffuser nozzle this reduction produces 99% quality steam flowing into the shell The JVV Value controls the steam pressure into the shell using a unique vacuum sensor, and the outlet water (fluid) with the RTD. 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.

Steam Safety Relief Valves can be added where code requires or upon preference by user



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

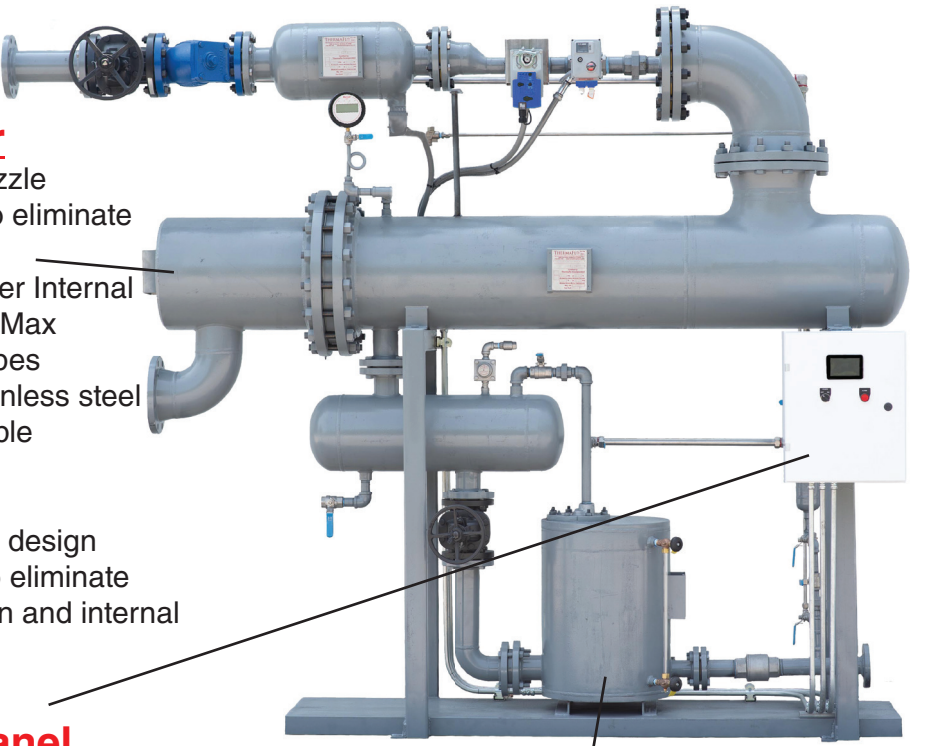
- Steam Conditioning Station Standard that produces 99% dry quality steam into the shell for higher BTU steam content
- Inlet Steam Separator with drip trap
- Vacuum Pressure Gauges
- RTD Electronic Sensors

OPTIONS

BAC/NET, Lowworks and other interfaces
Safety Relief Valve
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 81 DBA Max
- 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
- Heavy inner Teflon baffles to eliminate tube slitting due to expansion and internal corrosion



EC1000 Control Panel

- NEMA 1 UL 508 Constructed
- Electronic “Touchscreen” PID controller Controller High Temp
- Shutdown Building Management
- Building management Interface BACNet or Modbus option
- Slow Ramp Steam Startup to avoid thermal shock and water hammer NEMA 4 and 4X Available

JVV Control Valve

- Segmented V Steam Control Valve featuring 300:1 flow range eliminating 1/3 2/3 split range control valve stations, additional safety steam shutdown valve standard on all systems. Safety Valves or 1/3 2/3 valves installed as options.
- 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 200 PSIG Optional
- Stainless Steel single compression mechanism
- Specifically designed for vacuum steam service to avoid “Steam Locking”
- Complete with sight glass and stainless steel check valves
- 5 Year or 5 Million cycle warranty standard

Thermaflo Vacuflo Benefits

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

Reduces total installation cost by 40% 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 saving 18% steam usage when compared to traditional systems.

Provides accurate temperature control over a wide flow range using the EC 1000 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.

