



# ZER-O-PAC

DEAERATING SYSTEMS

CLASS "T"

by *BFS Industries, LLC*



24,000#/hr Deaerator system  
(2) B.F. Pumps  
NEMA #4X Electrical  
Jet Engine Manufacturing  
Facility installation



150,000#/hr Deaerator system  
Detachable deaerator section  
(3) B.F. Pumps  
Federal geological installation

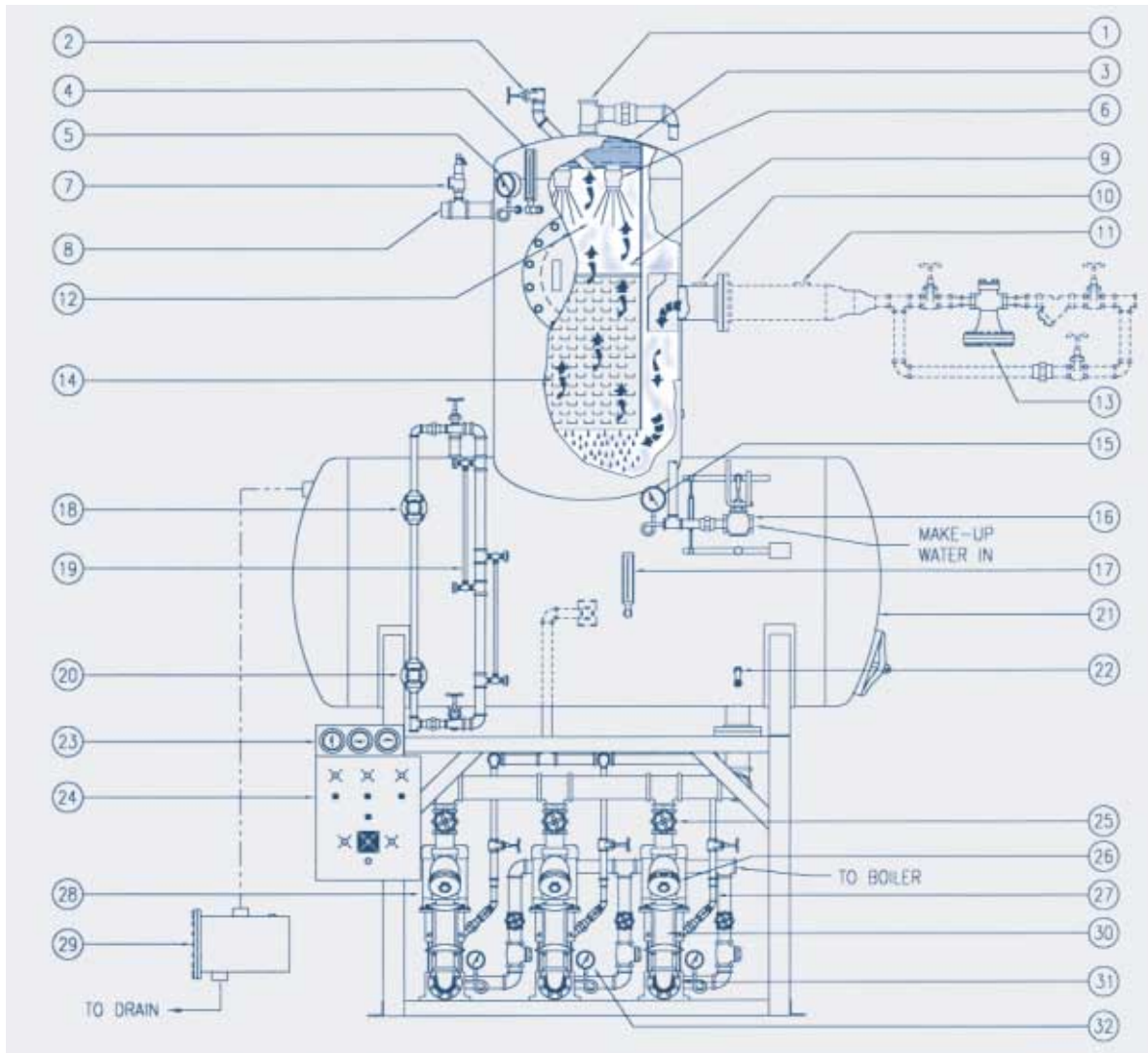


125,000#/hr Deaerator system  
(3) B.F. Pumps—Remote panel  
Brewery installation

**BFS Industries:** The name immediately suggests products of high quality, engineering prowess and experience that only 60 years of dedication can achieve. Currently we produce the most comprehensive array of deaerators and deaerating systems in the industry.

