

## Direct-contact Water Heating

PERCO-ACE - high efficiency  
alternative to water heating  
with steam or hydronic boilers



# Improve efficiency by 20%

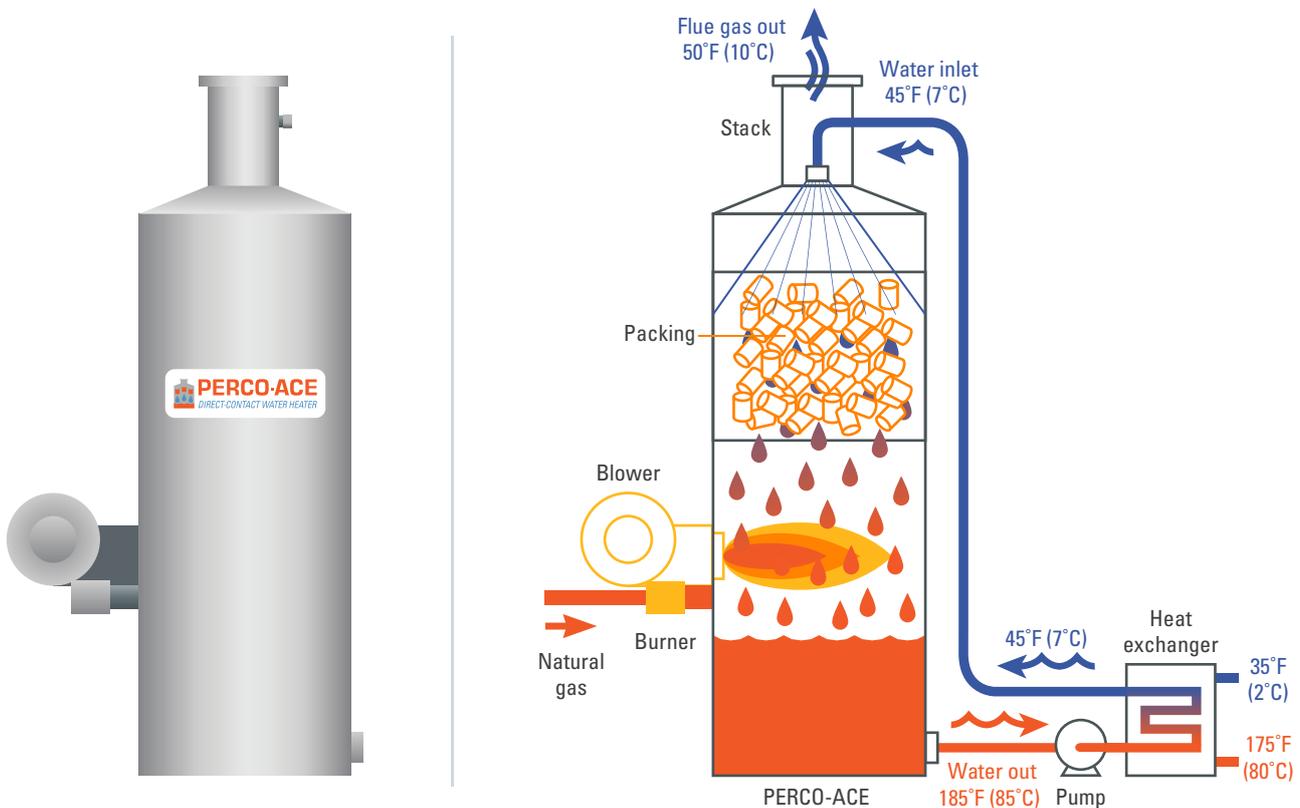
Many industrial and institutional facilities heat water with steam. While steam remains one of the most effective methods for transporting large quantities of energy around a plant, if a site's heating requirement is predominately hot water, they can benefit from a high-efficiency alternative.

