



ZER-O-PAC

DEAERATING SYSTEMS

CLASS "S"

by *BFS Industries, LLC*

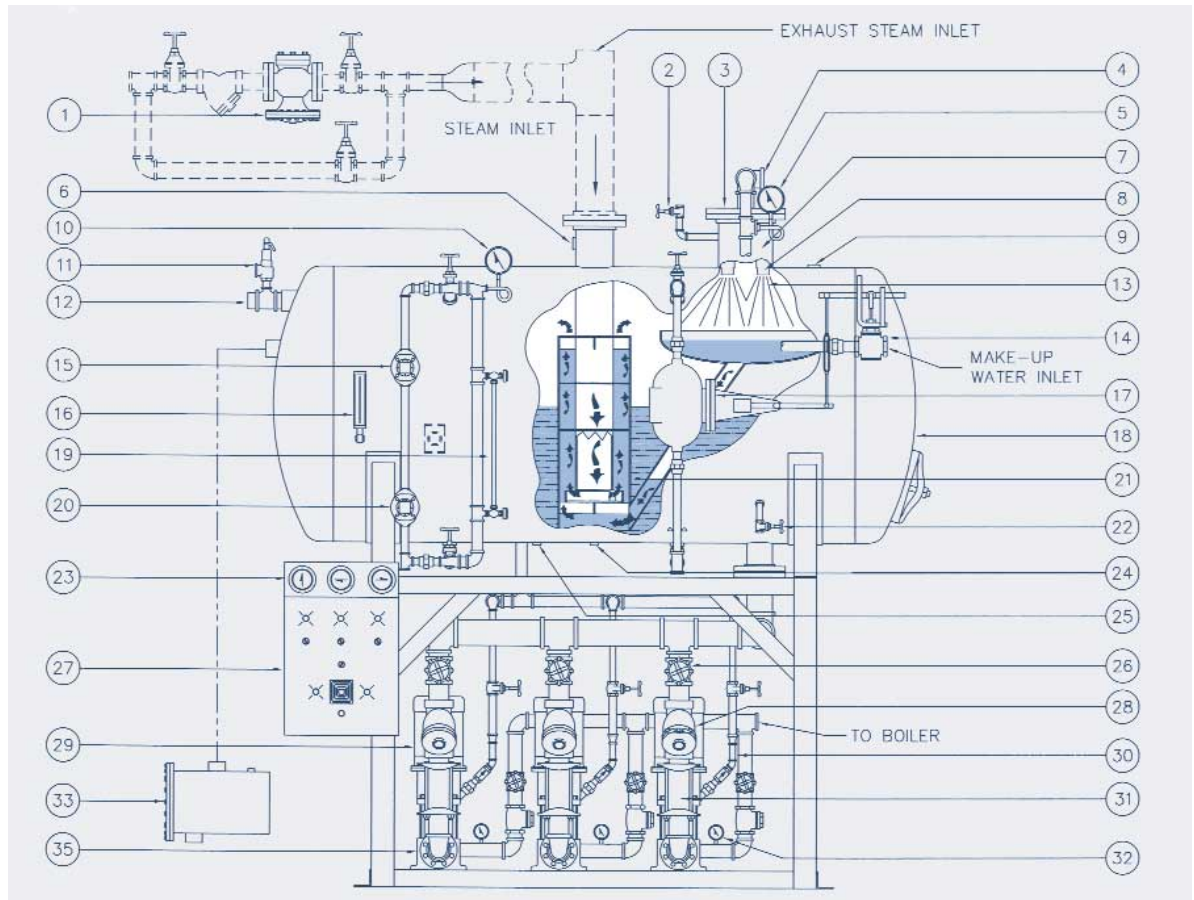


BFS Industries *Serving clients with hard work, knowledge and integrity since 1946.*

Today, we manufacture the most extensive array of deaerators and deaerating systems in the industry. Our Zer-O-Pac Class "S" systems are catalogued in sizes

ranging from 3500 #/hr to 125,000 #/hr with unlimited non-standard sizes and options. Step up to a Zer-O-Pac Class "S" deaerating system.

Remember—A Quality Product is Only the Beginning at BFS Industries



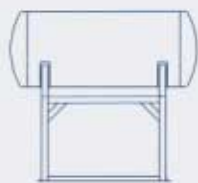
Sequence Of Operation

Undeaerated cold water enters the deaerator through the water inlet connection. There, stainless steel spray valves direct the flow in thin, conical sheets through the internal direct contact vent condenser into the steam atmosphere of the pre-heater section. This hot and partially deaerated water is then directed from the pre-heater section to the steam scrubber section, where final and complete deaeration is accomplished by vigorously scrubbing the water with a large excess of oxygen free steam. The deaerated water then spills over into the storage compartment where it remains available for use on boiler demand.

Steam enters the deaerator and is directed into the scrubber section where it collides at high velocity with the heated and partially deaerated water entering the scrubber from the pre-heater section. Violent scrubbing and mixing occur even at low load conditions. This action mechanically scrubs the last remaining traces of non-condensable gases out of the preheated water. Finally, the steam and deaerated water emerge from the top of the scrubber section into the storage compartment. Here the steam separates from the deaerated water and fills the entire steam and pre-heater section with an atmosphere of steam to continue the cycle. Released non-condensable gases are vented to the atmosphere through the internal direct contact vent condenser.