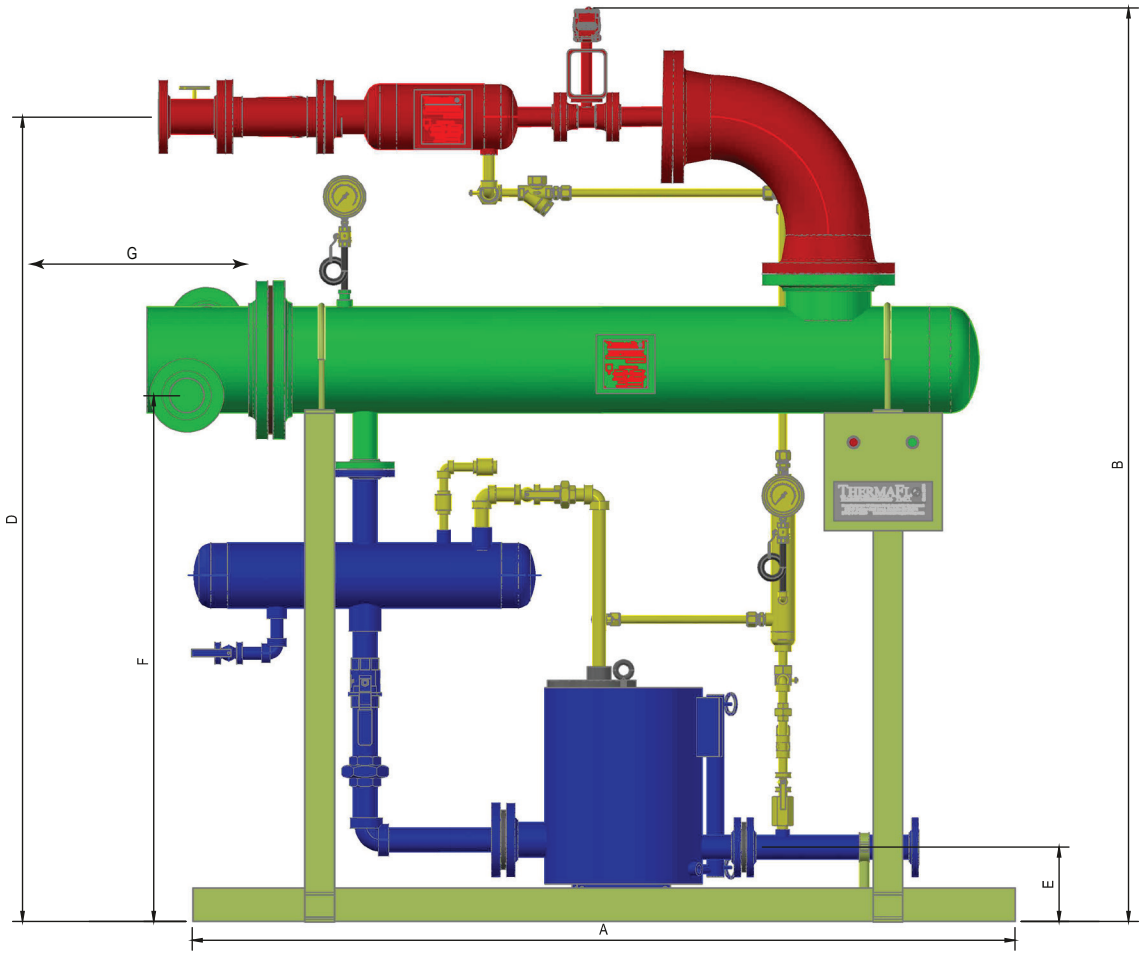
Over 50 years of steam experience.

5 Year Warranty Available

JVV Segmented V Control Valve

300:1 Rangeability • Fully Electronic

Vacuflo Dimensions & Capacities



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

Connections Measured from Finished Floor.

Note: See sizing on chart on page 7

Available with side inlet steam to reduce the overall height 18”

Standard Vacuflo Packages

VACUFLO FLUID HEATER SELECTION CHART

VACUFLO FLUID HEATER SELECTION CHART

Saturated Steam Supply Pressure 15 - 150 psig.

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

		WATER				BTU Capacity	Steam		Condensate
Model #		2= Inlet / Outlet	GPM	PD/ psi		MBh	lbs/ hr	1= Inlet	3 = Outlet
TH500VX-805		3" NPT	150	1.1		2,205	2,205	4" Flg	2" Flg

		Glycol Water				BTU Capacity	Steam		Condensate
Model #		②= Inlet / Outlet	GPM	PD/psi		MBh	lbs/hr	①= Inlet	③= Outlet
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

Note: Steam required and BTU outputs will vary with glycol. Please contact your Thermaflo representative for thermal data calculations when using glycol % and different fluids.

TH-500VX “Vacuflo”SteamFir ed Converter Water Heater Specification

General: Furnish horizontal type steam fi red 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 unfir ed 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 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 and vapor diffuser nozzle to produce 100% dry quality steam.
The steam control valve shall have dual seated segmented V trim construction with a soft steam seat for dead tight Class VI shutoff. Valve shall be electronic operated fail safe with 300:1 flow control turndown and noise level to 81 DBA maximum.

Furnish with a steam-operated vacuum rated ASME 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 EC1000 Bacnet Control Panel with UL Listed Digital Touchscreen temperature pressure controller with electronic 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 alarm and shutdown, white power on lights, alarm indicators and output, and shall be mounted and factory wired to the unit. The controller shall accept a BACNET 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 permissive inputs and will have BACNET or Modbus communications capability.

Unit shall be Thermaflo Engineering Company model TH500VX or equal. 9/23/2024

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

Over 50 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.“

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