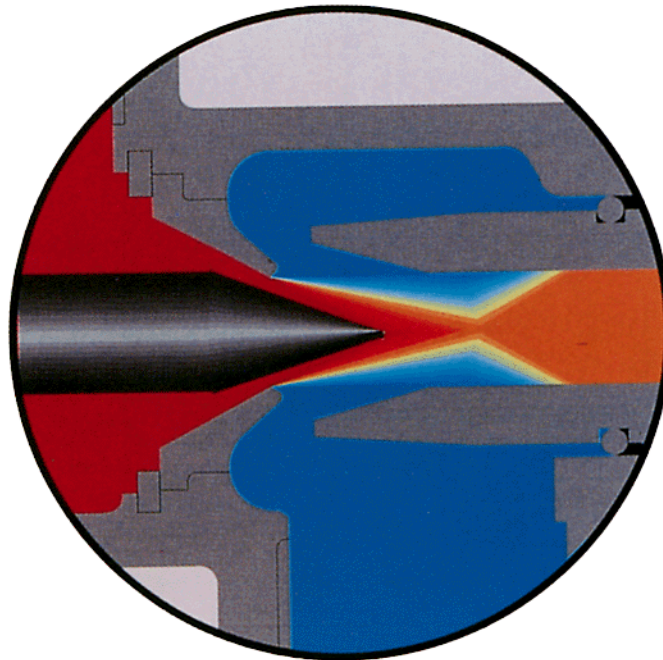


EFFICIENT STEAM HEATING *of* LIQUIDS *and* SLURRIES



hydro 
THERMAL®

HYDROHEATER®

Direct Injection Steam Heaters

attec

Starch Cooking Systems

HYDROHEATER— A SOPHISTICATED DEVICE *for* PUTTING HEAT *in* YOUR PROCESS

The
HYDROHEATER
is the most efficient,
maintenance free, heat transfer
device available for heating
water miscible liquids and
slurries with steam.

The HYDROHEATER is
installed in your process piping
in the same manner as a control valve.
It transfers heat by injecting precise
amounts of steam at high velocity into
your liquid or slurry. The high velocity
steam disperses the liquid or slurry into
tiny droplets to create the large surface
area necessary for the most rapid and
efficient heat transfer.

The amount of steam required to provide
the desired temperature of your liquid
or slurry is controlled *within* the
HYDROHEATER. Through the use of
a variable (area) steam nozzle inside
the HYDROHEATER, steam flow is
modulated at the point where steam and
liquid first contact and mix. This precise
method of steam flow control is called
internal modulation.

THE HYDROHEATER'S
EXCLUSIVE DESIGN
PROVIDES ADVANTAGES
NO OTHER TECHNOLOGY
or DEVICE CAN OFFER.

100% Thermal Efficiency

- The Hydroheater design uses both the latent and sensible heat of the steam.
- Rapid heat transfer permits a compact design, with no heat lost to the atmosphere.
- No heat transfer barrier means elimination of poor performance due to fouling, and ensures consistent efficiency over the life of the HYDROHEATER.

