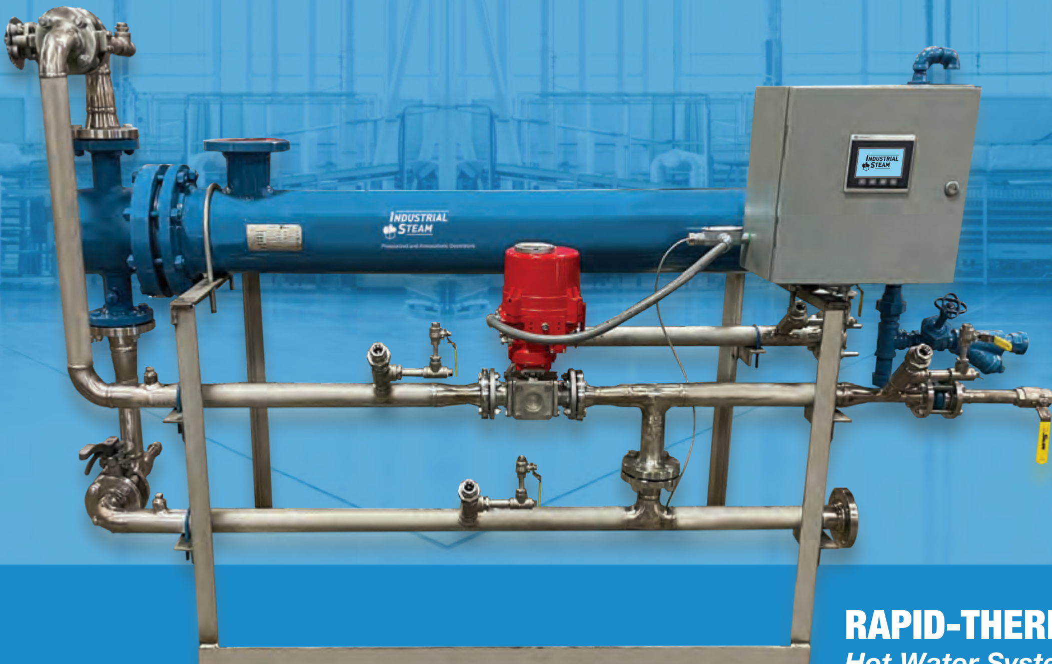
INDUSTRIAL STEAM

Pressurized and Atmospheric Deaerators

Steam Specialties



RAPID-THERM®
Hot Water System

Steam Specialties Booklet

Heat Exchangers, Pressure Gauges, Thermometers

Innovative Responses Today to Tomorrow's Challenges

MADE IN USA

Innovative Responses Today to Tomorrow's Challenges

Industrial Steam stands at the forefront of the deaeration industry, known for its cutting-edge .005 cc/l pressurized and atmospheric deaerators. Our legacy of innovation includes the trusted spray-type and tray-type designs, along with a unique line of dual-compartment systems that guarantee 100% performance, setting a new benchmark for reliability. It's not just our designs that make us leaders—it's our deep expertise in system controls and an unwavering commitment to customer satisfaction that truly sets us apart.

But how did it all begin?

Industrial Steam was founded in 1952 in Oakland, California, by Martin "Mike" Bekedam, a self-taught engineer and electrician with a passion for invention. With 16 patents to his name, Mike's vision shaped the company's innovative spirit. He hired Jim Williams as the first employee, who quickly became the chief engineer after learning the ins and outs of the boiler industry. Together, Mike and Jim served the booming industrial market of Northern California, supporting industries like wineries, tomato processing, and meatpacking.

Initially, Industrial Steam custom-built boilers, burners, deaerators, and chemical feed systems, but as the boiler industry consolidated, the company shifted focus toward specializing in deaerators. Over the years, we've continued to lead the way in new technologies and advancements, making bold moves like relocating our primary manufacturing facility to Atlantic, Iowa, in 2002.

From its humble roots to becoming a pioneer in the deaeration industry, Industrial Steam remains dedicated to pushing the envelope and providing unmatched solutions to our customers.

