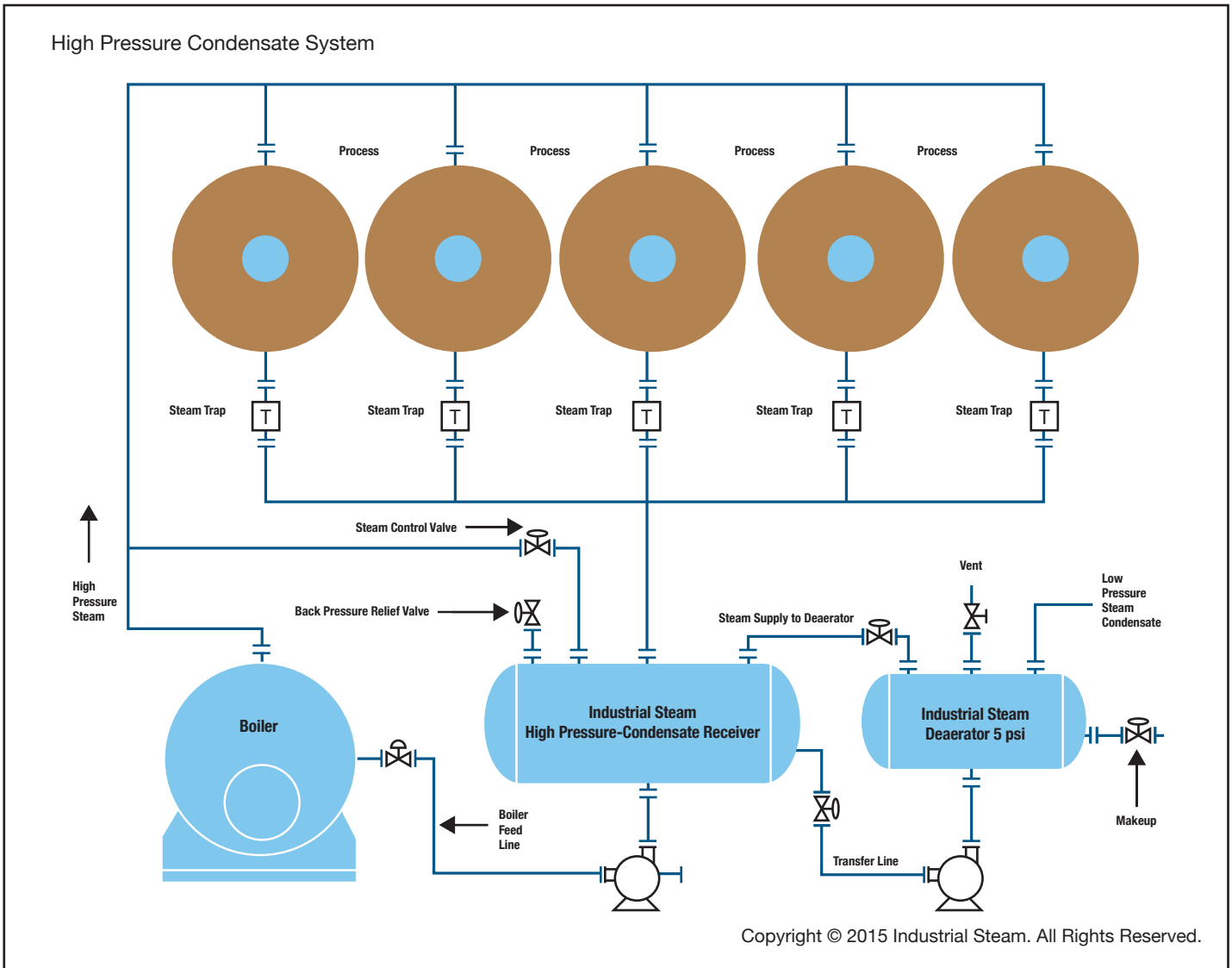




# High Pressure (HPR) Condensate Return System

## Closed Loop Condensate System



### SEQUENCE OF OPERATION:

Steam from the boilers is supplied to all of the corrugators. Steam in the corrugators gives up its latent heat of evaporation, and possibly small amount of sensible heat. Resultant liquid flows by gravity to the steam traps. As the traps cycle, high temperature condensate flows to High Pressure Condensate (HPR) receiver. Pressure in the HPR is maintained slightly below the lowest steam user in the system to facilitate the flow of condensate from the steam traps to the HPR.

