

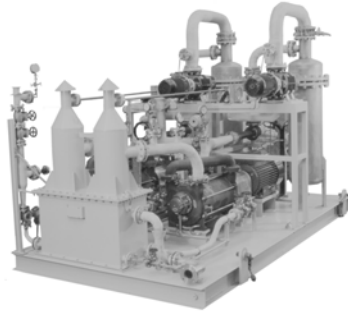
Trace gas stripping deaerators

This patented system combines vacuum stripping and inert gas stripping to offer a unit that operates under vacuum with the mass transfer process being assisted by a small quantity of inert gas admitted into the deaerator column.

This process allows highly compact deaerator columns to be used whilst the required vacuum pump capacity is substantially lower than would be associated with conventional vacuum stripping deaerators.

Deaeration and the use of sulphate removal systems

BOC Edwards is able to offer field proven designs for water injection deaerators, which are required to operate upstream of sulphate removal systems. Such installations require that the deaerator must operate without antifoam agents since the use of such agents is incompatible with the membranes used in the sulphate removal system.



BOC Edwards has supplied units to replace conventional packed column deaerator designs supplied by other manufacturers that have proved to be incapable of operating at the required design conditions without the use of antifoam agents. Our ability to offer proven technologies, which provide enhanced mass transfer capability can enable existing deaerator vessels to be re-used in order to minimize the cost and downtime associated with the upgrade.

Sulphate removal systems may be installed upstream of the deaerator in which case antifoam agents may be used, however this location upstream of the deaerator column has many serious disadvantages, which include:

- Materials of construction of the sulphate removal system must be suitable for service in contact with undeaerated seawater
- Presence of oxygen in the seawater will increase the risk of oxidation of the membranes and/or the possibility of aerobic bacteria or algae growth on the membranes
- Additional precautions to ensure the removal of any hydrocarbons present in the water may be necessary prior to the sulphate removal system to ensure that these do not contact the membranes

Deaeration on floating production vessels

BOC Edwards has considerable experience in the supply of deaeration packages for use on floating production vessels, including installations on FPSO's, semi-submersibles and on tension leg platforms.

These production facilities require that the deaeration package is insensitive to the motion of the installation and that the height and weight of the package together with the elevation of the center of gravity above grade level are minimized.

Our deaeration technology includes designs that are ideally suited to such floating production facilities, with references available for these types of installations at locations around the world, in conditions ranging from offshore Canada to Equatorial Africa.

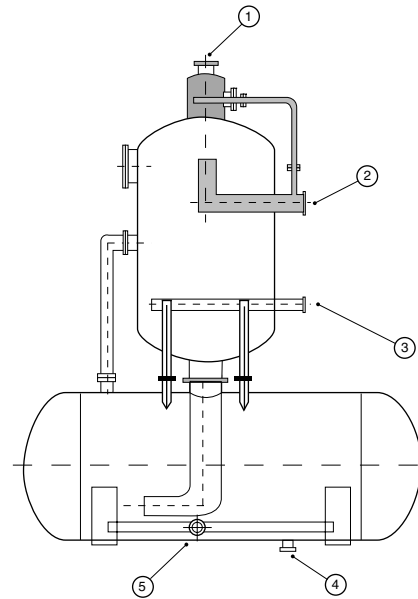
Boiler feedwater and process water deaerators

The types of deaerator described have been developed over years of experience of the different types required for numerous industrial applications. Examples of some of the industries where deaeration is used are:

Power stations – treating boiler feed water

Oil refineries and chemical plants – treating boiler feed water and process deaeration.

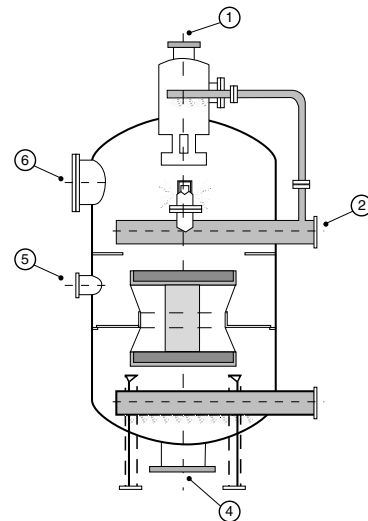
Breweries – deaerating water in the production of high gravity beer.



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|-----------------------|--------------------------|
| 1 Vent | 4 Deaerated water outlet |
| 2 Feed water inlet | 5 Off-load Heating Steam |
| 3 Heating steam inlet | |

High level pressure deaerators

For modern industrial installations where heat economy is essential, and where even lower oxygen contents are demanded to avoid costly maintenance work, the pressure heater/deaerator system is used where inlet boiler feed water is heated to well above atmospheric boiling point. BOC Edwards has developed a system of sprays and trays such that the feed water enters the deaerator through an atomizing spray valve assembly into the upper volume of the deaerator vessel where primary deaeration takes place. The feed then falls over a series of trays to the base of the deaerator during the course of which secondary deaeration takes place. Heating steam is admitted via a diffuser positioned below the tray assembly to ensure ultimate heating effect and optimum scrubbing action so as to produce residual oxygen contents down to 0.007 p.p.m. or less. This deaerating section is mounted on a storage compartment such that the whole system can be mounted at a suitable height to obtain the required suction head on the boiler feed pump advised by the manufacturer.



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|-----------------------|-------------------------------|
| 1 Vent | 4 Discharge to storage vessel |
| 2 Feed water inlet | 5 Balance pipe return |
| 3 Heating steam inlet | 6 Manway |