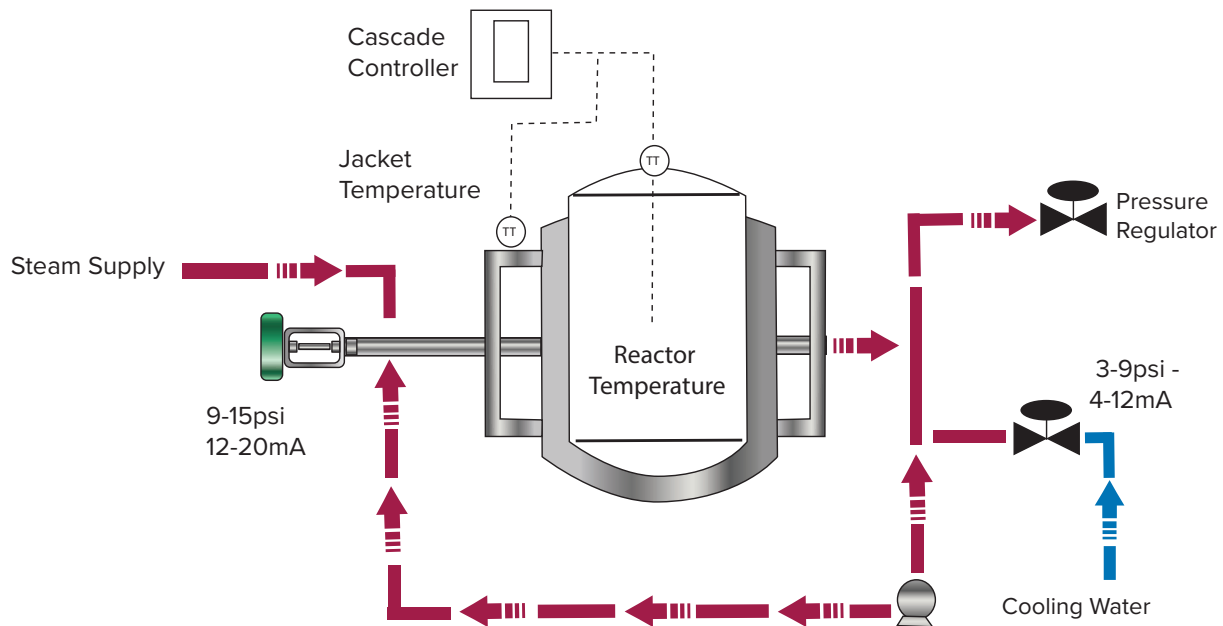




CHEMICAL PROCESSING & LIQUID SLURRIES

Improving Efficiency and Productivity While Lowering Production Costs Through Efficient Heating of Liquids and Slurries For Chemical Processing Needs

