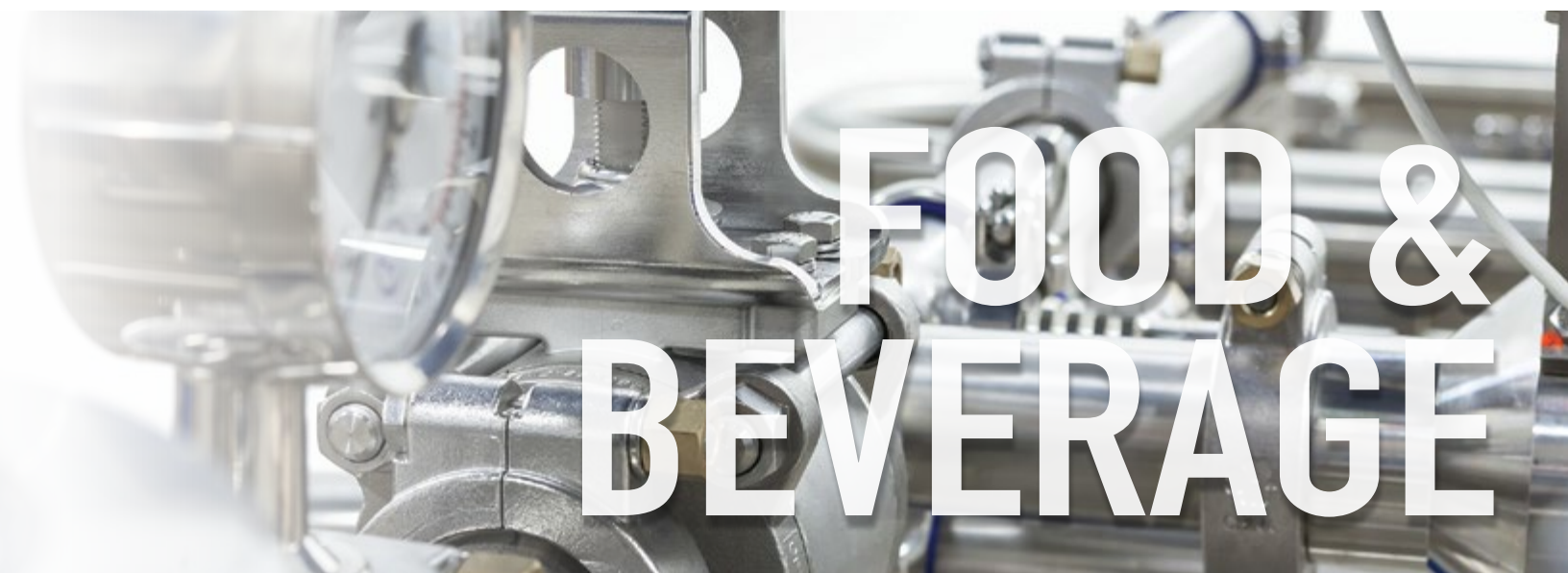




ETHANOL & STARCH



FOOD & BEVERAGE



INDUSTRIAL

hydro 
THERMAL®

STEAM HEATING

innovation expertise



Hydro-Thermal is the global leader in the development and manufacturing of Hydroheaters. Our more than 80 years of steam heating expertise and innovation have earned us a world class reputation in the wide range of industries we serve.

Through our headquarters and vast global channel partner network, Hydro-Thermal is represented in six continents. Our technology is used in facilities in more than 85 countries to heat water and process fluids, precisely and efficiently.

Hydro-Thermal is ISO certified, with PED, CRN, CE, 3A and FDA certifications. We are committed to delivering high value, superior products and exceptional customer service with a performance guarantee that is unsurpassed in the industry.

A few recent awards that recognize our commitment to innovation, evolving our expertise, and ultimately our customer, include:

- 2016 Governor's Export Achievement Award
- 2016 Fastest Growing Firms
- 2015 Future 50 Company
- 2014 President's E Award for Exports
- 2014 IQ (Innovation Quotient) Award

100% PERFORMANCE WARRANTY

If, at any time and for any reason, a Hydroheater should fail to perform as designed,* and Hydro-Thermal is given adequate opportunity to provide remedy, Hydro-Thermal will, after receipt of the unsatisfactory unit, reimburse 100 percent of the original price.

