Shippensburg Pump Company, Inc.

BOILER FEED • CONDENSATE • DEAERATOR • VACUUM

One Schwenk Drive
P.O. Box 279
Shippensburg, PA 17257-0279

Phone: 717-532-7321
Fax: 717-532-7704
www.shipcopumps.com

Supplemental Startup Guidelines For Spence Steam Regulator on *Pressurized* Deaerators.

Introduction:
The following startup guidelines are intended to supplement the Installation, Operation and Maintenance (IOM) Guidelines published by Spence. These guidelines attempt to offer a layman's perspective of how to startup the Spence steam regulator and assume the Spence steam regulator has been properly installed per IOM provided by Spence and the piping system has been flushed thoroughly to clear the pipes of welding beads, scale, etc…

The steam regulator consists of two components – a main valve (typically Models E or E2) on Shipco® pressurized deaerators and a pressure pilot (typically Model D5). The purpose of the pilot is to control the steam flow through the main valve by sensing the delivery pressure being provided into the preheat tube.

The Model E2 main valve is used on low-pressure applications (i.e., up to 15 psig steam pressure). The Model E main valve is used on high-pressure applications (i.e., 15 psig to 125 psig steam pressure).

If the deaerator is supplied with two steam regulators, the smaller steam regulator must be installed to the preheat tube located below the water line in the receiver. The primary purpose of the regulator below the water line is to ensure the water in the receiver stays at saturation temperature. The bottom regulator must have its sensing line run to the fitting provided on the preheater tube. The larger steam regulator must be installed to the preheat tube located either above the water line in the receiver or in the dome depending on the deaerator model. The primary purpose of the larger steam regulator is to scrub the makeup and/or returns entering the deaerator. The sensing line for the top regulator goes into the fitting on the receiver tank.

The installer can differentiate the regulators by examining the connection sizes on the main valve. The larger steam regulator has a larger input and output connections.

Startup and Setting Steam Valve and Pilot:

1. Shipco® deaerators may be fitted with one or two steam regulators depending on the system load. Therefore, when starting up a deaerator, begin by adjusting the steam regulator injecting steam to the preheat tube located below the water line. Refer to Shipco® piping diagram for where to locate steam regulator[s].
2. Before beginning to adjust the main valve (e.g., E or E2) and pilot (D5), ensure the water level is above the pre-heat tube located in the main storage tank.
3. Ensure the isolation valve feeding steam into the steam main valve is closed.

4. Release all tension of the *adjusting spring* on the pressure pilot by turning the *adjusting nuts* on top of the pilot counter clock-wise.
5. Open the isolation valve allowing steam into the steam regulator. At this point the main valve is closed preventing steam from entering the preheat tube.
6. Begin opening the main valve by compressing the *adjusting spring* in the pressure pilot, ensure the valve in the ¼" *sensing line* (also referred to "*control pipe*" in Spence IOM) is open. Otherwise, the pilot will not be able to sense the delivery pressure being feed into the preheat tube. Refer to Shipco® piping diagram for where to connect the sensing line to the deaerator.
7. Gradually compress *adjusting spring* in the pressure pilot by turning the *adjusting nuts* clockwise. Increasing the tension on the *adjusting spring* opens the main valve allowing steam to enter the preheat tube in the deaerator. It must be done slowly to minimize water hammer in the preheat tub. Otherwise, water hammer may occur damaging the preheat tube.

   Water hammer may occur in the preheat tube because initially there is water in the preheat tube. As the pressure increases in the preheat tube, the water in the preheat tube is forced out of the tube eliminating the potential for water hammer. Until the water is forced out of the preheat tube, the deaerator probably will make a lot of noise during startup.
8. Continue to compress the *adjusting spring* of the pressure pilot until the pressure gauge on the receiver reads 6 psig.
9. Once the pressure in the receiver reaches 6 psig, the steam regulator is adjusted properly.
10. If the deaerator is fitted with a second steam regulator, close the isolation valve to the steam regulator you just completed adjusting and repeat above steps to adjust the second steam regulator. Adjust the second steam regulator until the pressure gauge reads 5 psig.