THERMA FLO *Vacuflo Steam Fluid Heating System*

Details

Standard Auxiliary Items

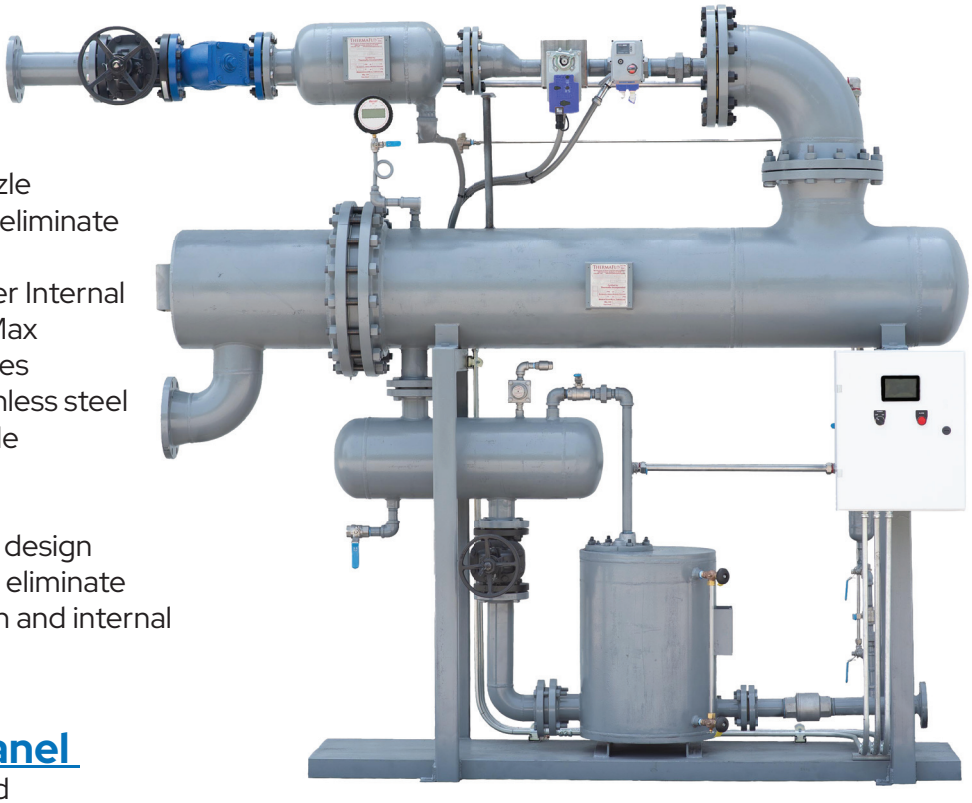
- Steam Conditioning Station Standard that produces 99% dry quality steam into the shell for higher BTU steam content
- Inlet Steam Separator with drip trap
- Vacuum Pressure Gauges
- RTD Electronic Sensors

OPTIONS

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

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



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

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

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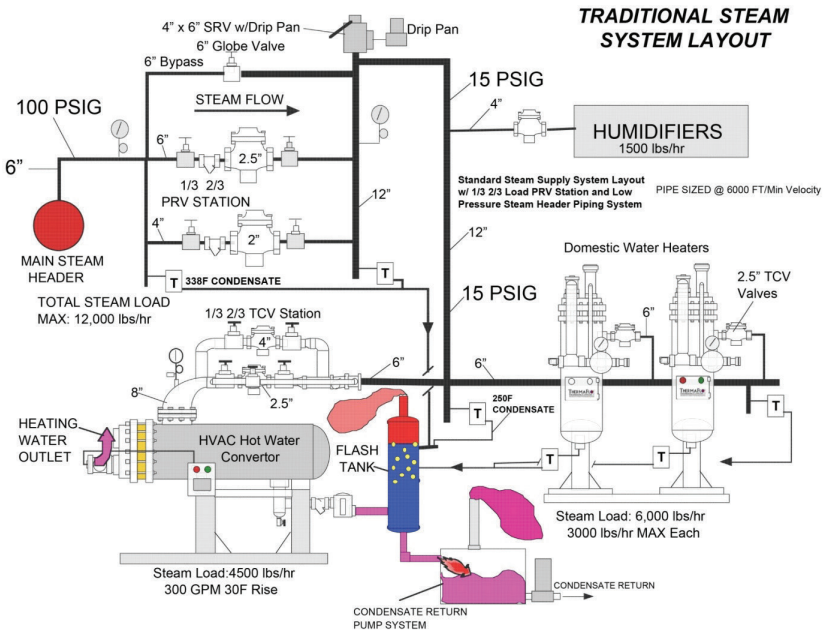
THERMA FLO Vacuflo Steam Fluid Heating System

