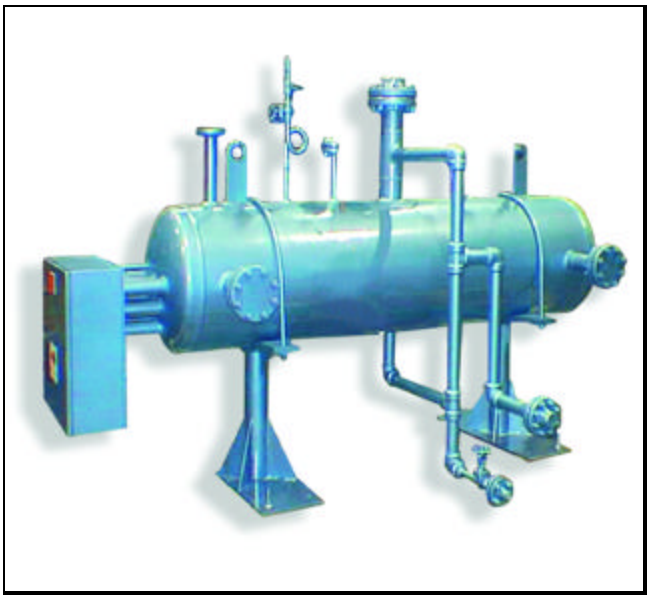
ELECTRIC VAPORIZERS

SPECIFICATIONS

- ASME code pressure vessel rated for 150 psig at 750°F
- Low watt density heaters
- 20 to 300 kW sizes available
- Horizontal vessel design
- Remote or integral control panel
- 208 to 600 volts



DESCRIPTION

Electrically operated organic fluid vaporizers are usually custom designed, but are also available as a “Pre-Engineered” packaged system, prewired, prepiped, insulated, pressure tested, and ready for installation. The most commonly used, vapor phase, organic heat transfer fluids are Dowtherm “A” from Dow Chemical and Therminol “VP-1” from Solutia. Both of these fluids allow process heating up to 750°F at a relatively low operating pressure. For example, a steam system 750°F would have an operating pressure well over 3200 psig, while Dowtherm A and VP-1 produce a vapor pressure of only 138 psig. The vaporizer consists of an ASME pressure vessel mounted safety devices and an integral control center.

FEATURES

- Long life, utilizing low watt density open coil heating elements
- Removable elements, no need to drain the system for replacement
- Provides high process temperature at relatively low pressures
- Less fluid required compared to a fluid system
- Better temperature uniformity compared to a fluid system
- Gravity return system, no pumping required

HEAT

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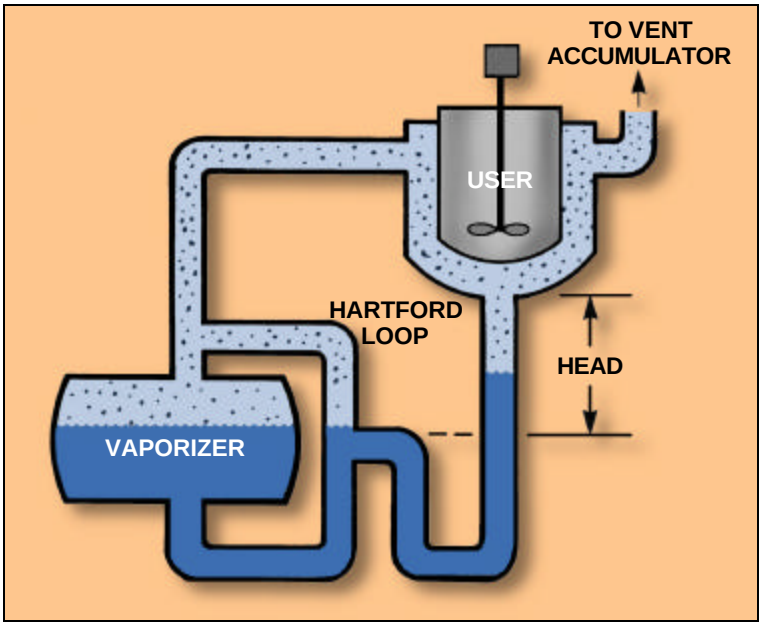
PRINCIPLES OF OPERATION

TYPICAL VAPOR SYSTEM OPERATION

Organic fluid vaporizer operation is very similar to that of a steam boiler. The organic media is boiled into a vapor within the heating chamber (vaporizer), and then travels to the user buy means of natural convection. The vapor then condenses on the transfer surface of the user and is gravity returned to the vaporizer as liquid condensate.