**Proper replacement of wear parts required*



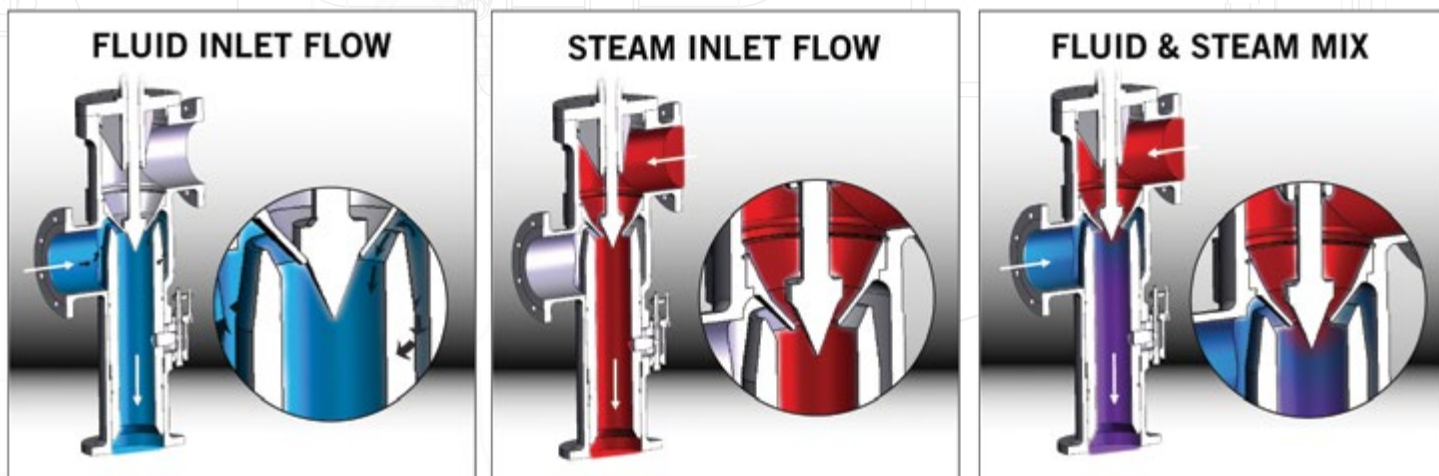
PED

CRN



Hydro-Thermal's heaters utilize Direct Steam Injection (DSI). Mixing steam directly with process fluids or slurries is ideal for heating liquids over a wide range of viscosities and solid contents to precise temperatures, while also transferring 100% of steam's latent and sensible energy.

OUR TECHNOLOGY



How It Works

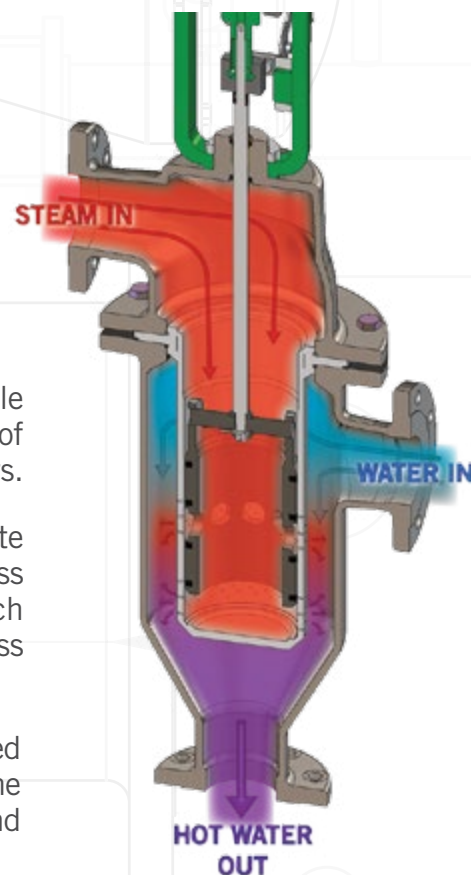
A Hydroheater's internal modulation assures exacting steam control, rapid temperature management, and produces predictable results.

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

Steam is mixed with the liquid through tiny holes in a combining tube. A precisely engineered, variable-area steam nozzle meters steam flow at the point where steam and liquid first contact and mix. The nozzle generates a steam pressure differential that chokes the mass flow rate of steam and accelerates it to sonic velocity unique to Hydro-Thermal heaters.