Our **Zer-O-Pac Class "T"** systems are catalogued in seventeen sizes from 3,500#/hr to 125,000#/hr. Additionally we offer unlimited nonstandard sizes and options. Upgrade to a **Zer-O-Pac Class "T"** deaerating system.

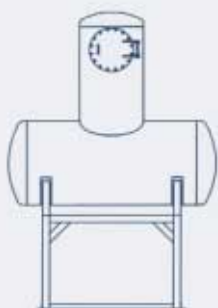
*Remember—A Quality Product is Only the Beginning at BFS Industries*



## Sequence Of Operation

**Unde aerated 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 then falls onto the banks of trays designed to provide maximum water retention and cascades downward through the remaining trays into the storage section. The effluent is now totally deaerated and ready for use.

**Steam** enters the deaerator and travels upward through the trays in a flow diametrically opposed to the water. After rising through the tray stack the steam continues up toward the lower pressure in the vent condenser created by condensing steam. Released non-condensable gases are drawn with the steam through curtains of cold water where most of the steam condenses and the remaining gases are expelled through the vent.



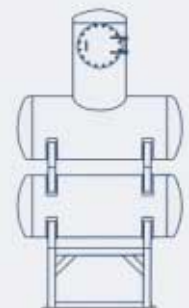
Horizontal Deaerator



Horizontal Surge

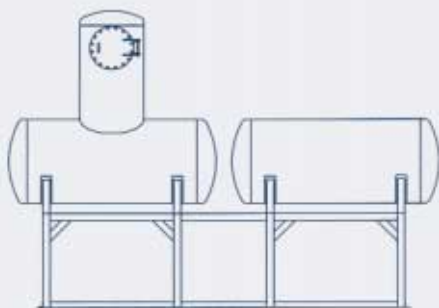


Vertical Deaerator

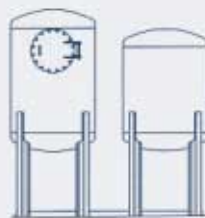


Over/Under Deaerator/ Surge

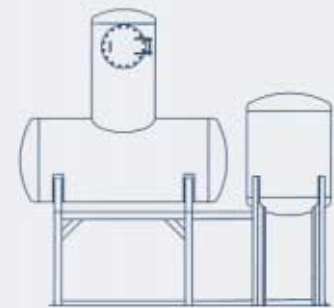
1. **LOW TEMPERATURE RETURNS.**  
Condensate temperatures having at least a 30°F differential less than the operating temperature of the deaerator should enter the deaerator here. Such condensate may return from surface condensers, vacuum heating systems, etc. By admitting the condensate after the water inlet control valve, preference will be given to the use of low temperature condensate.
2. **VENT.**  
Discharges liberated oxygen and CO<sub>2</sub> to atmosphere.
3. **TRAY SECTION – A.S.M.E. CERTIFIED**  
(deaerating section).
4. **STEAM SECTION THERMOMETER.**
5. **STEAM SECTION PRESSURE GAUGE.**
6. **S.S., SELF ADJUSTING, SPRAY VALVE.**
7. **STEAM RELIEF VALVE.**
8. **VACUUM BREAKER.**
9. **TRAY HOLD DOWN**  
Prevents tray upset during abnormal operating conditions.
10. **HIGH TEMPERATURE RETURNS.**  
This opening should be used for condensate returns having a higher temperature than the operating temperature within the deaerator. These returns will emanate from trap discharges of high pressure heaters and steam lines.
11. **EXHAUST STEAM INLET.**
12. **S.S. INTERNAL VENT CONDENSER / PRE-HEATER SECTION.**
13. **STEAM PRESSURE REDUCING VALVE.**  
For reduction of available steam pressure to the deaerator operating pressure (normally 5 P.S.I.G.).
14. **TRAYS - #430 S.S.**
15. **WATER INLET PRESSURE GAUGE.**
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. **STORAGE SECTION THERMOMETER.**
18. **HIGH LEVEL ALARM SWITCH (Optional).**
19. **WATER GLASS GAUGE.** Safety type.
20. **LOW LEVEL ALARM SWITCH (Optional)**
21. **DEAERATED WATER STORAGE SECTION.**  
A.S.M.E. Code certified construction. Ten minute minimum storage capacity.
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. **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).
28. **MOTORS.** Heavy duty N.E.M.A. rated, without special service factor or duty rating.
29. **OVERFLOW TRAP.**
30. **BOILER FEED PUMP SUCTION COUPLING.**  
One for each pump. Protects pumps from stresses due to vibration, expansion or contraction.
31. **BOILER FEED PUMPS.** Selected for optimum performance at intermittent or continuous operation. All pumps suitably constructed for operation with hot water at 250°F.
32. **PUMP DISCHARGE PRESSURE GAUGE(S).**



