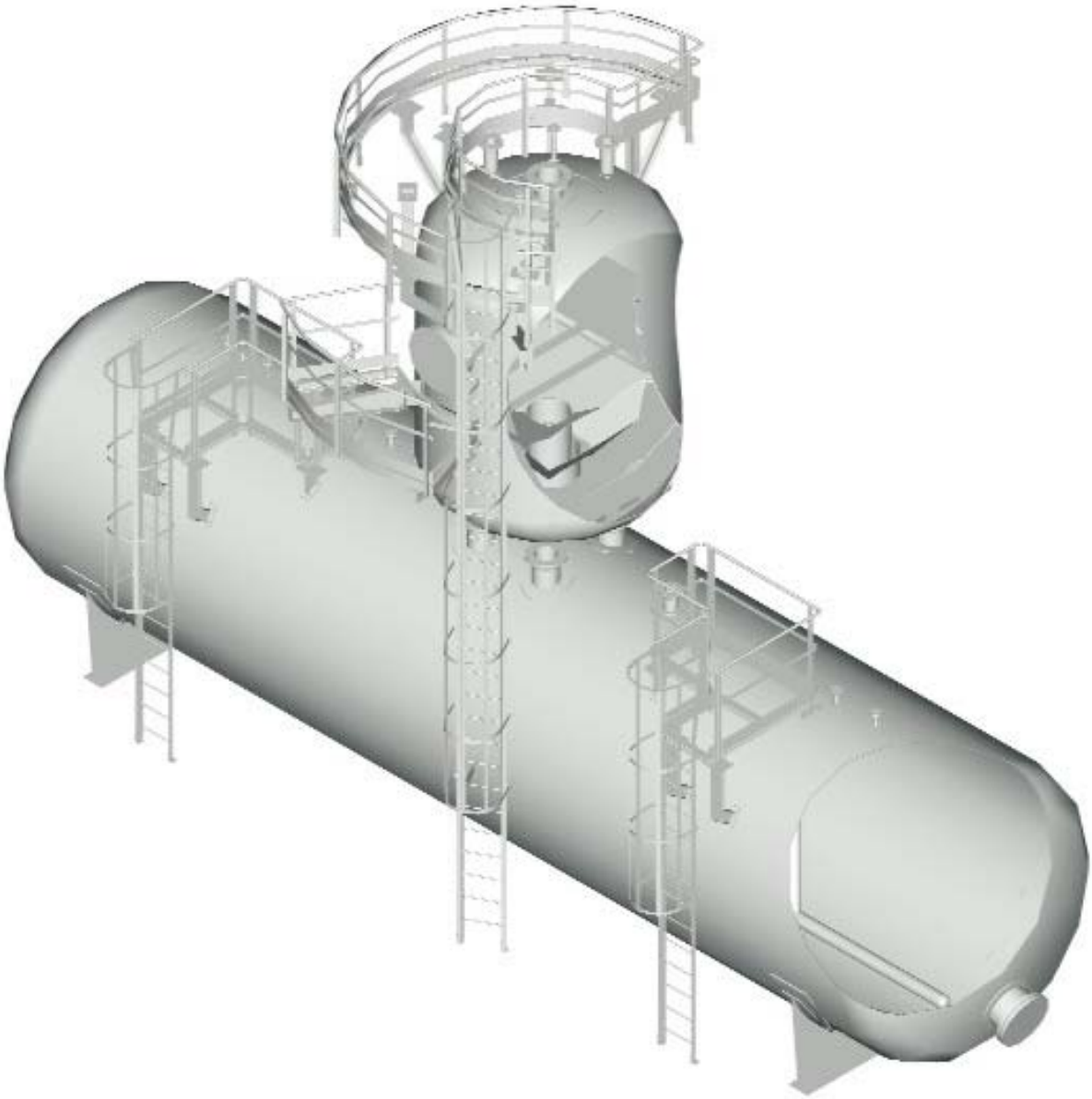
BOILER FEEDWATER DEAERATORS

cannon

BONO ARTES

Boiler Feedwater Deaerators

water spraying combined with a proprietary packing
provides the highest mass & heat transfer
in a very compact solution



The thermophysical deaerator is by far the most applied technology when oxygen and carbon dioxide in Boiler Feed Water must be reduced to negligible concentrations
Bono ARTES has inherited the experience in the design of Deaerators that started up within the BONO Group in 1959.