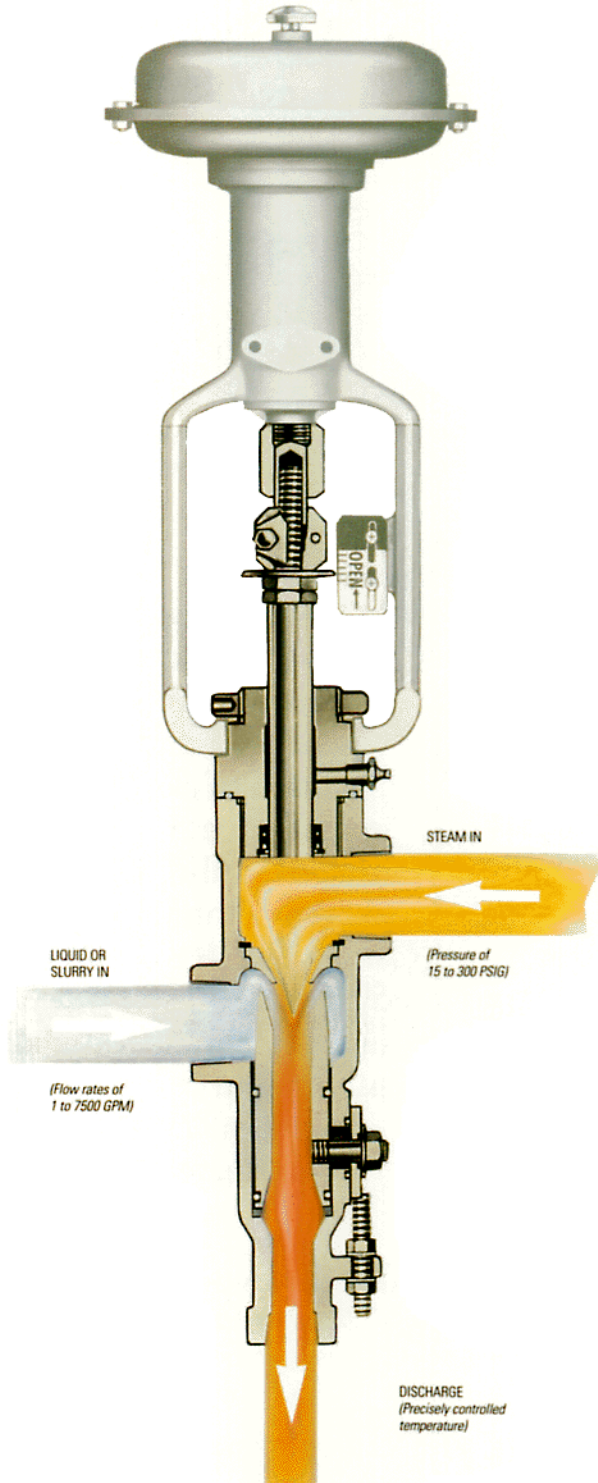
Low Maintenance

- No scaled/fouled tubes or plates to clean - ever!
- Continuously cleaned by its own turbulent mixing action.
- No need for expensive condensate return systems.

Smooth, Precise Operation

- High velocity mixing and internal modulation of steam provide smooth, stable operation.
- Internal modulation of steam provides enhanced steam and liquid flow turndown.
- Precise temperature control to $\pm 1/2^\circ\text{F}$ ($1/4^\circ\text{C}$) possible even with variable flows and pressures.
- Discharge temperature of liquid or slurry responds instantly to instrument signal input.

AUTOMATIC HYDROHEATER



THE HYDROHEATER ALSO OFFERS THESE ADVANTAGES

16 Sizes Available

- Liquid flow rates to 7500 GPM.
- Steam flow rates to 150,000 lbs/hr.

High Solids Capability

- Heats heavy viscous slurries up to 75% solids.
- Simple geometry eliminates plugging.
- Turbulent mixing action eliminates scaling from high solids solutions.

Rugged Design

- Designed in accordance with Power Piping Code ASME B31.1a.
- 300 PSIG construction.
- Heavy duty construction for continuous service under severe operating conditions.

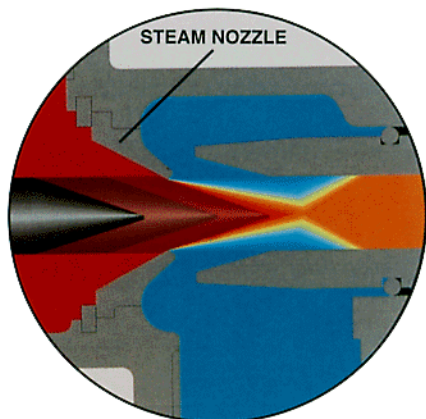
Variety of Alloys

- Stainless steel (316) or Ductile Iron available from stock.
- Cast steel, Hastelloy, Alloy 20, Bronze or other alloys per your requirement.

