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When Should a Surge/Transfer Pump System Be Used with a Deaerator?

A surge system, when used with a deaerator, acts as a buffer between the returning condensate and the deaerator tank. It also serves as a place to mix the condensate and make-up, prior to pumping to the deaerator.

Some points to consider when deciding whether to specify a surge/transfer system:

1. When using a pressurized deaerator, operating at 5 psig, gravity returns may not have enough static pressure to overcome the deaerator operating pressure and the drop across the spray valves. Approximately 10 psig is needed at the inlet to the deaerator tank to overcome these pressure drops. An atmospheric surge tank system can accept these returns and pump them to the deaerator.

2. A deaerator, like any mechanical device, operates best under steady state conditions. Installations that have a high rate of condensate return can overload the deaerator with water if multiple condensate pumps start simultaneously. The result is that the incoming condensate will be heated and deaerated, and then leave through the overflow to the drain, taking valuable BTUs with it! A surge system allows the condensate to be collected in a large tank, and fed to deaerator at a rate determined by the deaerator level control valve. If the surge tank does overflow, the loss is minimized due to the fact that no steam has been used to heat and deaerate this water.

3. Make-up water use is minimized by giving preference to condensate returns. The make-up valve on the surge system will open only during periods of low condensate return, when the surge tank reaches a low level.

4. The surge tank operates at atmospheric pressure, resulting in lower temperatures in the tank. This allows the tank to be mounted at a lower elevation above the transfer pumps, which facilitates the piping of low head return lines.

The surge system can be piped so that during deaerator shutdown and servicing, the boiler feed pumps can draw water from the surge tank. This minimizes plant downtime.
The percentage of condensate returns and the number of condensate pumps in the plant are the major factors in determining when a surge system is necessary. BFS can help you with a system evaluation, to determine whether a surge/transfer system is right for your application.