Tech Sheet #118
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Level Control

Deaerator level control:

The level control system on a deaerator is critical to the proper operation of the unit. The level control usually consists of a mechanism that measures the level in the storage tank and modulates a control valve to maintain the appropriate level in the storage tank. Deaerator inlet liquid flows can consist of a single stream with a control valve or multiple streams with more than one control valve. In either case, control valves should be sized for the actual flow conditions specified by the purchaser. If there are no flow conditions given, it is typical practice to size a single control valve for 100% of the flow required. It should be noted that gross over-sizing of control valves can lead to operational and performance problems. The level control system is available in various configurations:

Mechanical:

A mechanically controlled system consists of a level float mounted inside the storage tank or external to the storage tank in a separate chamber. The float is connected through linkage to a lever actuated control valve. As the level in the storage tank decreases, the float falls and the interconnecting linkage is used to open the control valve. When the water level is restored, the float rises and closes the control valve. A mechanical level control system is a basic method of level control.

Pneumatic:

A pneumatically controlled system consists of a displacer mounted inside the storage tank or external to the storage tank in a separate chamber. The displacer rises and falls with the level in the tank, and modulates an air output signal. This air signal is piped to the diaphragm of the level control valve. The air signal acts on the diaphragm with varying pressure, opening and closing the control valve. A pneumatic level control system provides an accurate method of level control.

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Electric:

An electric level control system typically consists of a float mounted external to the storage tank in a separate chamber. The float is connected within the device to a slide wire or potentiometer that will have a variable output electrical signal based on the float level. The output can be a variable 24 volt or a resistive (ohm) signal. The level control valve is opened and closed by an actuator motor that responds directly to the variable electric signal received from the level control device. An electric level control system provides an accurate method of level control.

Electronic:

An electronic level control system consists of a level transmitter mounted on the storage tank. The transmitter typically measures the differential pressure between the top of the tank (usually the tank operating pressure) and the bottom of the tank (the tank operating pressure plus the static pressure of the water level within the tank). The transmitter sends a variable electronic signal (usually 4-20 mA) to an electronic controller. The controller is a programmable device that interprets the input signal and sends an output control signal to the control valve. The control valve will have either an electric motor actuator that will receive the input signal and modulate the valve or a pneumatic actuator with an electronic to pneumatic signal converter mounted on the valve. In this case, the variable electronic signal is converted proportionately to a variable air signal that acts upon the diaphragm to modulate the valve. With this type of system it is important to clarify who is responsible for the controller portion. In many instances, the control is performed by the owners DCS, or plant control system, and the equipment supplier is responsible for the transmitter and control valve only. This issue should be coordinated between the supplier and the customer. An electronic level control system provides an accurate method of level control, and allows the user to change the range of control and the level set point through the controller without making any physical changes to the system.

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