EnviroSep
FLUID & HEAT RECOVERY SYSTEMS
A DIVISION OF TMT, INC.

Variable Flow Heat Transfer System

Model HTS-VF

The Model **HTS-VF**, Variable Flow Heat Transfer System is a UL-Listed, factory assembled and tested system used in building hydronic heating systems. The **HTS-VF** provides significant ***power savings*** by automatically controlling the speed of system pump(s) based on the actual building system demand. Typically, Differential Pressure Transmitters are placed across the building heating system zone loops. The transmitters signal to the **HTS-VF** System Controller which controls a ***Variable Frequency Drive*** for each pump to the appropriate speed. Additionally, the **HTS-VF** can be controlled by system load (BTU/hr) which utilize a flowmeter and RTD's; system pressure; or system temperature by customizing the controller to individual building requirements. The **HTS-VF** can be configured in any of the EnviroSep Heat Transfer System offerings:

A. **HTS**-Standard Heat Transfer System
B. **HTS-ITC** Heat Transfer System w/ Integrated Temperature Control
C. **HTS-NP** Negative Pressure Heat Transfer System
D. **HTS-HWB** Heat Transfer System w/ Hot Water Boiler

Consequently, when configured with the **HTS-NP**, the Variable Flow Heat Transfer System maximizes ***energy and power savings***. Hot water is supplied at a standard 180°F and is recirculated through the building system by use of VFD-controlled centrifugal pumps which are sized to meet specific building requirements. The Model **HTS-VF** includes a UL-listed System Controller with single-point power connection which is prewired to all electrical sources. ***Variable Frequency Drives*** may incorporate Manual or Automatic bypasses. Each system is custom-engineered and designed to meet specific requirements. All systems are UL-listed, fabricated and welded per ASME Section IX, and are Hydrostatically tested prior to shipment. The best feature of the **HTS-VF** is the ability to provide a ***cost reduction*** to building owners. Additionally, this fully integrated, ready-to-install system speeds installation and start-up of building hydronic heating systems which provide significant savings to contractors, engineers, and building owners.

CONDITIONS OF OPERATION

Max. Allowable Pressure:	125 psig / 8.6 bar
Max. Allowable Temperature:	240 ºF / 115.5 ºC

STANDARD CONSTRUCTION

- Structural Channel Base
- Carbon Steel Piping
- Operational Testing
- Pump Isolation Valves
- Hydrostatically Tested
- High Temperature Industrial Enamel Coating

Legend:

A. Base-mounted, End-suction Centrifugal Pumps
B. Shell and Tube , U-tube Heat Exchanger with Steam Trap (if applicable)
C. Isolation and Check Valves
D. Air Separator with Auto Air Vent
E. Expansion / Compression Tank
F. System Inlet / Outlet Thermometers
G. Pump Differential Pressure Gauge
H. UL-listed Electrical Control Panel
I. Make-up Water Assembly
J. Condensate Recovery System (if applicable)
K. Variable Frequency Drives & Controller

MODEL HTS-VF SAVINGS

Pump Speed (%)	Input Power (%)	Potential Savings ($ /yr.)
100	100	**$0**
90	73	**$4,329**
80	51	**$7,856**
70	34	**$10,581**
60	22	**$12,505**
50	13	**$13,948**
40	6	**$15,070**
30	3	**$15,551**

NOTES:

1. Savings are based on max. potential savings at max. pump capacity on 8600 hr./yr. of continuous operation.
2. Power costs at $0.10/kW-hr.
3. Savings assume continuous operation of one (1) 25 Hp Pump.
4. Savings based on approx. calculations.

c UL us Listed Industrial Control Panels

c UL us Listed Packaged Pumping Systems

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Model HTS-VF
Heat Transfer System Order Form

Form 00-HTS-VF

Specify the following parameters:

I. System Heat Load = _____ BTU/hr

II. System Differential Pressure Required = _____ psid

III. Steam Pressure (@ Heat Exch.) = _____ psig

IV. Return Temperature = 160 °F

V. Supply Temperature = 180 °F

VI. System Electrical = _____V _____ Hz

VII. System Volume = _____ Gal.

Note: Tube-side medium assumed to be water, unless otherwise specified.

SYSTEM OPTIONS

HTS – Standard Heat Transfer System

HTS-ITC – Heat Transfer System w/ Integrated Temperature Control

HTS-NP – Negative Pressure Heat Transfer System

HTS-HWB – Heat Transfer System w/ Hot Water Boiler

Pneumatic-operated Steam Control Valve
- Electronic Positioner
- Pneumatic Positioner

Stand-by Pump

Vertical In-line Pump

Split-coupled Vertical In-line Pump

Closed-coupled end-suction Centrifugal Pump

Auto standby pump start on lead pump failure

Auto Pump Alternation

Remote start connection of Constant Speed Pumps

Pump Suction Diffuser

System drain valves

Flexible Connectors

Vibration Isolation

Digital Temperature Controller with PID Loop and Thermocouple

Remote Temperature Control

1/3:2/3 Control Valve arrangement for Variable Loads

Control Valve Bypass and Isolation

Panel-mounted Differential Pressure Gauges

Pump Run-time Hour Meter

Outdoor-use Rating

Outdoor Cabinet

System Inlet/Outlet Isolation Valves

System Flow Switch

Differential Pressure Switch across Pump suction/discharge

Regardless of system size, temperature, pressure, fluid medium, or space requirements, **EnviroSep** can provide solutions to all specialized needs.