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.

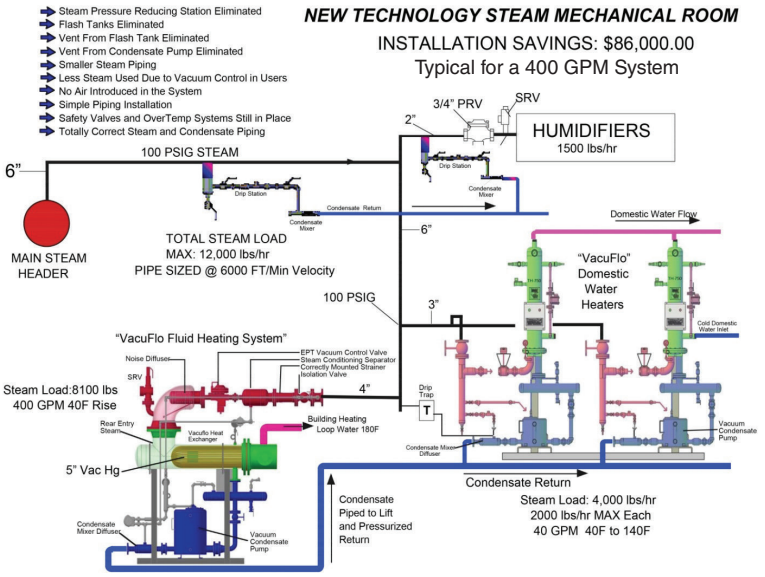


Vacuflo System

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.



