Vent Condensers

FOR ASPHALT TANKS

presented by:
Used to capture asphalt vapor emissions and return them to the storage tank in liquid form.

CEI asphalt tanks with vent condensers at a hot mix asphalt plant in British Columbia.
Finned pipe provides plentiful surface area for heat to dissipate.
Asphalt vapors pass upward from the storage tank, into the vent condenser’s finned pipe.
Cooler ambient air circulates around the finned pipe, dissipating heat and cooling the asphalt vapors.
Asphalt vapors cool and return to liquid state, dropping back down into the storage tank.
CEI extreme-duty vent condensers reduce exhaust temperatures below ambient air temperatures.
Finned pipe provides plentiful surface area for heat to dissipate.
Asphalt vapors pass upward from the storage tank, into the vent condenser’s finned pipe.
The refrigeration unit cools ambient air to below-ambient temperatures, and circulates the cooled air around the finned pipe. Exhaust temperatures of well below 120° F are attainable.
Asphalt vapors cool and return to liquid state, dropping back down into the storage tank.
Vent Condensers remove asphalt fumes and visible “blue smoke” emissions from AC storage tanks.

Light ends that are present in asphalt have a tendency to vaporize when heated to elevated temperatures. Condensing the vapors back into a liquid form, through a heat exchanging process, ensures that the evaporated light ends do not escape into the atmosphere.

Vent condensers are effective, simple to maintain devices that are capable of capturing asphalt vapors and limiting emissions. Vent condensers are often used in combination with a common header to multiple tanks (or storage tanks. Normally, multiple tanks are connected through a single vent condenser system.

The simple design of a vent condenser results in a cost-effective way to remove fumes. Light ends that are present in liquid asphalt become vapors when heated to elevated temperatures. The required heat energy to condense vapors is provided by a condenser, which is typically made of stainless steel or another material that is resistant to corrosion. Heat exchange technology is a simple method of removing asphalt fumes from storage tanks.

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A typical system for blending SBS polymer includes a box-dumping hopper, two mixing tanks mounted on load cells, a grinding mill to reduce the pellets in size and hasten the dissolving process and a pair of holding tanks for diluting to the final desired concentration.

The process requires elevated AC temperatures and finite control over the ratio of asphalt cement to SBS on a weight basis. The control panel is PLC-based to simplify the operation. Due to the viscosity of the product, a large-diameter pumping system is desired to maintain production rates. Vertical tanks with mixers installed should be used for all polymer-handling applications.

An Auger is used to transport the SBS pellets from the hopper and into the mixing tank. Asphalt cement is metered into the mixing can until a concentration of 12–15% is achieved. The mixing can is mounted on load cells to obtain an accurate measurement of each constituent.

The mixer helps pull the pellets down into the liquid AC. This action “wets” the pellets and aids in dispersion prior to being circulated through the grinding mill at the bottom of the tank. The concentration level is maintained at a higher-than-use level to enhance the grinding efficiency.

The grinding mill shears the pellets into smaller pieces as they make multiple passes in a circulation loop. This speeds up the blending and dissolving process. The temperature of the mixture is normally 170 degrees C (340 degrees F) in the mixing tank.

Each batch of concentrate requires about 3 to 4 hours for processing. Therefore, it is normal to have two parallel mixing tanks in the process to increase the system’s production rate. The two-batch process also lends itself to higher quality control.

The grinding mill provides three functions. First of all, it reduces the size of the pellets. In the grinding process, it adds heat to the mixture. Finally, it is used as the transfer pump to empty the mixing can into the holding tank.

The holding tank, or use tank, is fitted with a mixer to ensure that the polymer stays suspended. Virgin asphalt cement is metered into the holding tank to obtain a final mixture concentration of 3 to 4 percent polymer by weight. The holding tank is maintained at 170 degrees C (340 degrees F) for 45 to 60 minutes prior to being ready for use.