In a simple convection system, the user must be located sufficiently higher than the vaporizer to provide a hydrostatic head pressure somewhat greater than the total system pressure drop to allow for a gravity return of the condensate.

Because the condensate is returned to the vessel at a point which is below that of the heater elements, a Hartford Loop must be installed. The Hartford Loop prevents siphoning of fluid that would expose the heater elements. Fluid must be in contact with the heater surfaces at all times or overheating will occur and result in a rapid decomposition of the fluid media.

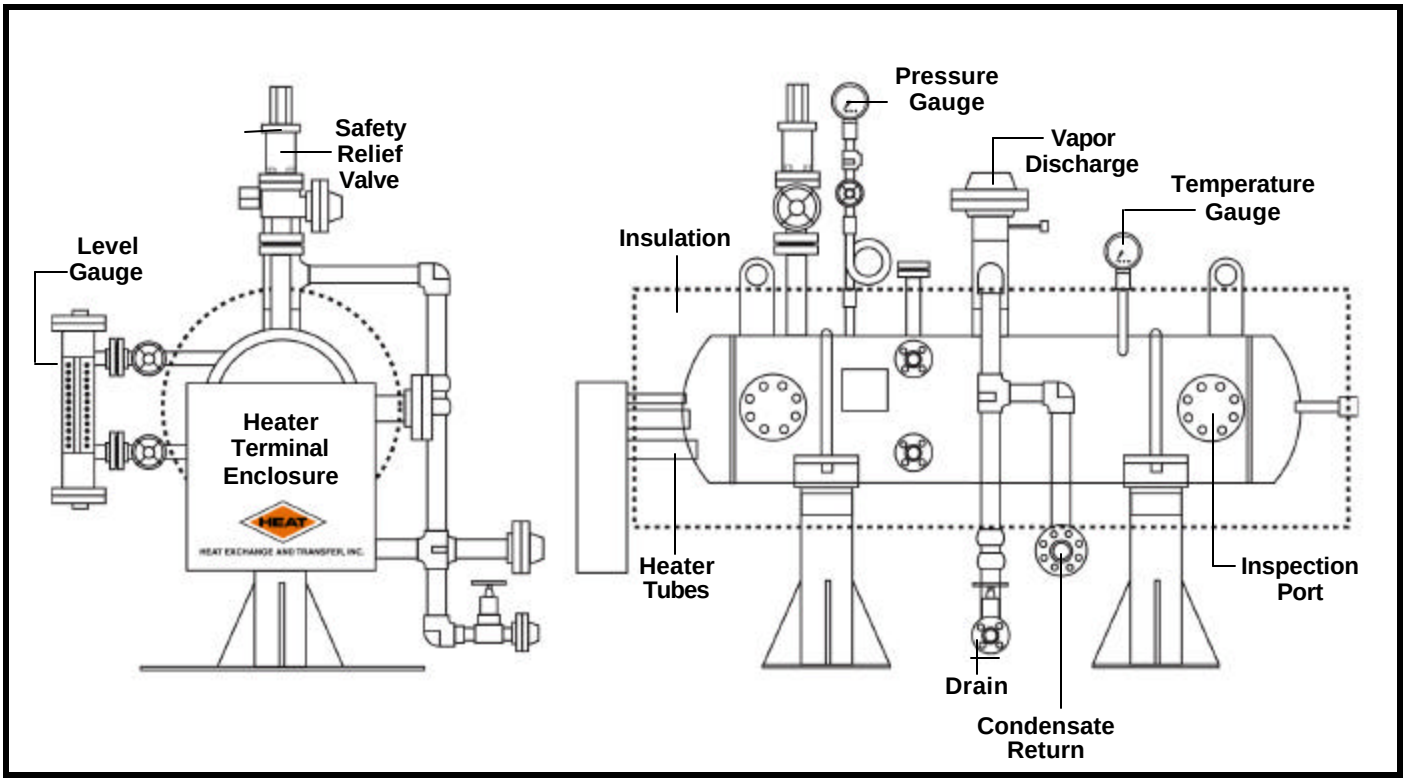
Under normal operating conditions, a vapor phase system will produce low boiling contaminants referred to as " non-condensibles." A Vent Accumulator must be incorporated into the piping system to allow for venting of these non-condensibles to avoid temperature control problems.