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Vacuflo Diagram

How Vacuflo Works

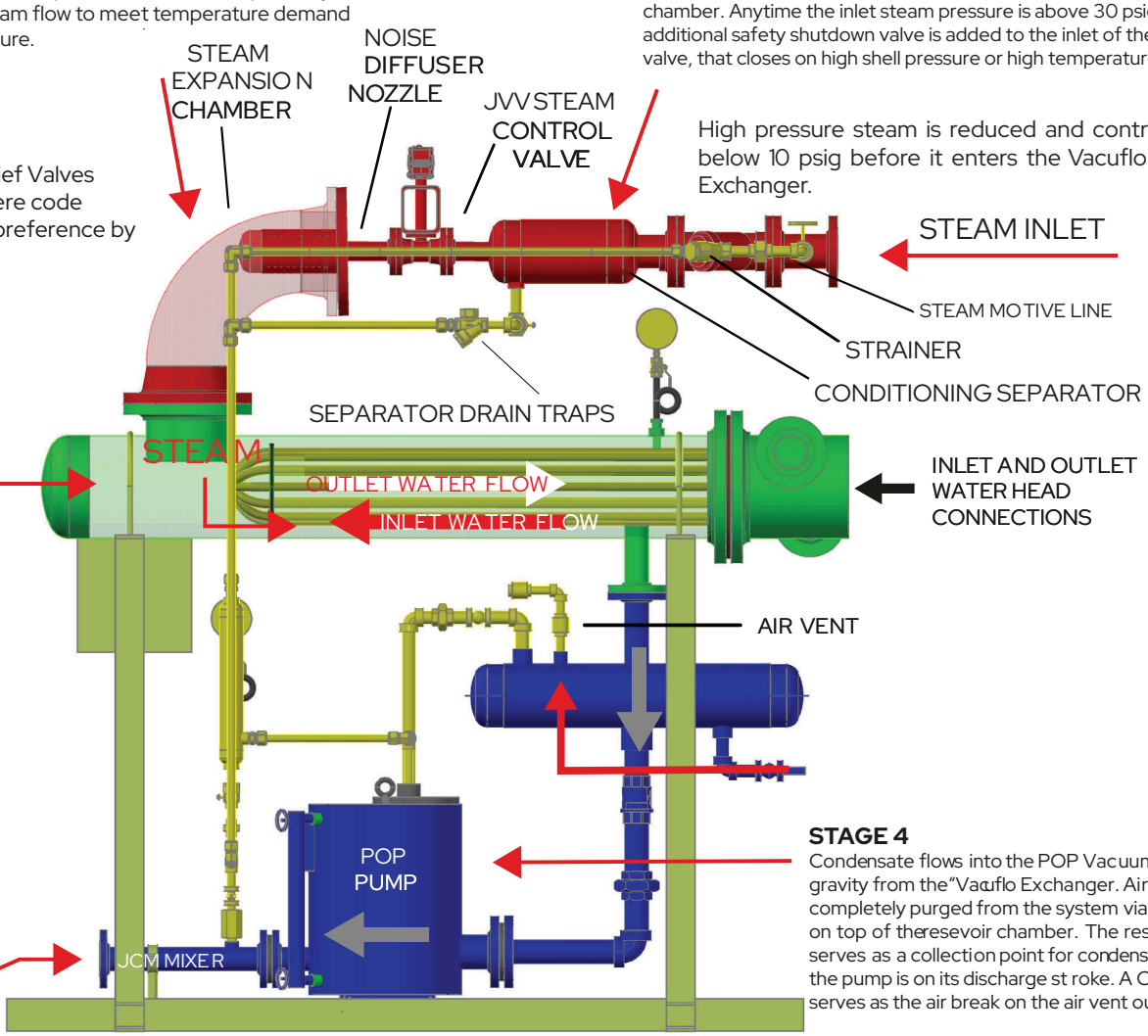
STAGE 1
Steam enters the steam conditioning section where it passes through the inlet strainer and into the steam conditioning separator where all entrain ed condensate and moisture are removed and condensate is discharged to the return system. Steam pressure is reduced at this inital stage to 5 psig max entering the expansi on 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 o utlet.

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.

High pressure steam is reduced and controlled below 10 psig before it enters the Vacuflo Heat Exchanger.

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 theresevoir chamber. The reservoir serves as a collection point for condensate when the pump is on its discharge st roke. 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.

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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