Industrial Steam manufacturing plant in Atlantic, Iowa

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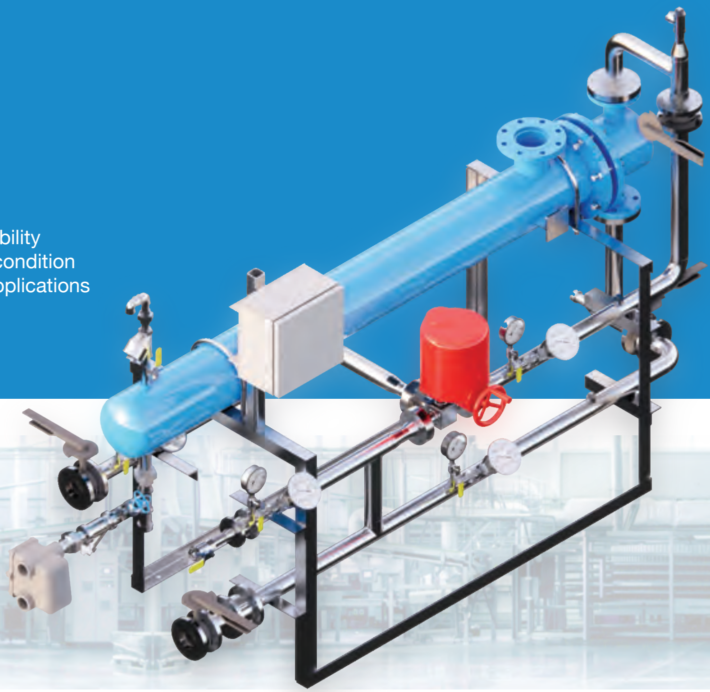
RAPID-THERM®
Hot Water System

- Packaged System
- Non-Proprietary Components
- Stainless Steel Piping
- Programmable Logic Controller

Industrial Steams RAPID-THERM system utilized a shell and tube steam to hot water heat exchanger to deliver hot water instantly to the hot water loop. The RT system seamlessly blends the high temperature water with the domestic/process water for consistent temperature so hot water is always immediately available. Allen Bradley Programmable Logic Controller insures precise control of the three way blending valve.

FEATURES
- ASME rated Shell/Tube heat exchange
- Stainless steel external piping
- Three way blending valve
- Low pressure steam control
- Packaged system
- PLC based control system
- All non-proprietary components

ADVANTAGES
- Simple compact design
- Precise temperatures reduce system variability
- Customizable to any temperature or flow condition
- High set point capability for wash down applications
- Seamless integration with existing BAS
- Readily available replacement parts



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Components

- Heat Exchanger
- 3-Way Ball Valve
- Steam Trap
- PLC

RAPID-THERMAL CAPACITIES					
	Water Side		Steam Side		100F Delta T
	Inlet	GPM	Inlet	Condensate Out	MBH
RT1	1"	16	2"	3/4"	820
RT1.5	1.5"	34	2.5"	1"	1750
RT2	2"	63	3"	1.25"	3240
RT3	3"	120	6"	2"	6174
RT4	4"	300	8"	2.5"	15435

Zero Flash High Pressure Condensate System

Industries Served

- Paper & Corrugated Box Plants
- Rendering & Byproducts
- Hospitals
- Food Manufacturing with Closed Kettles
- Tomato Processors
- Cooking and Drying

FEATURES AND BENEFITS

SAVES FUEL up to 30% by returning condensate directly to the boiler without flash loss.

INCREASES PRODUCTION by eliminating the traps for unrestricted flow from process.

IMPROVES HEAT TRANSFER by continuously purging non-condensable gases from process.

