GRAHAM HELIFLOW
VENT CONDENSERS

For • STORAGE TANKS
• DISTILLATION COLUMNS
• PROCESS REACTORS/REFLUXING
• VAPOR RECOVERY SYSTEMS

Minimize Air Contaminants
Recover Valuable Solvents
Cryogenic, Water or Brine Cooled
Counter Flow Maximizes Vapor Removal
Proven Design with Low Pressure Loss
Compact Design for Easy Installation
Accommodates Mounting of Conservation Vents and Flame Arresters
Wide Range of Metallurgies
Eighty Standard Sizes
GRAHAM HELFLOW®
Vent Condenser Design
Advantages

The unique Heliflow® counter flow heat exchanger, long noted for its spiral counter flow design, has now been adapted for storage tank vent condensing applications.

To prevent pressure build up or collapse under vacuum, liquid storage tanks are vented to the atmosphere. Loss of vapor from atmospheric storage tanks can, under some circumstances, be surprisingly large and costly.

As storage tanks are warmed by the sun during the day, liquid is vaporized and is vented to the atmosphere.

At night, vapor and liquid volume decrease and air is drawn in, only to be re-expelled together with its saturation vapor component during the next temperature rise.

A similar situation occurs when the tank is filled or drained, with vapor exiting during filling and air entering during drainage.

The loss of vapor during these episodes may or may not be a major cost factor, but increasing government environmental regulations require that even the escape of relatively small vapor quantities be limited.

Graham Corporation has developed several versions of its world famous Heliflow spiral counter flow heat exchanger, which can be readily installed in or on existing, as well as new, storage tanks.

These compact counter flow devices assure that the vented gases are stripped of saturation vapors by optimizing cooling as exiting gases are sub cooled by the "coldest" entering cooling medium.

The Heliflow's unique coil design allows it to operate under extremes of temperature and pressure. This ability to absorb thermal stresses proves ideal in vent condenser applications where cooling mediums of chilled thermal fluids, refrigerants and liquified gases can be utilized by sub zero cooling of process vent gases.

The unique Heliflow design forces the vapor around the long spiral path, counter flow to the coolant. Designs are available for vapor flow within the tubes as well as on the shell side. In all cases, the same spiral counter flow arrangement is utilized.

Even at low velocity, the vapors are caused to constantly change direction as they impact the spiral tube barrier, yet pressure drop is minimized because both tube and shell side are fed in parallel.

Unlike shell and tube exchangers, the Heliflow design has the thermal characteristics of a double pipe exchanger, yet provides equipment compactness. Since the flow path continuously turns, the Heliflow has the added advantage of the vapor not slipping along the tube but must constantly change direction and impinge on the tube surface, thus assuring contact and condensation, wringing moisture from exiting gases as they are cooled by the cold entering cooling medium.
Graham Heliflow® Vent Condensers available in a wide range of styles and areas 1 ft.² to 650 ft.²

<table>
<thead>
<tr>
<th>VCT</th>
<th>VCON</th>
<th>VCON/VCIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Side Condensing</td>
<td>External Mount on</td>
<td>with FLAME ARRESTER and/or</td>
</tr>
<tr>
<td></td>
<td>Existing Flange</td>
<td>CONSERVATION VENT</td>
</tr>
</tbody>
</table>

**VCT Tube Side Condensing**
When corrosive vapors require special metallurgy, the vapors can be condensed tube side, thus limiting special materials to the bundle only.

Vapors entering the bundle are contained within the manifold and parallel tubes. Entrance is adjacent to shell side coolant outlet. The vapors must follow the spiral tube path in counter flow to coolant, and exit adjacent to the shell side cooling inlet.

Condensed liquid drains down the exhaust manifold into the storage tank, or via piping to external receiver.

**VCON External Mount on Existing Flange**
If the existing flange on the storage tank is too small to accommodate the VCIN internal nozzle mount, this version can be utilized.

Vapors rising from the tank enter the bottom of the extended Heliflow casing. The bundle and base plate are identical to the VCIN design. Vapor flow is forced to follow the same horizontal spiral counter flow path, exiting the base plate adjacent to the coolant inlet manifold. Condensate drips off the bottom baffle and back into the storage tank though the flanged nozzle, or via drain piping to external receiver.

**Direct Mounting**
The compact design and unique orientation of the Heliflow VCON and VCN styles accommodates the direct mounting of a flame arrester and/or conservation vent on the vent condenser outlet connection. This feature eliminates extensive interconnecting piping and supports making installation simple and economical.
Graham provides vacuum and heat transfer equipment to the chemical, petrochemical, pharmaceutical, power and process industries – Our products include:

- Heliflow Heat Exchangers
- Desuperheaters
- Steam Jet Ejectors
- Plate Heat Exchangers
- Steam Surface Condensers
- Atmospheric Relief Valves
- Steam Vacuum Refrigeration Systems
- Liquid Ring Vacuum Pumps
- Micro Mix II Water Heaters

Graham Corporation
20 Florence Avenue
Batavia, NY 14020
585-343-2216 Fax: 585-343-1097

Bulletin VC94-2