When the steam flow is choked, Hydro-Thermal heaters internally modulate the steam flow by adjusting the flow area between the steam and process fluid. Only the cross sectional area of the steam nozzle changes which provides process stability through a much wider variation of process conditions.

The stem plug rises and falls based on the amount of steam that is required and responds immediately and precisely to changes in steam demand. As the mixing occurs, steam condenses instantaneously, eliminating hammer and vibration, also causing a turbulent mixing action that self-cleans the unit.



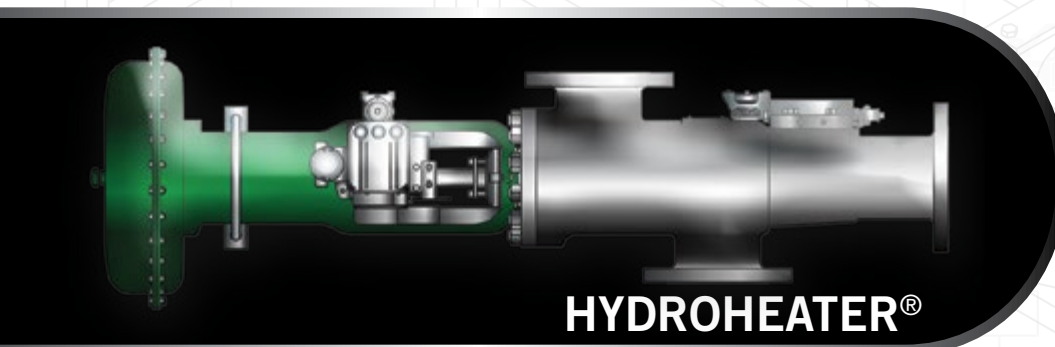
PRODUCTS

Hydro-Thermal heaters can be purchased as individual units, an entire skidded system, or any configuration between a heater and a skid, that can be easily plumbed into your current system. Each is custom designed to your operating conditions and carries a 100% performance warranty.



**Completely customized
solution-designed,
built and installed to
individual specs.**

INDUSTRIAL

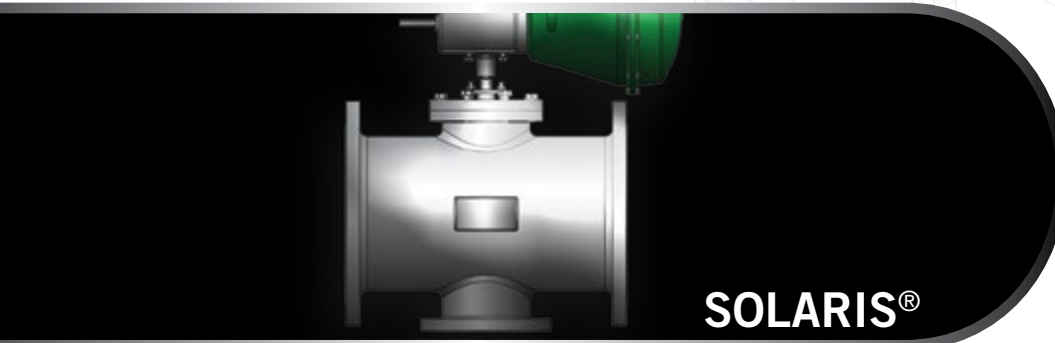


(Also known as the Jetcooker™)

Heats a wide range of liquids from
water to heavy viscous slurries

Uses: pulp and paper applications,
biofuels, ethanol and starch
conversion, large volume water,
anaerobic digestion, cooking & more

Volume capability: 1 up to 6,700 gpm [.2 up to 1,522 m³/hr]



Optimized straight-through heater,
handles heavy slurries, medium
consistency pulp stock or higher
solids content.