Accurate temperature control of electric vaporizers is best achieved by sensing the outlet vapor temperature and utilizing proportional heat input control with an SCR power controller. However, both pressure and temperature instrumentation should be installed for comparison of measured readings with published vapor pressure data on the fluid media.

APPLICATIONS

- PLATENS/MOLDS
- SPINERETTES
- CALENDER ROLLS
- PIPE LINE TRACING
- JACKETED VESSELS
- EXTRUDERS

PRINCIPLES OF OPERATION



VAPORIZER SHELL

The vaporizer vessel contains the condensed liquid organic heat transfer fluid as well as the heat source for vaporization of that fluid. All shells are designed, constructed, and stamped in accordance with the A.S.M.E. code and registered with the National Board of Boiler and Pressure Vessel Inspectors. Maximum temperature of 750°F and maximum working pressures of 150 PSIG are common design ratings, however others are available. After construction, the vaporizer is hydrostatically tested according to the ASME code. The vaporizer shell is coated with high temperature paint and fully insulated with 1200°F rated calcium silicate solid insulation

HEATING ELEMENTS

Flexible open coil heating elements are utilized in the vaporizer. The open coil heaters can be designed to produce from 1 to 12 watts per square inch of heat density depending upon design conditions. The open coil heater consists of nickel chromium resistance coils supported in high temperature ceramic insulators on a flexible stainless steel strap. Each element is housed in an individual 2” or 3” sch. 40 pipe well. A key feature of the open coil heater design is that the element may be inspected or replaced without draining the fluid media from the system (See bulletin OCH-05-04)

CONTROL CENTER

The power control center is usually mounted to the vessel, but can be furnished as a remote mounting unit if required. The control center is furnished as a complete unit, wired, tested, and ready for operation. Contents of the control center will vary depending upon which type of control mode is utilized. (See bulletin CC-05-04)

AUXILIARY EQUIPMENT

AUXILIARY SAFETY EQUIPMENT

The following list of safety equipment is required for safe operation of a vaporizer. This equipment is normally supplied and installed as part of the complete vaporizer package

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RELIEF VALVE

A safety relief valve, designed for organize vapor service and sized for the proper relieving capacity, must be installed on the system.

LEVEL GAUGE

A liquid level sight gauge should be installed.
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LEVEL CONTROL

Externally mounted, float type, level controls should be installed to detect high and low fluid level conditions.

OVER TEMPERATURE CONTROL

All vaporizers are equipped with over temperature thermocouple wells that are welded to heater tubes for use with an over temperature controller.

HARTFORD LOOP

All vaporizers are equipped with a Hartford Loop to prevent the fluid from being drawn out of the vaporizer through the condensate return line due to vapor lock at the user.

PRE-ENGINEERED MODELS

kW	BTU/Hr	Vessel Diameter	Vessel Volume	Overall Length	Model Numbers	
					240 V, 3 Phase	480V, 3 Phase
20	68,240	18"	86 Gal.	106"	OFV18-020-243	OFV18-020-483
30	102,360	18"	86 Gal.	106"	OFV18-030-243	OFV18-030-483
40	136,480	18"	86 Gal.	106"	OFV18-040-243	OFV18-040-483
50	157,000	18"	106 Gal.	124"	OFV18-050-243	OFV18-050-483
40	136,480	24"	157 Gal.	111"	OFV24-040-243	OFV24-040-483
50	157,000	24"	157 Gal.	111"	OFV24-050-243	OFV24-050-483
60	204,720	24"	157 Gal.	111"	OFV24-060-243	OFV24-060-483
75	235,500	24"	191 Gal.	129"	OFV24-075-243	OFV24-075-483
100	341,200	24"	250 Gal.	159"	OFV24-100-243	OFV24-100-483
100	341,200	30"	250 Gal.	111"	OFV30-100-243	OFV30-100-483
125	392,500	30"	306 Gal.	129"	OFV30-125-243	OFV30-125-483
150	511,800	30"	360 Gal.	147"	OFV30-150-243	OFV30-150-483
175	549,500	30"	414 Gal.	165"	OFV30-175-243	OFV30-175-483
200	682,400	30"	471 Gal.	183"	OFV30-200-243	OFV30-200-483
200	682,400	36"	581 Gal.	159"	OFV36-200-243	OFV36-200-483
250	853,000	36"	714 Gal.	189"	OFV36-250-243	OFV36-250-483
300	1,023,600	36"	845 Gal.	219"	OFV36-300-243	OFV36-300-483