LOWERING PRODUCTION COSTS AND IMPROVING PRODUCTIVITY



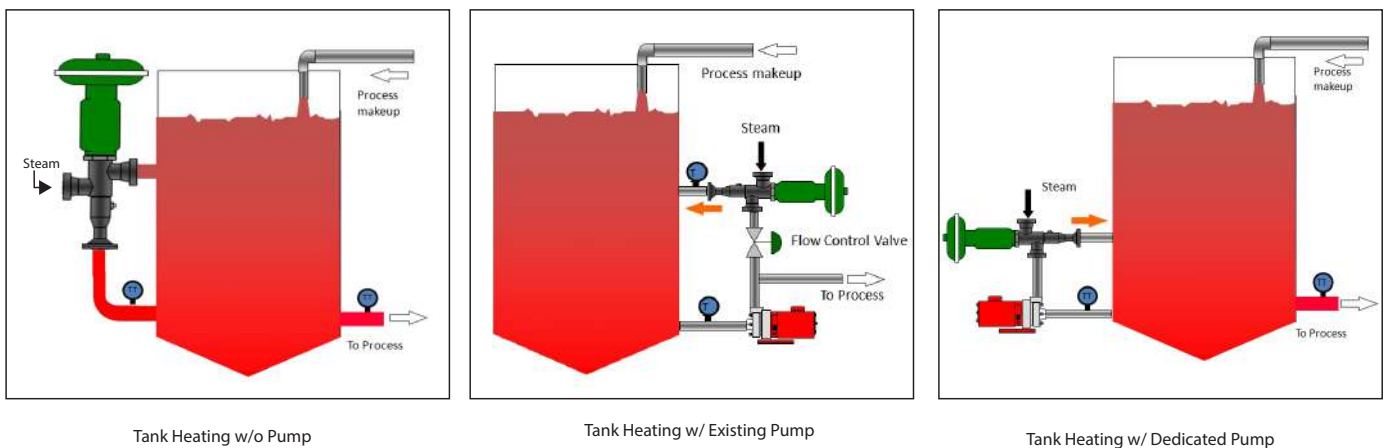
JACKETED VESSELS OR REACTORS

Chemical processing is all about achieving the ideal temperature for a suitable duration. The Hydroheater provides temperature control throughout the various heating and cooling stages eliminating hot spots. Using direct steam injection and a water jacket, we can eliminate the thermal shock associated with heating with steam and cooling with water. Accurate temperature control can often increase batch efficiencies, ultimately leading to increased production.

Hydroheaters are used extensively on jacketed reactors because they give all the benefits of efficient direct steam contact jacket water heating and provide the control that eliminates violent steam and water hammer experienced with other units. The initial temperature rise can be as fast as the available heat transfer surface, product heat sensitivity, and water circulation rate will allow. No floor space is required because Hydroheaters are installed in the vessel piping where convenient.

HEATING/WASHING

Hydro-Thermal's tank heating/washing solution allows you to clean equipment at the optimal temperature in one pass. Hydroheaters can heat the fluid going into the tank; re-circulate the tank to maintain a specific temperature, or leave the tank cold and heat the liquid exiting the tank, producing hot water on demand. Many customers see a return on investment (ROI) in 6-12 months with significant energy savings. Whether you need to heat a tank or heat on the discharge to the exact temperature, the Hydroheater can meet your needs.

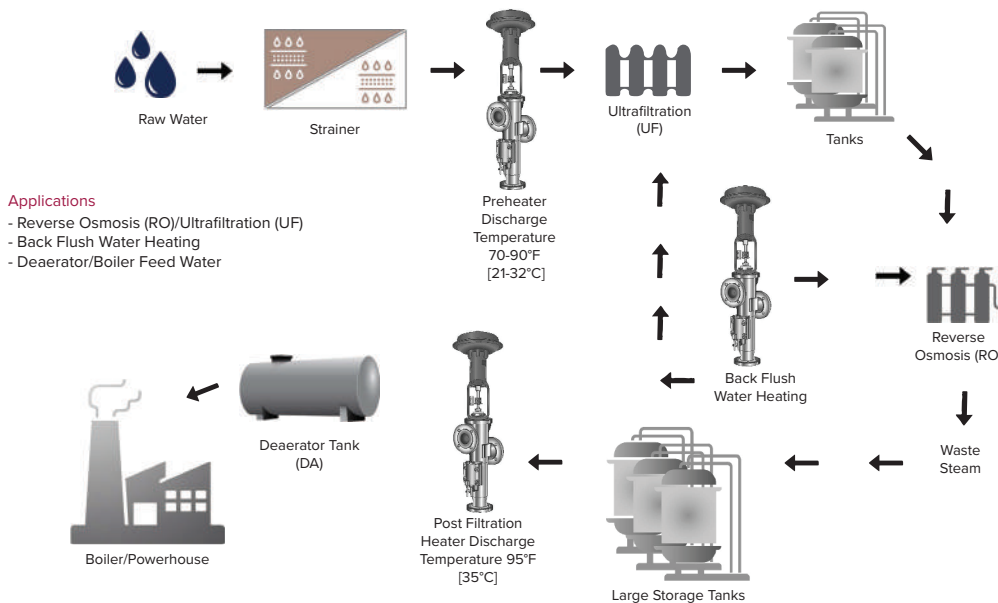


REVERSE OSMOSIS (RO)

Hydro-Thermal provides a versatile, proven water purification solution. Our products can heat RO inlet water or heat membrane back flush water while achieving precise temperature control and maintaining consistent throughput. Ultimately, a Hydro-Thermal heater can prolong your membranes' performance and life expectancy in your RO system.

