

Lockwood Deaeration

The primary function of a Lockwood Deaerator is to remove non-condensable gases (oxygen, carbon dioxide, and air) from boiler feedwater. The presence of undissolved oxygen in feedwater is a principal factor in corrosion of steam system components constructed of iron, steel, or brass. Carbon dioxide, besides being itself corrosive, will accelerate corrosion when combined with oxygen. Carbon dioxide in feedwater will also carry over into the steam and subsequently into the condensate, forming corrosive carbonic acid that will erode piping and heat transfer equipment. Air (non-condensable gases) is an insulator and will "plate out" on heat transfer surfaces as the steam condenses, greatly reducing heat transfer efficiency.

Lockwood spray-scrubber deaerators are designed to remove these non-condensable gases and reduce the oxygen content of the feedwater to not more than 0.005 cc/liter, and reduce the titratable free carbon dioxide to zero. As an added benefit, the feedwater from a Lockwood deaerator, being at saturation temperature, eliminates problems caused by cold water being injected into a boiler such as thermal shock and an unstable water level created by collapsing steam bubbles.

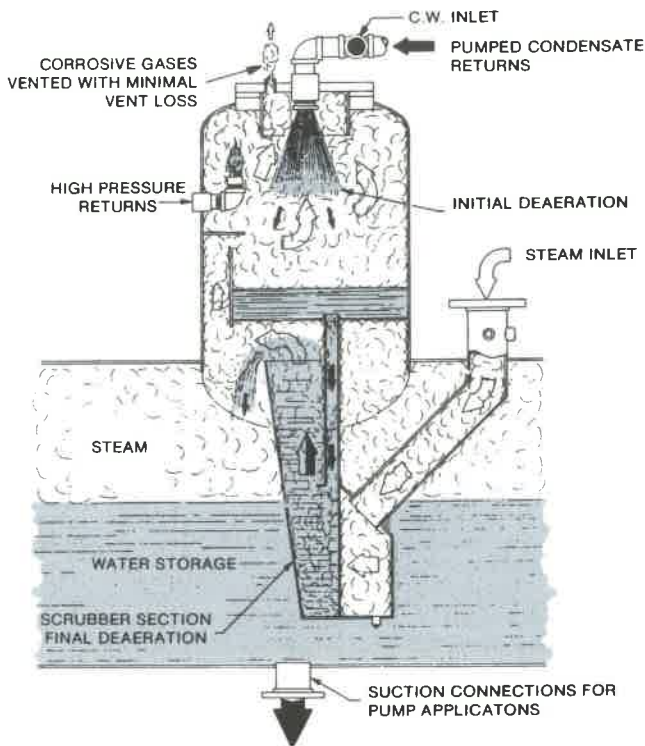
Oxygen, carbon dioxide and air are costly elements which must be eliminated to preserve boilers, piping, and heat transfer equipment. Oxygen scavenging chemicals are somewhat effective in reducing oxygen content, but are of little value in removing carbon dioxide and other non-condensable gases. Mechanical deaeration is the best and most economical method of accomplishing these tasks.

Operation

Incoming cold or tempered water first enters into the internal direct contact vent condenser of the vertical heater compartment, where stainless steel spray valve(s) direct the flow of water in conical sheets into a steam atmosphere. (Tempered water is a mixture of pumped condensate and cold water make-up.)

In the internal direct contact vent condenser most of the corrosive gases are removed before the water strikes any steel surfaces and is expelled from the deaerator through a stainless steel vent pipe with a restricted orifice to the outside.

The hot deaerated water then passes into the steam scrubber section where remaining traces of undissolved gases are released as the water is vigorously scrubbed with a large excess of steam containing no free oxygen.



It is important for the surface tension of the water to be broken down so that the gas bubbles formed by heating the water can escape.