



ZER-O-PAC

DEAERATING SYSTEMS

CLASS "P"

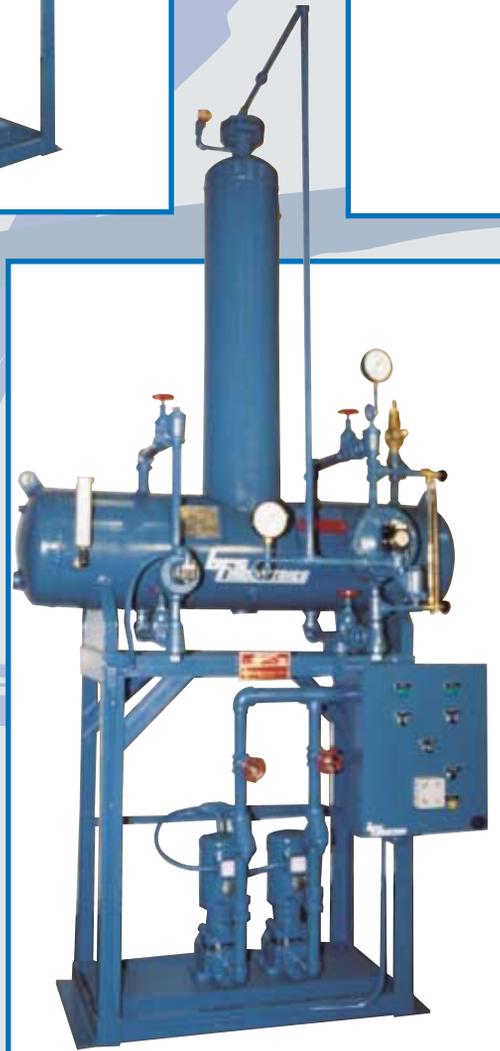
by *BFS Industries, LLC*



5,000#/hr Deaerator system
(2) B.F. Pumps
Tank Insulation
Pneumatic controls
Laboratory Installation



11,000#/hr Deaerator system
(2) B.F. Pumps
Detachable Deaerator section
Chemical Plant installation



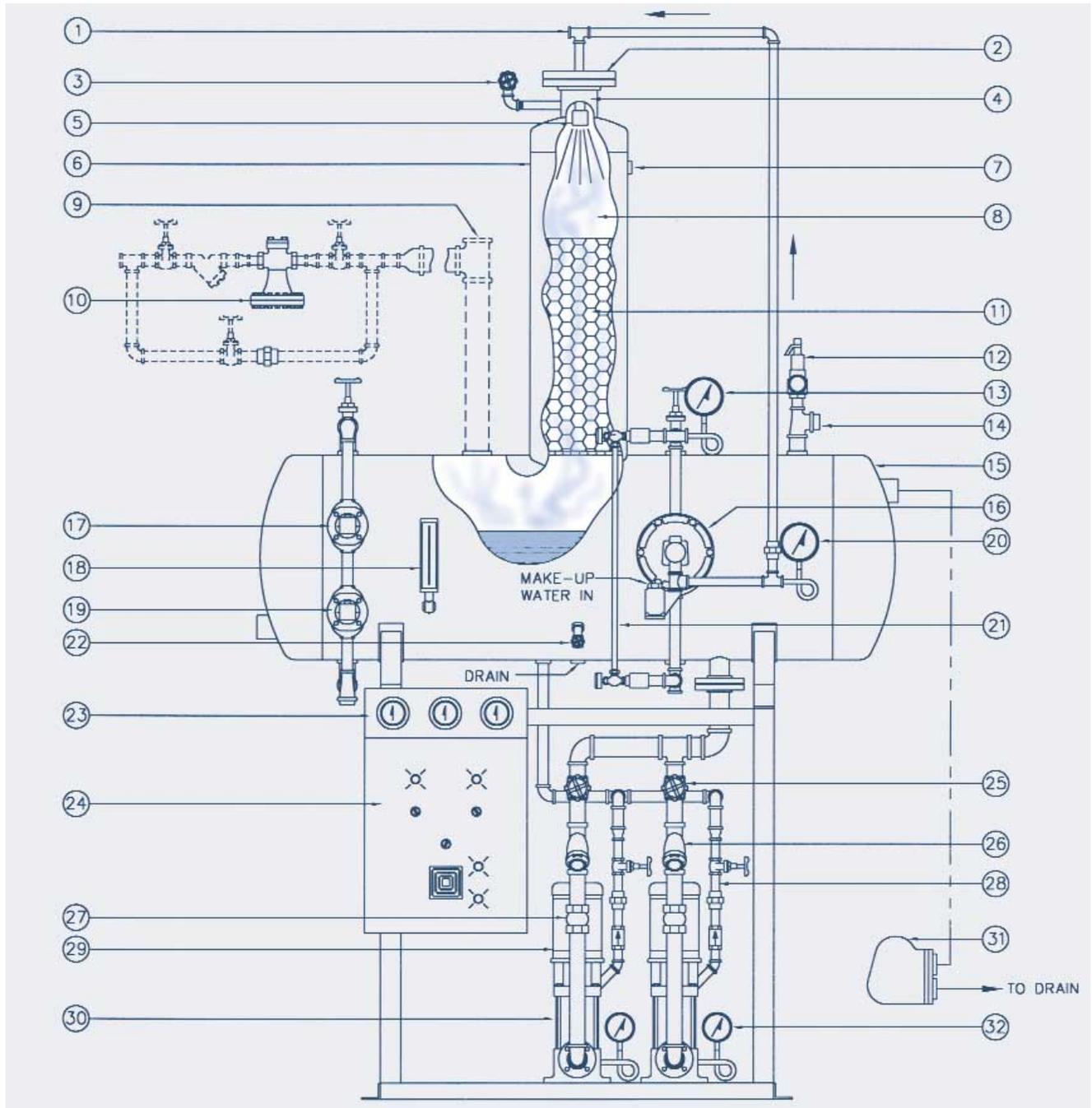
2,500#/hr Deaerator system
(2) B.F. Pumps
Animal Zoo Installation