When steam is generated in the boiler, the carbonates decompose and produce CO<sub>2</sub> gas which is non-condensable. These gases are mixed with steam and enter the corrugator heating units. Since they build up and plate-out on the heating surfaces, the gases must be continuously removed to maintain maximum heat transfer in the corrugator. This is accomplished by the continual removal of steam and CO<sub>2</sub> through the gas purge line to the pressurized feedwater system. The flow of steam from the HPR to the deaerator is controlled by a modulating control valve. The improved heat transfer will result in an increased production of up to 10%.

Makeup water and all other condensate from the steam system are collected in the pressurized deaerator. The modulating level control on the HPR maintains a constant level with feedwater from the deaerator. Non-condensable gases are vented into the atmosphere.

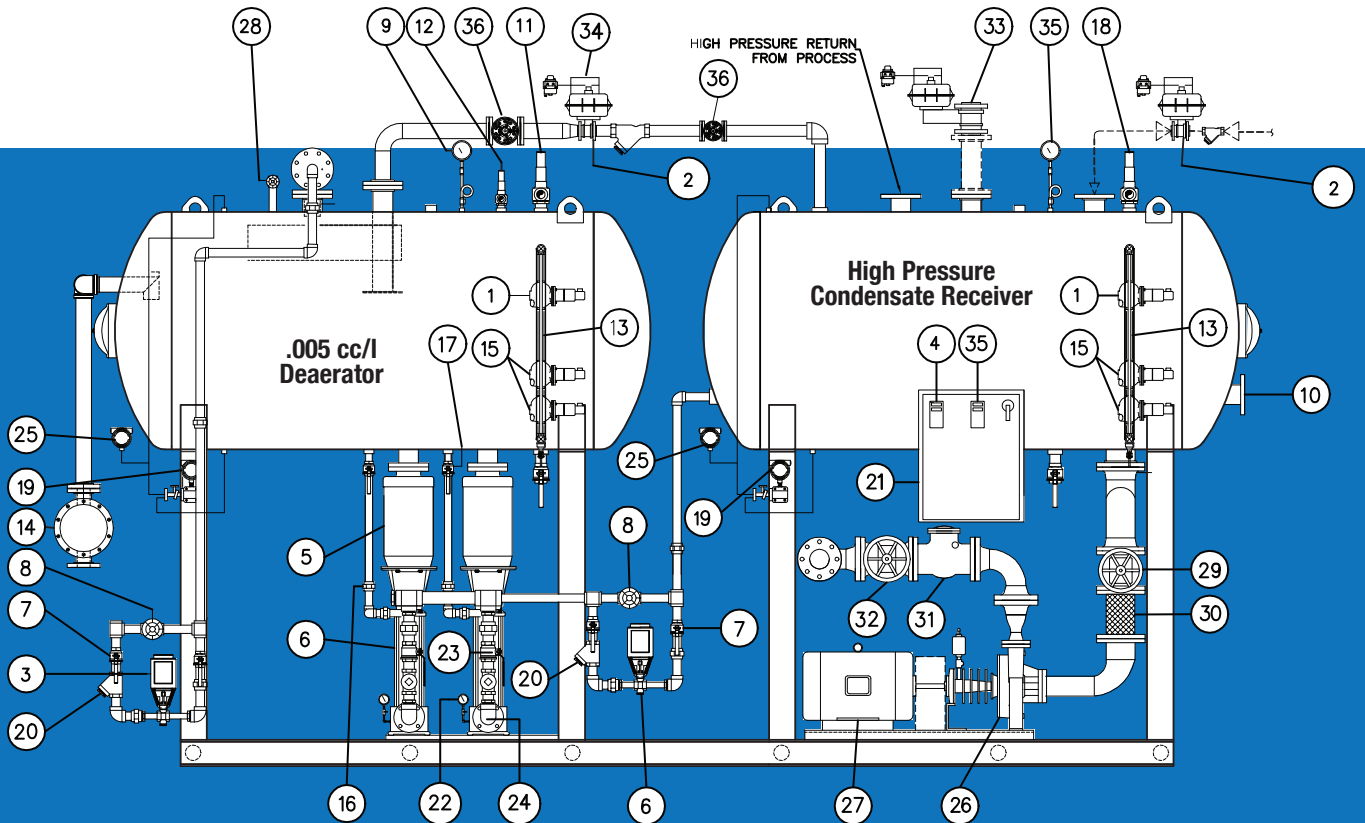
#### Customer Engineered Packaged System

