**DEAERATOR**

**General**

Dissolved oxygen and carbon dioxide in the Boiler Feed Water of industrial steam generators that are used in electricity plants and incineration plants, causes the corrosion of the Boiler Feed Water Container, which significantly affects the durability of pipes and all the equipment. To eliminate the dissolved oxygen and carbon dioxide, installing a deaerator is essential. This deaerator can also preheat the Boiler Feed Water up to the necessary temperature as a Feed Water Heater, which helps increase the efficiency of the equipment.

**Classification by Shape**

Generally, the Deaerator is divided into two parts: the top, deaerating Heater for degassing, and the bottom, Storage Section. Due to their different shapes, the deaerating Heater is classified into Vertical deaerator type, and Horizontal deaerator type.

- **Vertical deaerator with horizontal storage tank**
  - Applicable to small and medium capacity up to 220 ton/hr

- **Horizontal deaerator with horizontal storage tank**
  - Applicable to large capacity over 220 ton/hr

**Principle of deaerating**

The removal of dissolved gases from boiler feedwater is an essential process in a steam system. The presence of dissolved oxygen in feedwater causes rapid localized corrosion in boiler tubes. Carbon dioxide will dissolve in water, resulting in low pH levels and the production of corrosive carbonic acid. Low pH levels in feedwater cause severe acid attack throughout the boiler system. While dissolved gases and low pH levels in the feedwater can be controlled or removed by the addition of chemicals, it is more economical and thermally efficient to remove these gases mechanically. This mechanical process is known as deaeration and will increase the life of a steam system dramatically.

Deaeration is based on two scientific principles. The first principle can be described by Henry’s Law. Henry’s Law asserts that gas solubility in a solution decreases as the gas partial pressure above the solution decreases. The second scientific principle that governs deaeration is the relationship between gas solubility and temperature. Briefly explained, gas solubility in a solution decreases as the temperature of the solution rises and approaches saturation temperature. A deaerator utilizes both of these natural processes to remove dissolved oxygen, carbon dioxide, and other non-condensible gases from boiler feedwater.

The feedwater is sprayed in thin films into a steam atmosphere allowing it to become quickly heated to saturation. Spraying feedwater in thin films increases the surface area of the liquid in contact with the steam, which results in more rapid oxygen removal and lower gas concentrations. This process reduces the solubility of all dissolved gases and removes them from the feedwater. The liberated gases are then vented from the deaerator.

The system reduces dissolved oxygen concentration to less than 0.005 cc/liter (7 ppb) and completely eliminates the carbon dioxide concentration.