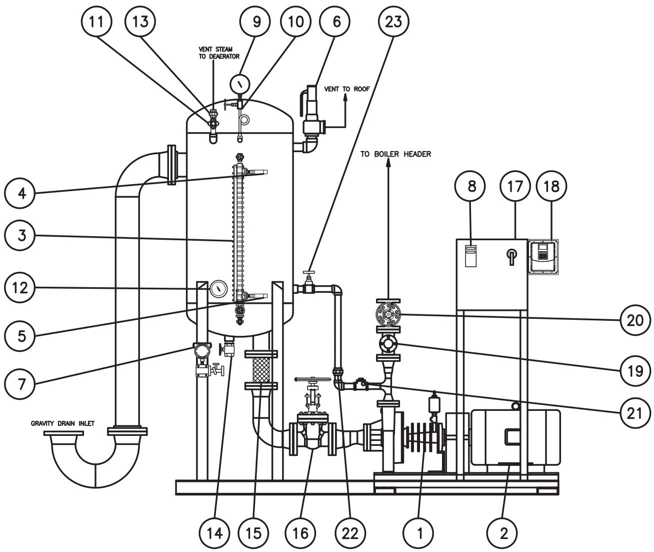
ELIMINATES STEAM TRAPS for:

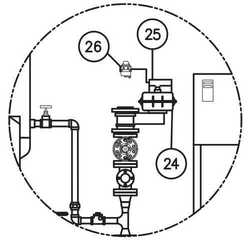
- Faster start-up
- Reduced maintenance
- Instant drainage
- Better process control
- Maximum production

PAYS BACK INVESTMENT,
often within one year.

Go to: www.industrialsteam.com
for animated sequence of operations
& downloadable specifications

Typical Installation





PNEUMATIC LEVEL CONTROL

1 Condensate Pump
2 Condensate Pump Motor
3 Reflex Sight Glass Assembly
4 High Water Alarm
5 Low Water Cut-Off
6 Safety Relief Valve
7 Level Transmitter
8 Level Controller
9 Pressure Gauge (0-200#)
10 Needle Valve (Gauge Cock)
11 Gate Valve (Vent)
12 Temperature Gauge (50º-550ºF)
13 Orifice Union (Vent)
14 Gate Valve (Drain)
15 Flex Connector (Pump Suction)
16 Gate Valve (Pump Suction)
17 Control Panel (Nema 4X)
18 Variable Frequency Drive (Nema 4X)
19 Check Valve (Pump Discharge)
20 Gate Valve (Pump Discharge)
21 Check Valve (Recirculation)
22 Orifice Union (Recirculation)
23 Gate Valve (Recirculation)
24 Level Control Valve (Discharge) (Optional)
25 I To P Transducer (Discharge) (Optional)
26 Air Filter Regulator (Discharge) (Optional)

Energy Savings Estimate - 30,000 pph Process Load

Operating Conditions:

1. Average Process(Cooker) Load: 30,000 pph
2. Steam Pressure to Process: 100 psig
3. Hours of Operation: 4,000 hrs/year (2 shifts)
4. Average Fuel Cost: $8.00 per Decatherm
5. Condensate Drains to Atmospheric Vessel:

Flash Loss = 13% (amount of condensate lost through vent)
Lost Condensate = 3,900 pph
Retained Condensate = 26,100 pph

Total Energy Lost per Hour of Operation = $39 per hour

Annual Energy Lost in Flashing Condensate = $156,000 per year

Fuel Losses at various Pressures

System Pressure psig	Volume lost due to Flashing %	Total Heat lost due to Flashing %	Fuel lost to replace lost heat** %
15	4	5	6
50	9	10	13
100	13	15	19
125	15	17	21
150	16	18	23
200	18	21	26
250	20	23	29
300	22	25	31

*Based on the replacement of the lost flash steam with makeup at 60^{o}F.
** Based on the regeneration of lost heat in a boiler operating at 80% efficiency.

High Pressure (HPR) Condensate Return System

Industries Served

- Paper & Corrugated Box Plants
- Hospitals
- Asphalt Plants
- Rail Car Heating Terminals
- Barge Terminals
- Rendering & Byproducts
- Hospitals
- Food Manufacturing With Closed Kettles
- Rubber Moulding
- High Temperature Plating Operations
- Roofing Material Plants
- Pharmaceutical Manufacturing
- Refineries
- Tank Farms

FEATURES AND BENEFITS

CUSTOMER ENGINEERED PACKAGED SYSTEM

Result in a small foot print, minimal onsite installation costs, and a single source of responsibility for all major components.

