

Technologies

Sub-Cooling Steam

The helical coil design of our WaterWizard family of products achieves thermal efficiencies in excess of 90% and ultimately requires less steam to perform a given duty when compared to any other steam-to-water heat exchanger design. In addition, recovering more energy (BTU/hour) from each pound of steam, the equipment is engineered to “subcool” condensate and offers these additional advantages over conventional products:

- Flash loss is eliminated
- Energy use is reduced by up to 15%
- Cost of makeup feed water and treatment chemicals is reduced
- Heat loss from condensate return piping can be reduced by up to 75% (or more)
- No trap is needed in most applications
- Condensate pump motor and seal life is increased
- Impeller cavitation damage is reduced
- District steam customers reduce condensate coolant water and lower sewer charges

Latent Heat Exchange in Steam-Fired Equipment

All steam-to-water heat exchangers use the latent energy found in the steam to function. In short, as the gaseous incoming steam is forced into a liquid state, energy is released and transferred through the surface of the exchanger in the form of heat. After this vaporization occurs, the remaining steam and condensate fluid is expelled and directed to vents and traps in conventional equipment. The energy or heat transfer process is complete and the job is done.

Sub-Cooling Increases Efficiency

The unique, helical coil design of AERCO equipment goes much further – taking advantage of all the available energy in every pound of steam. It leverages the latent heat extracted from the vaporization of steam as described above. Then, through sub-cooling, it also takes advantage of the “sensible heat” of the high-temperature liquid condensate within the heat exchanger.

The helically shaped coils maximize the surface area of the heat exchanger, providing ample opportunity for the high-temperature liquid condensate to pass its sensible heat to incoming water. This energy transfer is driven by a dramatic pressure drop, which dramatically cools the saturated steam as it passes through the heat exchanger and is enhanced by the equipment’s fire-tube design. As the condensate and remaining steam (typically 212°F to 250°F) pass through the stacked system of coils, they are continually surrounded by the larger body of much cooler water in the pressure vessel. This principle is taken to its extreme in the WaterWizard B+II unit, where the contents of all coils are forced for a final pass through a dedicated sub-cooling coil located at the very bottom of the pressure vessel, where incoming water enters and the coolest water remains settled.

The sub-cooling process reduces both the volume and temperature of condensate created. Temperatures typically drop to <140°F with no drains or traps necessary.



Heating and Hot Water Solutions

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