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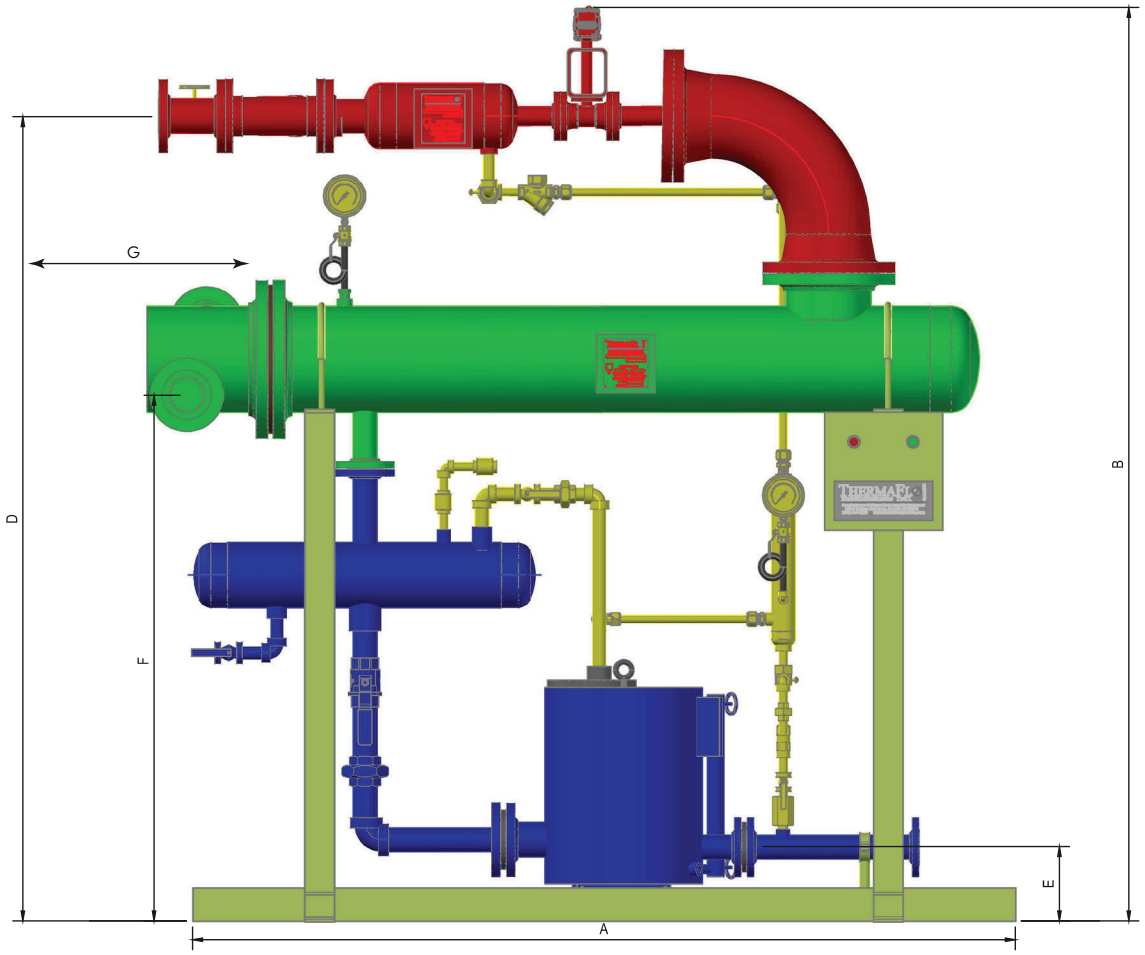
Vacuflo Dimensions & Capacities



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-1 005		106"	96"		80"	7.75"	51"	48"
TH500VX-1 205		106"	96"		82"	7.75"	51"	48"
TH500VX-1 405		126"	96"		86"	7.75"	60"	60"
TH500VX-1 605		132"	96"		90"	7.75"	60"	60"
TH500VX-1 805		138"	104"		96"	7.75"	75"	60"
TH500VX-1 806		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 6

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

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Standard Vacuflo Packages

VACUFLO FLUID HEATER SELECTION CHART

VACUFLO FLUID HEATER SELECTION CHART

Saturated Steam Supply Pressure 1 5 - 1 50 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-1 005		3" NPT	200	0.7	2,940	2,940	6" Flg	2" Flg
TH500VX-1 205		4" FLG	300	0.7	4,411	4,411	6" Flg	2" Flg
TH500VX-1 405		6" Flg	400	0.8	5,881	5,881	6" Flg	3" Flg
TH500VX-1 605		6" Flg	500	1.2	7,351	7,351	8" Flg	3" Flg
TH500VX-1 805		6" Flg	600	0.6	8,822	8,822	8" Flg	3" Flg
TH500VX-1 806		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-1 005		3" NPT	200	0.7	2,940	3032	6" Flg	2" Flg
TH500VX-1 205		4" FLG	300	0.7	4,411	4548	6" Flg	2" Flg
TH500VX-1 405		6" Flg	400	0.8	5,881	6064	6" Flg	3" Flg
TH500VX-1 605		6" Flg	500	1.2	7,351	7592	8" Flg	3" Flg
TH500VX-1 805		6" Flg	600	0.6	8,822	9110	8" Flg	3" Flg
TH500VX-1 806		6" Flg	800	1.1	11,763	12,104	0" 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.