Horizontal End To End Deaerator/Surge



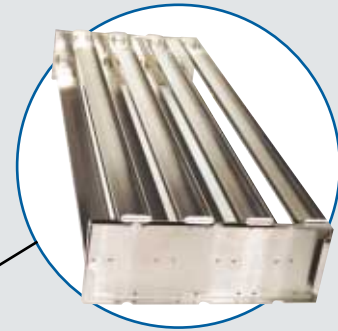
Vertical End To End Deaerator/Surge



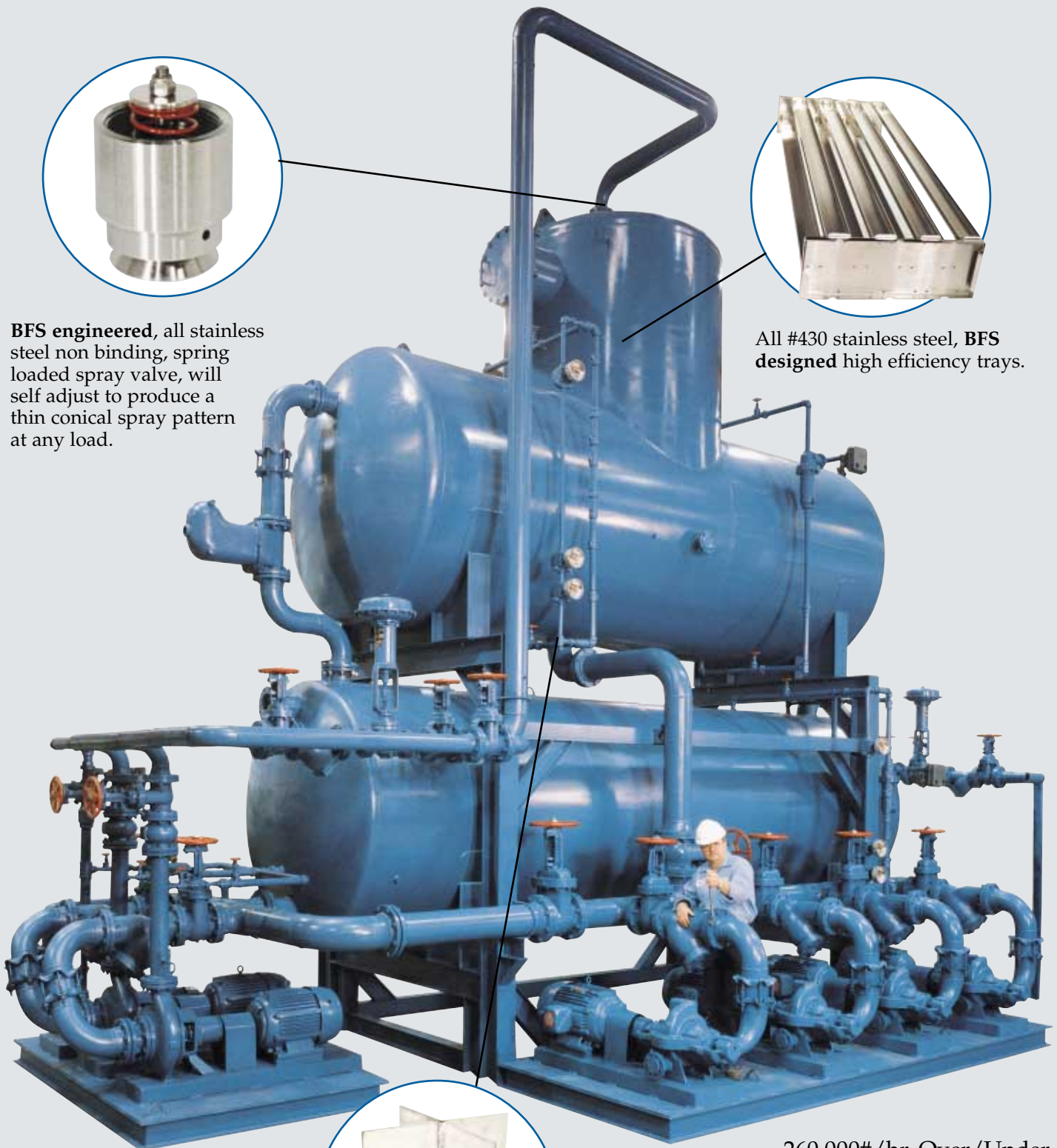
End To End Deaerator/Surge



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



All #430 stainless steel, **BFS designed** high efficiency trays.



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



260,000#/hr. Over/Under  
Deaerator/Surge System  
(4) B.F. Pumps—(2) Transfer Pumps  
University Medical Center Installation

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