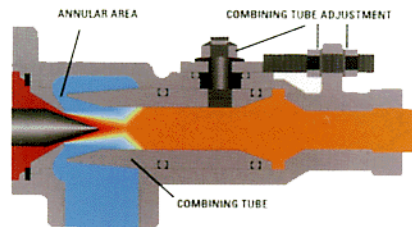
H Y D R O - T H E R M A L

PRECISE CONTROL, STABLE OPERATION *and* ENHANCED TURN-DOWN— *the* BENEFITS *of* INTERNAL MODULATION *of* STEAM

The HYDROHEATER provides smooth and stable operation over an extended range of steam and liquid flow rates by utilizing *internal modulation* of steam. Steam flow control is accomplished by a choked, variable area steam nozzle within the HYDROHEATER. Steam nozzle exit pressure remains constant from 0-100% of steam flow, because the point of control is close coupled to where steam contacts the liquid or slurry. This eliminates the potential for pressure upsets and ensures smooth and stable operation over a wide range of steam and liquid flow rates.



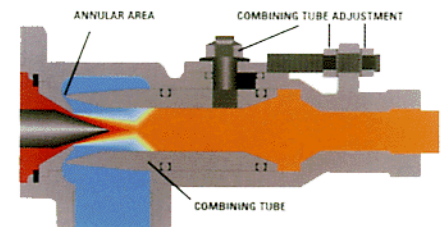
MORE FLEXIBILITY *and* CONTROL *to* OPTIMIZE YOUR PROCESS *with a* FULLY ADJUSTABLE CONDENSING REGION



Combining-tube adjusted to 50% open position.

The combining-tube adjustment provides control of liquid or slurry velocity at the steam/liquid interface. This adjustment gives the user additional control of the condensation process to ensure smooth and stable operation. Combining-tube positions less than 50% open increase liquid pressure drop across the HYDROHEATER by reducing the annular area through which liquid must flow. Combining-tube positions greater than 50% open decrease liquid pressure drop by streamlining the flow path of the liquid.

UNIFORM HEATING *of* HEAVY, VISCOUS SLURRIES. COMPLETE COOK-OUT *of* STARCH *and* PROTEIN



Combining-tube adjusted to nearly closed position.

When heating or cooking heavy viscous slurries, a reduced annular area results in a ribbon-like stream of slurry that is evenly heated and easily mixed. In this application, the combining-tube adjustment can also offer additional mechanical shear, ensuring steam contact with all the slurry granules for the most complete and uniform heating.

CHOICE of MODELS *and* ACTUATION



Automatic Series K
(Flanged connections from 2-1/2 - 12 inches)



Automatic Series M
(Threaded connections from 3/4 - 2-1/2 inches)

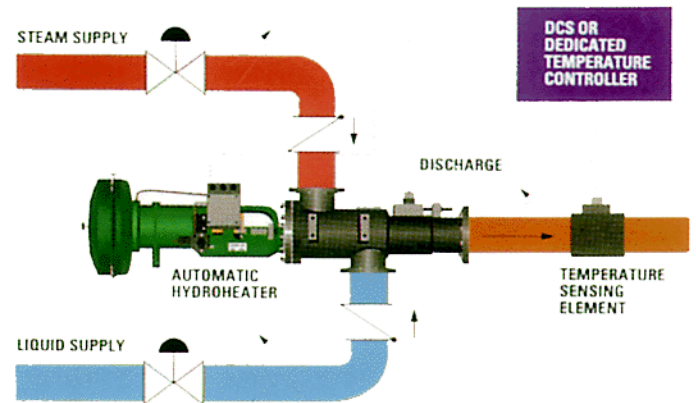


Manual Series M
(Threaded connections from 3/4 - 2-1/2 inches)



Automatic Series A
(3A certified. Tri-clamp connections)