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Typical Specifications for HTS-VF

Furnish and install one **EnviroSep** Model HTS-VF- [A] - [B] - [C] - [D] Variable Flow Heat Transfer System with the system capacity to heat _____ BTU/hr from 160 °F to 180 °F when _____ psig steam is available at the Heat Exchanger.

KEY:
[A] = Model # (BTU/hr)
[B] = # of pumps (1,2,3,etc.)
[C] = Parallel (P) or Stand-by (S) pump designation
[D] = Manual (M) or Automatic (A) alternation for multiple pumps

GENERAL - This package shall be UL-listed and factory assembled with pump(s), Variable Frequency Drives, heat exchanger (if applicable), hydronic accessories, shell and tube heat exchanger, fabricated steel frame, interconnection piping(welded per ASME Section IX certified welders), UL-listed System Controller factory wired for single-point field connection per NEC.

PUMPS-Pump(s) shall be single, end-suction type with radically split, top center-line discharge, self-venting casing. Pump construction shall be cast iron, bronze fitted and shall be fitted with a long-life, product lubricated, drip tight mechanical seal, with O-ring seat retainer. Impeller shaft to be 416SS fitted with a SS shaft sleeve and be supported by two heavy duty ball bearings. The design shall allow back pull out servicing, enabling the complete rotating assembly to be removed without disturbing casing piping connections. The pump shall be mounted on a rigid, single base plate and by flexible with guard to the motor. Seal shall be rated for continuous duty at 270°F, motor shall be open drip proof, NEMA MG-1 with 1.15 service factor

VARIABLE FREQUENCY DRIVE – Variable Frequency Drive shall be variable torque AC inverter enclosed in NEMA 1 or 12 enclosure. Standard features shall include circuit breaker disconnect, Hand-Off-Auto selector switch, manual potentiometer (speed pot), door-mounted keypad, run relay contacts, fault relay contacts, and top/bottom conduit entry. Drive bypass shall be provided as standard with Drive-Off-Bypass selector switch. Class 20 overloads are included.

SYSTEM CONTROLLER – Controller shall include all controls necessary to operate the system as a stand-alone system. The PLC-based controller shall be of the same manufacturer as the Packaged Pumping System. Controller shall include Remote/Local system start capability. Acceptance of up to 16 remote 4-20 ma signals shall be provided for modulation of pump speed, and other optional control functions. Enclosure shall be NEMA 12 with thru-the-door disconnect. Operator Interface shall be a color touch screen type. Controller shall include independent PID control loop for each remote signal.

HEAT EXCHANGER - Heat exchanger shall be shell and tube type with removable tube bundle. Shell is carbon steel with cast iron heads and tube sheets. Tubes are ¾" OD copper. Unit is rated for 150 psig at 375 °F. Shell-side connections 4" and larger are 150 lb. ANSI flanges and all 3" and smaller are NPT connection. Unit shall carry U-1 form and have ASME stamp for 150 psig operation.

AIR REMOVAL EQUIPMENT- System shall include one tangential air separator with internal stainless steel collector tube. Connections to be flanged with a rating of 150 psig. System shall be equipped with ¾" Pressure Relief Valve, ¾" Pressure Regulating Valve, ASME Compression / Expansion Tank (sized by or provide system volume and temperature difference), and tank fitting, sight glass, and tank drain connections to tank.

TRIPLE DUTY VALVE- System shall include, on the discharge of each pump, a combination valve incorporating three functions in one body: tight shut-off, spring closure type silent non-slam check, and flow measured/throttling. Valve body shall be ductile icon with two ¼" NPT connections on each side of the valve seat. The valve disc shall be bronze plug disc type with high impact engineered resin seat to ensure tight shut-off and silent check valve operation. Valve stem shall be SS with flat surfaces provided for adjustment with open end wrench.

STEAM TRAP - Steam trap shall be of the mechanical ball float type with cast iron body, NPT connections, and all stainless steel internals. A stainless steel balanced pressure thermostatic air vent shall be incorporated into the trap body withstanding 45°F of superheat and resisting waterhammer without sustaining damage. Internals shall be serviceable without disturbing piping

STEAM-POWERED CONDENSATE PUMP - Pump shall be low profile, steam-powered, operated by steam up to 125 psig, not requiring any electrical energy, and safe for use in flammable atmospheres. Body construction shall be cast iron or fabricated steel. The pump shall contain a float operated snap-action mechanism with no external seals or packing, stainless steel trim, and hardened bearing components. Pump shall include stainless steel Inlet and Outlet check valves, and gauge glass.

MANUFACTURER - Shall assume system liability, and performance guarantee and warranty all equipment.

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