
Steam System Best Practices

Document No. 2

Deaerator Venting

Why Venting Has To Be Accomplished

In a steam deaerator, steam serves as the scrubbing agent to reduce the partial pressures of the gases being removed. The phenomenon of gas removal from water through the use of scrubbing in a deaerator can be accomplished in several different ways.

With the scrubbing action occurring, the deaerator must vent the non-condensable gases into atmosphere. Therefore, the only acceptable steam venting from a steam system operation is the Deaerator venting of non-condensable gases with a very small percentage of steam. To accomplish this goal of venting non-condensable gases; the deaerator will vent a small percentage of steam.

With the high cost of steam today, the deaerator vent must be investigated to insure excessive venting of steam is not occurring. Our Steam Team has found steam losses that have exceeded **Bht 3,500,000.00** a year cause unnecessary Venting from the deaerator.



Deaerator Devices

Typically most manufacturers of deaerators provide a manual vent mechanism, which can be an orifice or manual valve with a small hole in the gate of the valve. The engineering design of the opening in the valve or orifice provides a means of continuous venting of gases with minimal steam during operation. These devices should be located at the highest point of the deaerator to eliminate the possibility of entrainment of non-condensable gas build up in the deaerator process.

Deaerator Startup

A manual valve provides the best means of evacuating large volumes of non condensable gases that either build up or are present at cold start up. The operation of the manual valve should be part of the deaerator (SOP's) Standard Operating Procedures. The manual valve is a simple device that evacuates a large volume of non condensable gases.

What is the Correct Venting of Steam

The rule of thumb in the deaerator industry is that the vent valve passes a maximum 1/10 of 1% of the deaerator capacity.

The exact vent rate can be calculated as follows:

$$\text{Vent Rate in lbs/hr} = 24.24 \times P_a \times D^2$$

Where:

P_a = Deaerator operating in PSIA (absolute)

D = Diameter (inches) of opening in the manual valve or orifice



The minimum loss of steam is a requirement in all plant operations and one area to insure no unnecessary loss is occurring is the deaerator operation.

Best Practices

1. Visual inspection of the vent from the deaerator operation
2. Check the venting mechanism for proper sizing
3. If unknown, consult with the deaerator manufacturer
4. Use a stainless steel needle valve instead of a gate valve for better performance