- Small foot print
- Minimal installation costs
- Single source responsibility

#### Electronic Instrumentation

- HART compatible transmitters
- Modulating level and pressure controls
- Variable frequency drives (optional)

# Components and Sizing



- |                                 |   |                                      |                               |
|---------------------------------|---|--------------------------------------|-------------------------------|
| 1 High Water Alarm Switch       | 10 Temperature Gauge w/thermowell           | 19 Level Transmitter                 | 28 Vent Gate Valve            |
| 2 Pressure Control Valve        | 11 Safety Relief Valve (Set at 50#)         | 20 Make-up Y-Strainer                | 29 Suction Gate Valve         |
| 3 Make-up Control Valve         | 12 Sentinal Relief Valve (Set at 20#)       | 21 Control Panel                     | 30 Suction Coupling           |
| 4 Level Controller              | 13 Sight Glass Assembly                     | 22 Discharge Pressure Gauge (0-400#) | 31 Discharge Check Valve      |
| 5 Deaerator Pump Motor          | 14 Overflow Trap                            | 23 Discharge Ball Valve              | 32 Discharge Gate Valve       |
| 6 Deaerator Pump                | 15 Low Water Alarm & Cut Off Switch         | 24 Discharge Check Valve             | 33 Back Pressure Relief Valve |
| 7 Make-up Gate Valve            | 16 Recirculation Orifice Union              | 25 Pressure Transmitter              | 34 Pressure Controller        |
| 8 Make-up Globe Valve           | 17 Recirculation Ball Valve                 | 26 Boiler Feed Pump                  | 35 Pressure Gauge             |
| 9 Pressure Gauge (0-15#) w/cock | 18 Safety Relief Valve (Steel, Set at 120#) | 27 Boiler Feed Pump Motor            | 36 Steam Line Shut Off Valve  |

Maximum Boiler Load			HPR		Deaerator			Approximate Weights (Lbs.)		
Model #	lbs/hr	HP	Receiver Dimensions	Storage Capacity	Receiver Dimensions	Storage Capacity	Overall Dimensions	Shipping	Operating	Flooded
2HPR	6,900	200	36"x 65"	258 Gal.	36"x 65"	155 Gal.	48"x 156"(13')	2,800	5,400	7,000
4HPR	13,800	400	48"x 70"	496 Gal.	48"x 70"	285 Gal.	60"x 168"(14')	4,000	8,800	12,000
6HPR	20,700	600	48"x 94"	590 Gal.	48"x 94"	413 Gal.	60"x 228"(19')	4,800	11,000	15,300
8HPR	27,600	800	54"x 120"	1,124 Gal.	54"x 120"	697 Gal.	66"x 288"(24')	6,200	16,800	23,600

- \* Dimensions are approximate for a typical system. All units are custom built to fit existing space constraints
- \* Vertical systems may be substituted upon request
- \* Storage capacities are measured to overflow
- \* Packaged engineered systems up to 300,000 lbs/hr are available

### Energy Savings/Efficiency

- Reduce vent loss
- Increase corrugator heat transfer
- Reduce carbon emissions
- Increase boiler efficiency

### Quality Components

- 300# flanged steel valves
- Pneumatic actuators
- Rugged Nema 4x transmitters
- Schedule 80 piping

