Spray Flow II

.005 cc/Liter
Atmospheric Deaerator
CONSTANT RECYCLING guarantees deaeration of all dissolved oxygen in excess of .005 cc/liter from 0% to 100% of deaerator capacity.

industrialsteam.com
**Spray Flow II**  
*Atmospheric .005 cc/liter*

### FEATURES

**CONSTANT RECYCLING** guarantees deaeration of all dissolved oxygen in excess of .005 cc/liter from 0% to 100% of deaerator capacity.

**UNIQUE FULL PARTITION DESIGN** accepts gravity returns to the atmospheric scrubbing section along with make-up and pumped returns. Deaerating section accepts trapped returns for preferential use of flash steam.

**ELECTRONIC INSTRUMENTATION FOR MODULATING LEVEL CONTROL** includes a HART compatible differential pressure transmitter, PID controller, and motorized control valve.

**SEPARATE DEAERATING & MIXING SECTIONS** offer a two stage continuous cycle which provides .005 cc/l deaerated water during all load conditions regardless of surges from the system.

**ONLY STAINLESS STEEL** components come in contact with undeaerated water.

**ATMOSPHERIC NON-CODE VESSEL** require no annual shutdown for inspection.

**CUSTOM ENGINEERED**  
**PACKAGED SYSTEM** includes boiler feedwater pumps and quality components to insure reliable service.

### When to use

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
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<tbody>
<tr>
<td>100% Makeup 0% condensate</td>
<td></td>
</tr>
<tr>
<td>30% Makeup 70% condensate</td>
<td></td>
</tr>
<tr>
<td>High Pressure condensate returns</td>
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<tr>
<td>100% Turndown</td>
<td></td>
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<tr>
<td>Load Swings</td>
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### Testing Requirements

This system requires steady state conditions per the ABMA testing procedure.
ADVANTAGES
Industrial Steam's exclusive constant recycling feature and the use of a partitioned receiver provide the advantages of a two-tank system as a single package. These advantages are available without the necessity for onsite erection or field installed piping. Expanded deaerating sections are standard for surge condensate loads.

GUARANTEED PERFORMANCE FROM 0% to 100% of capacity regardless of load conditions is unmatched by any other deaerator.

CUSTOM ENGINEERED PACKAGED SYSTEM results in a small foot print, minimal onsite installation costs, and a single source of responsibility for all major components.

OPERATION
Modulated make-up water is sprayed through a stainless steel spring loaded nozzle into a stainless steel internal vent condenser located in the scrubbing section. The nozzle produces a thin conical sheet of water which condenses the vapors while permitting oxygen to exit through the unrestricted atmospheric vent. Pumped low temperature returns are also sprayed through the nozzle. Gravity returns flow unrestricted to the scrubbing section.

The combined make-up and returns in the scrubbing section are heated with steam and recycled deaerated water from the deaerating section. Both the steam and deaerated water enter the scrubbing section through separate stainless steel manifolds. The perforated steam manifold provides jets of steam to vigorously scrub the major portion of the dissolved oxygen from the make-up, pumped returns, and gravity returns. The temperature in the scrubbing section is controlled at 210°F (at sea level), which assures the release of the majority of the dissolved oxygen without flash loss.

The scrubbing section water, which is nearly fully deaerated, is continuously recycled to the deaerating section where it is sprayed through stainless steel, wide-angle, full-cone nozzles. Steam enters the deaerating section in response to the temperature in the scrubbing section. Since the cycle is continuous, pure steam is always available for final deaeration. The last traces of oxygen are removed at the point of contact with the purest steam. Excess, fully deaerated water flows continuously from the deaerating section to the scrubbing section through the stainless steel recycle manifold. Trapped returns are piped to the deaerating section where the flash steam is preferentially used for final deaeration.

Since the recycle pump capacity exceeds the deaerator capacity by at least 25%, the deaerator is able to meet .005 cc/l. From zero to 100% load. This same feature also enables the deaerator to supply fully deaerated water to the boiler on start-up. Rapid load changes and on-off boiler feedwater controls, which are very troublesome for other atmospheric deaerators, will not affect the Spray Flow II's performance or operation.
### Components and Sizing

1. Make-up Controller
2. Make-up Control Valve
3. Make-up Nozzle (Stn. Stl.)
4. Vent Condenser (Stn. Stl.)
5. Pressure Switch
6. Spray Nozzle
7. Recycle Pump Motor
8. Recycle Pump
9. Boiler Feed Pump Motor
10. Boiler Feed Pump
11. Magnesium Anode
12. Ball Valve (Column Drain)
13. Level Transmitter
14. Coupling (Recycle Pump Discharge)
15. Coupling (Recycle Pump Suction)
16. Gate Valves (Recycle Pump Suction)
17. Ball Valves (Drain)
18. Globe Valve (Make-up Inlet)
19. Ball Valves (Make-up Inlet)
20. Y-Strainer (Make-up Inlet)
21. Thermometer w/thermowell (50 DEGREE - 500 DEGREE F)
22. Temp Control Valve
23. Control Panel (NEMA 1)
24. Ball Valve (Column Isolation)
25. Ball Valve (Discharge)
26. Check Valve (Discharge)
27. Low Water Alarm
28. High Water Alarm Switch
29. Y-Strainer (Steam Inlet)
30. Emergency By-pass Valve
31. Sight Glass Assembly
32. Coupling (BF Pump Suction)
33. Ball Valve (BF Pump Suction)
34. Pressure Gauge w/cock (0/60in H20)
35. Starter (Recycle Pump)
36. Low Water Cut Off Switch
37. Pressure Gauge (0-60 psig)
38. Chemical Feed Quill
39. Gate Valve (Recycle Discharge)
40. Check Valve (Recycle Discharge)
41. Pressure Gauge (0-300 psi)
42. Orifice Union
43. Sight Glass Assembly
44. Ball Valve (Vacuum Breaker Line)
45. Vacuum Breaker (Check Valve)
46. Starter (BF-Pump)
47. Ball Valve (Recirc)
48. Check Valve (Recirc)
49. Orifice Union (Recirc)

### Table: Components and Sizing

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<th>MODEL NUMBER</th>
<th>RATED CAPACITY</th>
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</table>

Consult factory for systems above 300,000#/hr * Overall height includes 48” stand. ** Shipping weight does not include boiler feed pumps or any optional equipment

* Consult Factory for systems over 300,000 lbs./hr  • Weights do not include pumps or optional equipment * Includes 48” Stand ** Includes Control Panel
Additional Industrial Products

Have questions or need help specifying this equipment? Email: engineering@industrialsteam.com
Need help with an existing system or parts? Email: techsupport@industrialsteam.com
Looking for a local representative? Email: sales@industrialsteam.com
Literature available for download at industrialsteam.com

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