“Small boilers do not justify the use of a deaerator”.

Sadly, this opinion still exists in some quarters, yet all the arguments for deaeration on large boilers apply to small ones as well. **BFS** engineers realizing this have developed a full line of **Zer-O-Pac Class “P”** deaerators ranging from 200#/hr to 11,000#/hr.

These “state-of-the-art” systems are true deaerators capable of sustaining an oxygen level of .005 cc/liter and “0” titratable free CO₂. The high standards of BFS quality are maintained with all stainless steel column, spray valves, and high efficiency packing. Settle for nothing less than a **Zer-O-Pac Class “P”** deaerator.

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



Sequence Of Operation

WATER enters the deaerator through the water inlet valve to the top of the column and is atomized through the stainless steel spray valve in the steam atmosphere of the vent condenser. Here the water is preheated before entering the mass of high efficiency packing. The effluent, traveling downward, flows through the many voids between the packing, thereby maintaining a thin, turbulent flow, until finally passing through the packing retainer grid into the storage section. There it remains in reserve awaiting boiler demand.

STEAM enters the deaerator in the storage section and is directed upward through the high efficiency packing, diametrically opposed to the incoming water, toward the lower pressure in the vent condenser. The resulting vigorous scrubbing of the water by clean, fresh steam making contact in opposing directions, assures complete mechanical separation of the non-condensable gases. These gases are then carried with the steam through the vent condenser, where the incoming cold spray condenses the steam, leaving the non-condensable oxygen and CO₂ to be expelled through the vent.

1. **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 low temperature condensate.
2. **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.
3. **VENT.**
Discharges liberated oxygen and CO₂ to atmosphere.
4. **S.S. INTERNAL VENT CONDENSER SECTION.**
5. **S.S., SELF ADJUSTING, SPRAY VALVE.**
6. **S.S. PACKED COLUMN (deaerating section).**
Randomly packed with S.S., high efficiency packing.
7. **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.
8. **PRE-HEATER SECTION.**
9. **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.
10. **STEAM PRESSURE REDUCING VALVE.**
For reduction of available steam pressure to the deaerator operating pressure (normally 5 P.S.I.G.).
11. **S.S., HIGH EFFICIENCY PACKING.**
12. **STEAM RELIEF VALVE.**
13. **STEAM SECTION PRESSURE GAUGE.**
14. **VACUUM BREAKER.**
15. **DEAERATED WATER STORAGE SECTION. A.S.M.E.**
Code certified construction. Ten minute minimum storage capacity.
16. **WATER INLET CONTROL VALVE.**
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.
17. **HIGH LEVEL ALARM SWITCH (Optional).**
18. **STORAGE SECTION THERMOMETER.**
19. **LOW LEVEL ALARM SWITCH (Optional)**
20. **WATER INLET PRESSURE GAUGE.**
21. **WATER GLASS GAUGE. Safety type.**
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. **SYSTEM CONTROL CENTER.**
Specifically designed to meet the needs of boiler feed pump control. Components completely prewired with special attention to circuit and operator safety. Flexible design allows panel to be customized to suit job conditions.
25. **BOILER FEED PUMP SUCTION GATE VALVE.**
One for each pump.
26. **BOILER FEED PUMP SUCTION STRAINER. (Optional)** One for each pump.
27. **BOILER FEED PUMP SUCTION COUPLING.**
One for each pump. Protects pumps from stresses due to vibration, expansion or contraction.
28. **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).
29. **MOTORS.**
Heavy duty N.E.M.A. rated, without special service factor or duty rating.
30. **BOILER FEED PUMPS.**
Selected for optimum performance at intermittent or continuous operation. All pumps suitably constructed for operation with hot water at 250°F.
31. **OVERFLOW TRAP.**
32. **PUMP DISCHARGE PRESSURE GAUGE(S).**



5,000#/hr. Deaerator system
(2) B.F. Pumps
Medical Research Installation



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



1,000#/hr. Deaerator system
(2) B.F. Pumps
Theatre installation



All stainless steel, high efficiency, packing designed to maximize exposure to the oxygen free steam atmosphere.



Pump suction are oversized, positioned above the bottom and equipped with **BFS engineered**, stainless steel vortex breakers.

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