Uses: medium consistency pulp
stock, bleaching, anaerobic digestion,
and other fibrous slurries

Volume capability: 5 up to 25,000 gpm [1 up to 5,678 m³/hr]

WATER ONLY

Water only applications

Uses: central hot water systems, tank heating/filling, washdown, clean-in-place (CIP), sanitation, clean-up can topping, cook pots, chemical reactors



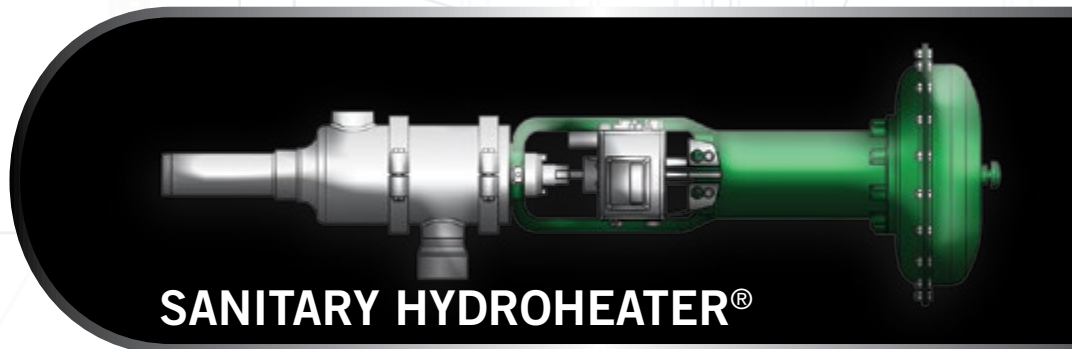
EZ HEATER® & EZ SKID™ SYSTEM

Volume capability: 2 up to 1,350 gpm [.5 up to 306 m³/hr]

SANITARY

Patented 3A certified heater manufactured in stainless steel(s), heats a wide range of liquids from water to heavy viscous slurries

Uses: food and beverage cooking, cheese and dairy production, sauces, and pharmaceutical fluids



SANITARY HYDROHEATER®

Volume capability: 1 up to 180 gpm [.2 up to 41 m³/hr]

Sanitary 3A, CE certified & FDA compliant, stainless steel system for starches, slurries and high solid products

Uses: tomato paste, sauces, soup stocks, salsa, meat slurry, vegetable blanching, cheese production, dairy based drinks and sauces, beverages



Volume capability: 5 up to 200 gpm [1.1 up to 45 m³/hr]

Unlike heat exchangers, kettles, or solutions that appear similar, Hydroheaters have many advantages and benefits that make them unique.

WHY IT'S BETTER

Hydroheaters are not a one size fits all solution. They consistently outperform heat exchangers and other fluid heating systems since each Hydroheater is created in response to the input you provide. Hydro-Thermal listens to your needs and custom designs a solution to meet the specific requirements of your industry, your company, and your application.

PRECISE TEMPERATURE CONTROL

Internally modulated steam means responsive and precise temperature control (within $\pm 1^{\circ}\text{F}$), instantaneous temperature attainment, and rapid heat transfer.

ENERGY EFFICIENCY

Hydro-Thermal's heaters are 100% energy efficient. They utilize both the latent and sensible heat available, ultimately resulting in a 20-30% energy savings.

LOW MAINTENANCE

Our simple design and minimal moving parts mean you will spend little time on maintenance. Sonic velocity creates a self-cleaning action that eliminates process interruptions, downtime, and costly chemicals.

QUIET OPERATION

The Hydroheater's patented internal modulation is so smooth it eliminates hammer and vibration. It's so quiet; you might not know it's there.

COST SAVINGS

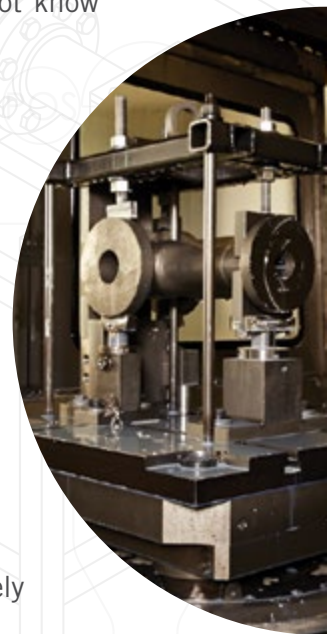
Our system responds immediately to changes in set point, flow rate, pressure variation and process upsets—saving you time, money and frustration. Through this, performance is optimized under varying conditions, production maximized, and disruptions virtually eliminated.

SMALL FOOTPRINT

Efficient design means freeing up production floor space, saving you up to $\frac{3}{4}$ of your space. Our system also eliminates need for condensate return systems, further saving space and costs.