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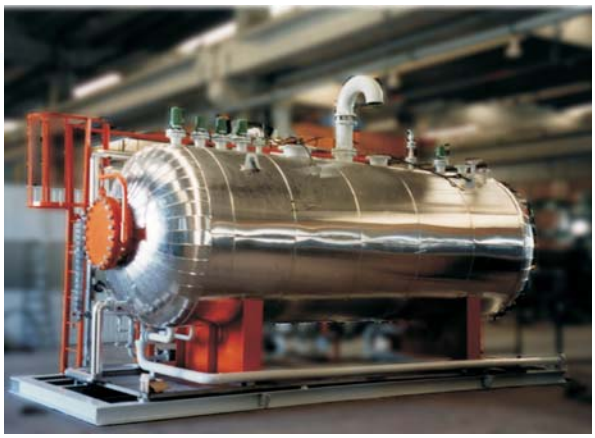

The Boiler Feed Water, if in equilibrium with the atmosphere, may contain significant levels of corrosive gases, mainly carbon dioxide and oxygen, the concentration of which has to be strictly controlled to avoid corrosion in the boiler and steam circuit.

In high-pressure plants dissolved oxygen should be reduced to levels of negligibility.

Corrosive gases can be removed by either physical or chemical means. Dissolved gases are removed by reducing the partial pressure of oxygen and carbon dioxide over the liquid surface by replacing air with steam.

In order to establish the equilibrium for oxygen and carbon dioxide between the liquid and vapour phases the contact area is increased by spraying the liquid and making it fall on metallic trays or packing rings.

Steam is moreover employed as stripping and heating medium because of the reduced solubility of gases at higher temperature.

Therefore operation at pressures higher than the atmosphere enables the establishing of more favourable equilibrium conditions because of the decreasing solubility of gases at increasing temperature.

The degassing process is achieved in the deaerating tower where make-up water or oxygen-rich condensate are firstly atomised through "variable-area-spray-nozzles" in contact with the out-coming steam. Water then falls on a set of proprietary stainless steel packing that increases the contact surface between water and steam.

Oxygen and carbon dioxide are stripped by the steam flow and vented through a calibrated orifice or a throttling valve.

Deaerated water is collected in the storage tank so as to assure an adequate "Hold-up" time for the boilers downstream. Operating pressure in the deaerator is maintained by a self-actuated valve, or by a control valve on the steam line, regulated by a pressure transmitter.

Due to the possible "lifting" action done by steam on falling water the deaerating tower has to be carefully designed in order to prevent the occurrence of "flooding" conditions.

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Features of Artes' solution

Since strictly related to the process conditions the following accessories are normally supplied together with the deaerator:

- Artes' proprietary tower packing
- Variable-Area Spray nozzles
- Venting control device
- Safety valve
- Vacuum valve
- Steam bubbling device for start-up
- Overflow

According to the design capacity and steam flow, the deaerating tower may be arranged on a vertical or horizontal geometry so as, in the latter case, a larger surface of mass and heat transfer is implemented while not exceeding the shipping limitations. Deaerators are designed by BONO Artes on its own proprietary deaerating technology developed with dedicated heat & mass.-transfer simulation models leading to the complete understanding of the most variegated process conditions. Further a wide experience has been developed providing stainless-steel-cladded deaerating towers and tanks where particular design conditions are requesting the same. Design against vacuum conditions and ASME "U" stamped vessels have moreover become a common practice in "high-quality" reference markets.

Advantages

- An extremely efficient Mass-Transfer rate leads to reduction of dissolved gases in boiler feed water (oxygen, carbon dioxide, volatile compounds) to meet the most stringent specifications
- Efficient heating of the BFW to the required boiler temperature with a dramatic saving of the required steam.
- A very compact deaerating tower is obtained thanks to the efficient packing with a high "active area / installed volume" ratio.
- High reliability and low maintenance due to the implementation of 50 years of design and manufacturing experience in deaeration technology.

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