ELECTRONIC INSTRUMENTATION

Modulating level and pressure controls include HART compatible transmitters, PID loop controllers, and motorized control valves. Variable frequency drives (optional) can be employed to further increase efficiency and system lifetime.

ENERGY SAVINGS/EFFICIENCY

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

QUALITY COMPONENTS

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

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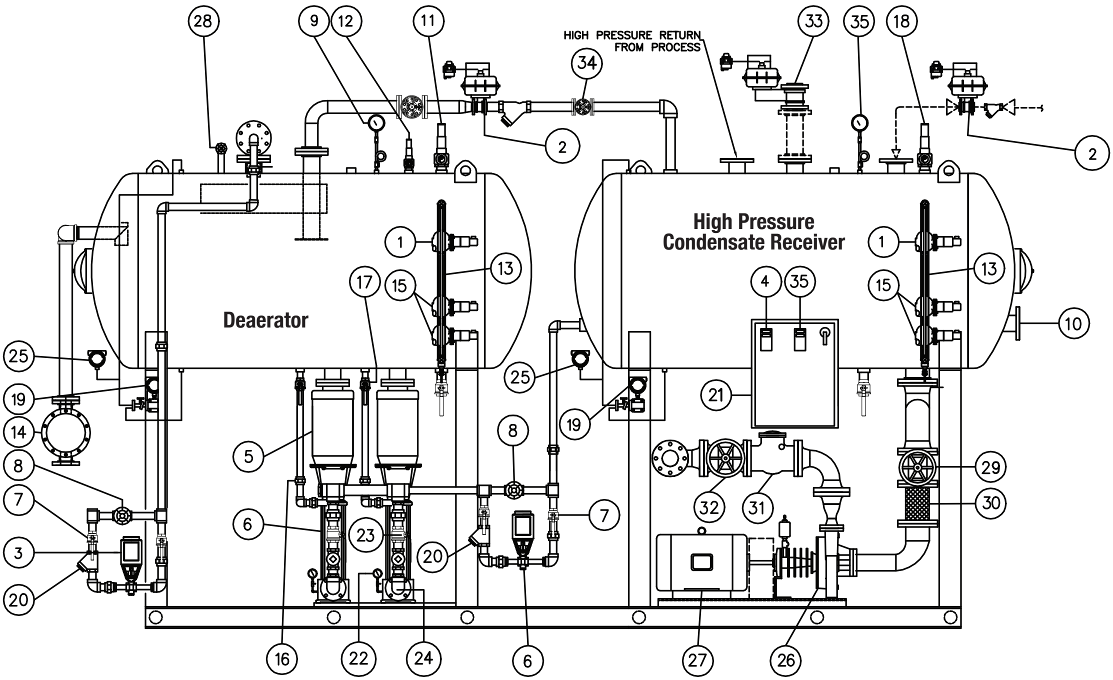


1 High Water Alarm Switch
2 Pressure Control Valve
3 Make-up Control Valve
4 Level Controller
5 Deaerator Pump Motor
6 Deaerator Pump
7 Make-up Gate Valve
8 Make-up Globe Valve
9 Pressure Gauge (0-15#) w/cock
10 Temperature Gauge w/thermowell
11 Safety Relief Valve (Set at 50#)
12 Sentinal Relief Valve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

Maximum Boiler Load			HPR		Deaerator			Approximate Weights		
Model #	lbs/hr	HP	Receiver Dimensions	Storage Capacity	Receiver Dimensions	Storage Capacity	Overall Dimensions	Shipping	Operating	Flooded
2HPR	6900	200	36"x65"	258	36"x65"	155	48" x 156"(13')	2,800	5,400	7,000
4HPR	13800	400	48"x70"	496	48"x70"	285	60" x 168"(14')	4,000	8,800	12,000
6HPR	20700	600	48"x94"	590	48"x94"	413	60" x 228"(19')	4,800	11,000	15,300
8HPR	27600	800	54"x120"	1124	54"x120"	697	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 substituited upon request
* Storage capacities are measured to overflow
* Packaged engineered systems up to 300,000 lbs/hr are available