Thermal Energy's **PERCO-ACE** direct-contact water heater typically operates at over 90% efficiency, resulting in water heating savings of over 20% when compared to heating with steam.

## What makes direct-contact water heating so efficient?

The typical boiler efficiency in a steam system is approximately 80%. However, further losses of 10% to 20% usually occur within the distribution network. As a result, steam-to-water heating generally achieves an overall efficiency of only 60% to 70%.

In a direct-contact water heater, cold water enters the unit at the top and is then distributed over the packing surface. As water penetrates down through the packing, it comes in "direct-contact" with the rising, hot products of combustion. The heat contained in the gas is then transferred to the water with maximum efficiency. The heated water is collected at the bottom and then pumped directly to the process, or across a plate and frame heat exchanger to transfer its energy to a building heating loop or process fluid. This significantly reduces any system losses and minimizes the flue gas temperatures.



# Who needs a direct-contact hot water heater?

Most operations with a boiler plant can take measures to become more efficient. However, our direct-contact hot water technology is particularly suited to use in:

- Compact sites with a large low temperature hot water requirement, such as the Food and Beverage sector – particularly meat rendering plants or abattoirs
- Facilities with a high domestic water or space heating requirement, including Healthcare, Universities, Hotels, Resorts, Apartment Buildings, and Residential Complexes
- New or retrofit locations with space limitations. Units can also be installed outside



## What impact will moving to direct fired hot water heating have on operations?

Aside from the increased efficiency, one of the key benefits of our direct-contact water heating units is that they are not classed as a pressure vessel. This means that specialist maintenance and regular health and safety inspections are not required in the same way, allowing processes to operate continually. Hot water of up to 185°F (85°C) is instantaneous, promoting productivity while eliminating waiting and shutdowns.

The all stainless-steel construction results in an industry leading average product lifecycle of 30 years, and each unit comes with a five-year guarantee.

The direct-contact design also contributes to the durability of the units. Corrosion, caused by condensation, is not an issue as it might be in other condensing water heater technologies such as tube (indirect) hot water boilers. This is because all surfaces remain wet countering spot corrosion and the dielectric effect.

Finally, this solution comes with the added benefit of providing pollution prevention and control. Since less fuel is being consumed, carbon emissions are reduced, and particulate matter from the flue is vastly reduced due to the scrubbing effect of the water spray. This means organizations can use these projects to support their sustainability commitments.

Ultimately, the solution has been designed to provide **higher efficiency over a longer period – all at a lower cost to your organization.**

### Achieving efficiency to suit you

In an unoptimized steam system, just 55% percent of fuel input results in useful heat output. If you choose to continue to operate with steam, there are other ways to improve efficiency.

Thermal Energy's FLU-ACE® and HeatSponge heat recovery technologies can help minimize stack losses to increase efficiency by up to 20%. In addition, our low-maintenance GEM™ Steam Traps eliminate the 10% of losses caused by steam traps.

For more information, visit [www.thermalenergy.com](http://www.thermalenergy.com).





### High efficiency

- 90% to 99% fuel to hot water efficiency
- Low carbon emissions and reduced emission of atmospheric pollutants
- Maximum flue gas temperatures no more than 10°F (5.5°C) greater than the temperature of the incoming water being heated



### Return on investment

- Lower cost than conventional steam boilers, hot water heaters, and hydronic boilers
- Rapid unit start-up (instantaneous hot water production)



### Minimal maintenance

- Stainless-steel corrosion resistant construction
- No supervision required (unit is not classed as a pressure vessel)
- Can be installed on both new and retrofit projects



## Thermal Energy International

Thermal Energy International is a full service, design-build firm with engineering accreditation. Established in 1996, our team of professionals is highly experienced in plant and process energy efficiency evaluations and innovative solution development.

We design, manufacture and deliver custom solutions which reduce energy costs, improve efficiency and reduce the environmental impact of your facility.

**Join the growing number of energy efficient organizations making their heating systems more efficient than ever.**