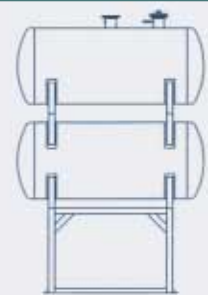
Horizontal Deaerator



Horizontal Surge

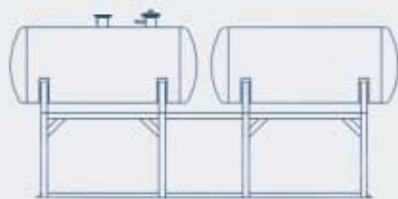


Vertical Deaerator

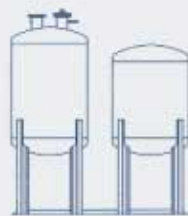


Over/Under Deaerator/ Surge

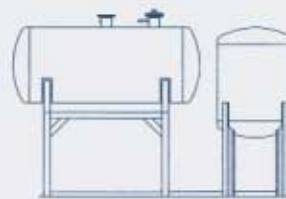
1. STEAM PRESSURE REDUCING VALVE.
For reduction of available steam pressure to the deaerator operating pressure (normally 5 P.S.I.G.).
2. VENT.
Discharges liberated oxygen and CO₂ to atmosphere.
3. SPRAY VALVE ACCESS FLANGE.
Allows operator to inspect the spray valves, and make repairs if necessary, without disturbing any piping or draining the entire system.
4. LOW TEMPERATURE RETURNS.
Condensate temperatures of 197°F or less should enter the opening provided between the water inlet control valve and the inlet water compartment, thus subjecting this water to the complete deaeration cycle. Such condensate may return from the surface condensers, vacuum heating systems, etc. By admitting the condensate after the water inlet control valve, preference will be given to the use of this condensate.
5. WATER INLET PRESSURE GAUGE.
6. HIGH TEMPERATURE RETURNS.
This opening should be used for condensate returns having a higher temperature than the temperature of the steam within the deaerator (above 227°F). These returns will emanate from trap discharges of high pressure heaters and steam lines.
7. S.S. INTERNAL VENT CONDENSER SECTION.
8. S.S., SELF ADJUSTING SPRAY VALVE(S).
9. MEDIUM TEMPERATURE RETURNS.
When condensate at a temperature of 198°F to 227°F is available from a high pressure steam heating plant, or other sources, it should be delivered to the medium temperature return opening.
10. STEAM SECTION PRESSURE GAUGE.
11. STEAM RELIEF VALVE.
12. VACUUM BREAKER.
13. PREHEATER SECTION.
14. WATER INLET CONTROL VALVE. (internal float std.)
Adds make-up water as needed. When a surge tank is used in conjunction with a deaerator, make-up water and condensate returns will be collected in the surge tank and delivered by transfer pump to the deaerator through the water inlet control valve.
15. HIGH LEVEL ALARM SWITCH (Optional).
16. STORAGE SECTION THERMOMETER.
17. EXTERNAL LEVEL CONTROLLER (Optional).
Operates water inlet control valve.
18. DEAERATOR STORAGE TANK, A.S.M.E.
Code certified construction. Ten minute minimum storage capacity.
19. WATER GLASS GAUGE. Safety type.
20. LOW LEVEL ALARM SWITCH (Optional).
21. SCRUBBER SECTION.
22. SAMPLING VALVE (Optional). Provided for operator's convenience in testing.
23. GAUGE PANEL (Optional).
Includes water and steam pressure gauges and storage section thermometer.
24. SCRUBBER SECTION DRAIN.
25. VESSEL DRAIN.
26. BOILER FEED PUMP SUCTION GATE VALVE.
One for each pump.
27. SYSTEM CONTROL CENTER.
Specifically designed to meet the needs of boiler feed pump control. Components completely pre-wired with special attention to circuit and operator safety. Flexible design allows panel to be customized to suit job conditions.
28. BOILER FEED PUMP SUCTION STRAINER (Optional). One for each pump.
29. MOTORS. Heavy duty N.E.M.A. rated, without special service factor or duty rating.
30. RE-CIRCULATING BY-PASS ORIFICE.
Provided where pumps will operate continuously through a modulating feedwater regulating valve. Assures adequate circulation to prevent over-heating within the pump at no or low water demand by the boiler (Piping optional).
31. BOILER FEED PUMP SUCTION COUPLING.
One for each pump. Protects pumps from stresses due to vibration, expansion or contraction.
32. PUMP DISCHARGE PRESSURE GAUGE(S).
33. OVERFLOW TRAP.
34. BOILER FEED PUMPS. Selected for optimum performance at intermittent or continuous operation. All pumps suitably constructed for operation with hot water at 250°F



Horizontal End To End Deaerator/Surge



Vertical End To End Deaerator/Surge



Horizontal Deaerator Vertical Surge End To End Deaerator/Surge

125,000#/Hr. Horizontal
Deaerator System
(4) Pumps (1 Summer)
PLC/Network Controlled
Automotive Plant Installation



Pump suctions are over-sized, positioned above the bottom and equipped with BFS engineered, stainless steel vortex breakers.



BFS engineered, all stainless steel non binding, spring loaded spray valve will self adjust to produce a thin conical spray pattern at any load.

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