LIFE CYCLE

With quick and easy installation the savings start immediately when you purchase a Hydroheater. With less than an hour of annual maintenance your Hydroheater will operate safely and precisely for decades. Our 100% performance warranty assures your heater's long life.



STEAM HEATING **innovation expertise**

At Hydro-Thermal we constantly seek ways to reinvent our products and processes to be more efficient and effective for our customers. In our more than 80 year history of direct steam injection innovation, we've evolved our expertise from paper mills in Wisconsin to a vast array of industries in more than 85 countries around the world.

We realize that creating an environment where creativity thrives is critical to our company and our customers' success. Our culture fosters innovation throughout the organization and encourages our engineers to continually develop new products and product enhancements.

Also fueling our innovation is our strategic research partnerships with people outside our building, our customers. Leading Midwestern universities, research associations and independent R&D engineering firms all play a role in challenging our fluid heating specialists. The Hydro-Thermal Partners in Technology program facilitates improvements and enhancements to current products, as well as, and inspires new product development.



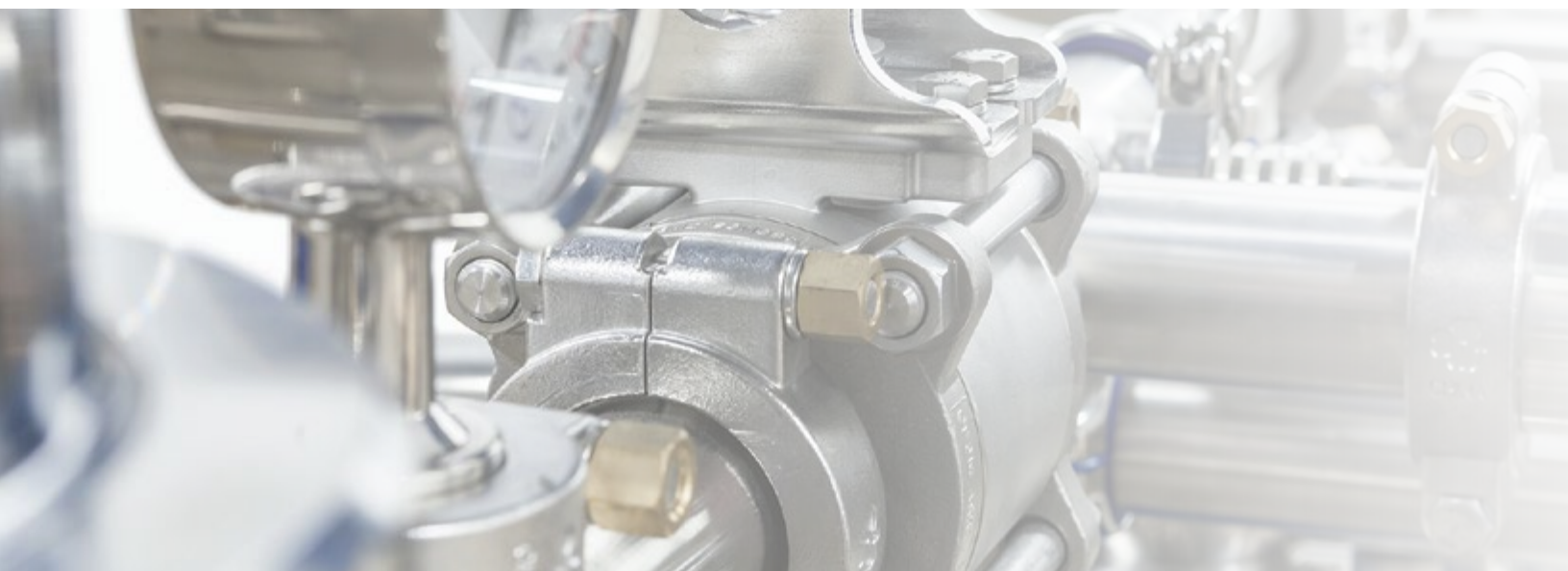
Since 1963 Hydro-Thermal has held patents on our steam heating technology. We currently hold more than a dozen active patents which are registered in multiple foreign countries. We also have four patents pending on new heater technologies, are also named in over 40 process patents. Our products are specified in systems developed by leading system integrators and are tied to over 60 of these off-shoot product patents.



PED

CRN





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