RO filters are designed for a given water temperature. As the water cools, viscosity increases and RO capacity decreases to 3% per degree °F [0.5°C] when operating below design temperature. A Hydroheater can keep the inlet water temperature at $\pm 1^\circ\text{F}$ [0.5°C] of the set point so the RO can operate at the designed capacity without wasting energy overheating the water.

Similar to above, if the back flush water is heated to the desired temperature, they can optimize the amount of water used and ensure that the membranes are properly cleaned.



DEAERATOR/BOILER FEED WATER

Achieving optimal production levels can often be tied to the productivity of your plant's boiler. Ensure that you have a consistent steam supply while reducing corrosion, scaling, and fouling of your feedwater system using Hydro-Thermal's direct steam injection equipment.

Properly conditioning boiler feed water can make your boiler work more efficiently to achieve optimal performance. Water is heated to 190-200°F [88-93°C] to remove dissolved oxygen resulting in reduced corrosion and consistent boiler feedwater temperature.

APPLICATIONS

- Filter backwash water heating
- Tank car washing and heating
- Pilot plant test skids
- Mold/Die Preheating injection into the process
- Central Hot water systems
- Tank/Process water
- Process water make-up heating
- Liquids/Slurries
- Starch applications

WATER HEATING

- Jacketed reactors
- Heat Exchangers
- Tank/Fill and Wash
- Deionization Systems
- Reverse Osmosis
- Roll Mills - Metals

HEATING/COOLING SLURRIES

- PVC
- Protein
- Alumina Gel
- Starch

STERILIZATION

- Fermentation broths
- CIP systems
- Biological waste streams

HEATING LIQUIDS

- Acids
- Caustics

IMPROVED PROCESS HYDRO-THERMAL HYDROHEATER®



Hydroheaters / Jetcookers commonly outperform other forms of direct steam injection and indirect heating methods such as heat exchangers. To accomplish this, a precisely engineered, variable-area steam nozzle meters the flow at the injection point and contact with the fluid. The large pressure drop from full steam pressure to the fluid process pressure ensures high-velocity choked steam flow and instantaneous mixing of the two streams. When steam flow is choked, its velocity at the nozzle exit is constant regardless of the total mass flow injected.

The internally modulated Hydro-Thermal heaters control the injection area (cross-sectional area of the nozzle opening) to regulate the heat load precisely. The constant steam velocity results in consistent and stable operation across the full range of set-up. Hydro-Thermal's patented direct steam injection heaters are ideal for heating liquids and slurries over a wide range of viscosities and solid contents to precise temperatures. A Hydroheater's internal modulation assures strict steam control, rapid temperature management and produces predictable results. Each Hydro-Thermal heater has internal trim custom designed to each customer's specific needs and requirements.

Hydroheaters/Jetcookers control both steam flow and mixing turbulence by employing a modulating stem plug and nozzle assembly inside the heater. The precise mixing of metered amounts of high-velocity steam directly with a liquid or slurry provides instantaneous heat transfer from steam to the liquid.

WHY DIRECT STEAM INJECTION?

Benefits of not returning your condensate

Achieving optimal production levels tied to the productivity of the manufacturer's boiler. Ensure that you have consistent steam levels while reducing corrosion, scaling, and fouling using a Hydro-Thermal heating system.

- Significant energy savings with DSI
- Recycle waste steam
- No condensate discharge
- 100% latent and sensible energy utilized
- No condensate return system needed
- Optimized steam production

Suppose you struggle with precise temperature or experience steam and water loss from a regular operation. In that case, Hydro-Thermal has the solution to make your plant more efficient and save you money.

Need more information about Hydro-Thermal products?

Go to www.hydro-thermal.com or contact us at info@hydro-thermal.com

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