HYDROHEATERS INSTALL EASILY *in* YOUR PROCESS

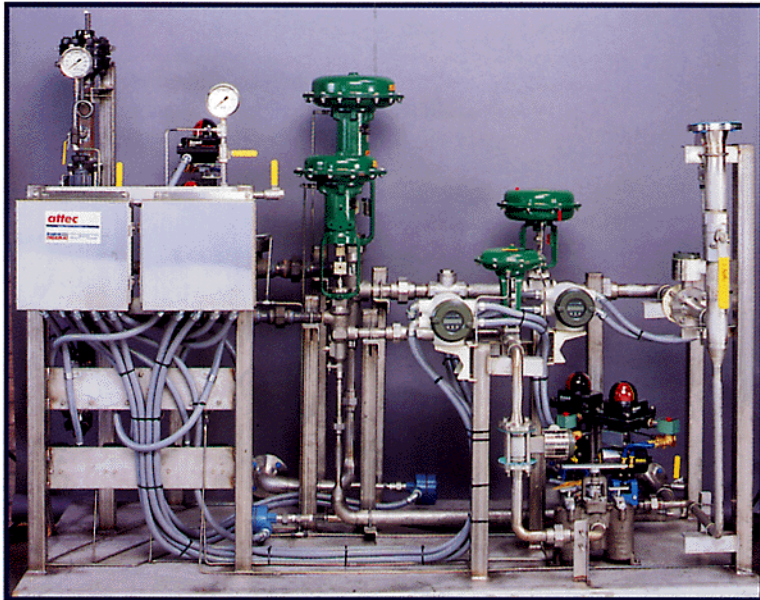


The HYDROHEATER is the simplest steam heating device to install in your process. The compact design, which controls steam flow internally, eliminates the need for a modulating steam control valve. The HYDROHEATER can be installed in any position your piping arrangement requires. Expensive condensate return systems are not required.

All 16 sizes of HYDROHEATERS are available with either automatic or manual steam flow adjustment. Automatic models use Fisher® reverse acting diaphragm actuators for fail-close operation. Manual HYDROHEATERS utilize a threaded stem and hand-wheel to control steam flow. Also available are cylinder actuators, positioners and I/P transducers, as well as equipment by other manufacturers.

A T T E C

FROM THE ATTEC DIVISION OF HYDRO-THERMAL



ENHANCED
PRODUCTIVITY,
LOWER MATERIAL
COSTS *and*
IMPROVED
PRODUCT QUALITY.

**...FOR THE MOST COMPLETE AND CONTROLLED
STARCH COOKOUT YOU CAN BUY.**

We know the science of starch cooking better than anyone. We have built more unique, specialized systems than anyone, using Hydro-Thermal's years of application experience and technical expertise: systems engineering, process control, instrumentation, fabrication and start up.

Most important of all, we are the only company that can build systems using the exclusive Hydroheater®. Thousands of applications over decades of use have proven that the ultra-efficient Hydroheater, in an effectively designed and controlled ATTEC system, controls starch cookout more accurately than any other jet cooker.

ATTEC systems are designed, built and installed to the individual specifications of your process. They're not "pulled off the shelf" and "forced" to work. An ATTEC system includes a skid-mounted piping assembly with an integrated, customized, PLC-based, fully automated control panel. Your process can be monitored at all important points without the operator ever having to leave the control room. ATTEC systems are also readily interfaced with distributed control systems. Ongoing, rapid-response technical assistance and support is only a phone call or email message away.

attec

Starch Cooking Systems

H Y D R O - T H E R M A L

hydro 
THERMAL®

The Leader in Engineered Liquid Heating Systems

HYDROHEATER®

Direct Injection Steam Heaters

attec

Starch Cooking Systems



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 a remedy, Hydro-Thermal will, after receipt of the unsatisfactory unit, reimburse 100% of the original purchase price.

**Proper replacement of wear parts required*



Hydro-Thermal Corporation is able to make this offer because of our commitment to ensure that the Hydroheater you buy has been engineered to meet your performance specifications, and that every product we manufacture meets our own stringent quality standards.

We're certain you'll be more than satisfied with our people, products and services, and we welcome the opportunity to show how they can benefit you and your operation.

HYDRO-THERMAL CORPORATION

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