Wet Steam Accumulators

FEATURES AND BENEFITS

- Proprietary internals produce dry steam
- Industrial components
- Vessel construction
    - Post weld heat treat
    - 100% x-ray
    - Wet magnetic particle test
- Eliminate downtime
- Eliminate boiler carryover
- Increased boiler efficiency

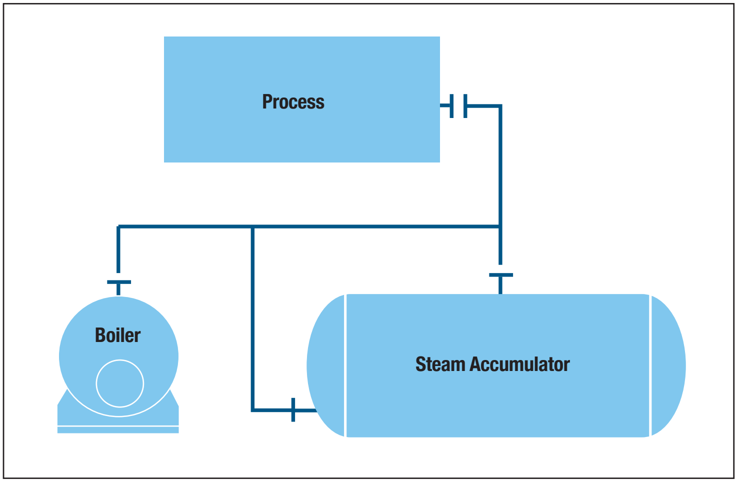
Industries Served:

- Food / Beverage
- Pharmaceutical
- Steel / Chemical / Petrochemical
- Plastics / Rubber / Foam Manufacturing

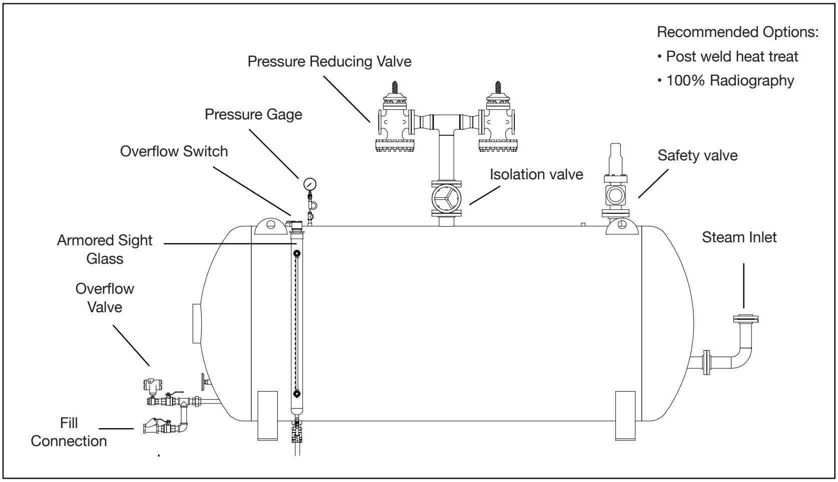
A wet steam accumulator is an un-fired pressure vessel that stores energy in the form of water. This energy is used by a process that sees a spike in demand for a short period of time. As the pressure decreases in the steam line the water in the accumulator will turn to steam and supply the process with the steam it needs for a short period of time. When the spike in demand ends the accumulator will recharge from the steam boiler.

Owners and operators are using smaller more efficient boilers. By storing energy for the peak demand period the accumulator allows more efficient boilers to be a viable option even when peak demand would require a much larger boiler. Even larger boilers that are sized for peak demand cannot respond quick enough to a spike in demand. The steam accumulator can respond immediately allowing the boiler time to ramp up.

Typical Installation



Components and Configuration



All equipment is custom engineered per application. Call us for sizing and engineering

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