

SmartPlate™ Heaters Replace Gas-Fired Units and 5,000-Gallon Storage Tank at High School

Gary Persechetti, director of Public Facilities for Chelmsford High School in Chelmsford, MA, needed to replace two A.O. Smith gas-fired water heaters. Seven years old, the two 400 MBTU/hr. Burkay units were nearing the end of their useful life. With one of the two units installed as emergency back-up (and later cannibalized for parts that had worn out on the active duty unit), the school relied on a 5,000-gallon storage tank to meet the DHW system's estimated 23 GPM peak load.

Rather than replace the non-condensing, copper-fin tube heaters, New England Combustion recommended retrofitting Chelmsford's DHW plant with an instantaneous solution that employs a brazed plate-style, stainless steel SmartPlate water-to-water heater supplied by the school's Benchmark condensing boiler plant. The proposed solution eliminates the disadvantages of the poor performing, storage-dependent system and opens the door to significant on-going operational savings.

Just one easy-to-maintain SP33 heater and a 200-gallon boiler-side buffer tank will enable the school to reduce costs during the summer months when one, high-turndown, condensing boiler supplying 145°F water is used to support DHW demand. DHW expenses will be virtually eliminated during colder weather when all boilers are employed and DWH demand is almost completely absorbed by the space heating load. In the first year, it was calculated that the school saved more than \$5,000.

RETROFIT REDUCES:

- Fuel Consumption & Carbon Emissions
- Electrical Consumption
- System Footprint
- Scale Build-Up & Thermal Failures
- Condensate Corrosion
- Legionella Risk

Facility fully leverages condensing boiler plant to maximize energy savings.

BEFORE



The previous system required a 5,000-gallon storage tank, shown above.

AFTER



The new system with a SP33 heater and 200-gallon boiler-side buffer tank.

The SmartPlate Difference

Widely recognized as the most thermally efficient, longest-lasting, water-to-water heat exchangers, SmartPlates' stainless steel, brazed-plate, and plate and frame heaters can utilize boiler water as little as 5°F above the desired DHW temperature. They are ideal for use with condensing boilers in low-temperature systems.

• **Reduced Fuel Consumption & Carbon Emissions** – Although the cold water inlet temperatures available in the Northeast are ideal to supply condensing equipment directly, incoming potable water had to be routed through the DHW storage tank so it could be pre-mixed to protect the original, non-condensing, gas-fired heaters. To reduce the risk of Legionella, the storage tank was maintained at 140°F. When the temperature fell below this target, tank water was pumped back to the heaters and reheated. Operating at such high temperatures – and continuously re-heating DHW in the storage tank – wastes energy and is compounded by radiant losses of the system. Conversely, the new tankless solution enables Chelmsford High School to meet lower 120°F DHW requirements while also taking advantage of an outdoor reset schedule that promotes low boiler supply water temperatures during warm weather to maximize energy savings.

• **Reduced Electrical Expenses** – Maintaining 140° F in the 5,000-gallon storage tank required frequent operation of two, 5 hp pumps. The expense to operate and maintain these recirculation lines, as well as the risk of Legionella, was eliminated when Chelmsford moved to an instantaneous DHW solution.

• **Reduced System Footprint** – The new SmartPlate unit measures <10ft², less than half the footprint of the two original heaters. A 200-gallon, 36" x 80" boiler-side buffer tank, used during the summer only, replaces the 5,000-gallon 8' x 14' DHW tank, further reducing the footprint.

• **Minimize Scale Build-Up & Thermal Failures** – SmartPlate's potable side circulator maintains consistent flow through the heat exchanger at velocities that prevent scale build-up. Quick disconnects provide easy access to the heat exchanger if mechanical cleaning is required. In contrast, scale builds up easily in high-temperature water-tube designs with no effective way to remove it from inside the tubes. In the short term, scale creates a barrier-to-heat transfer and diminishes heater capacity. Over time, tubes begin to overheat, which leads to pin holes, cracks and, ultimately, thermal failure.

• **Avoid Condensate Corrosion Failures** – Despite the school's best efforts to pre-warm water entering the original heaters, unintentional condensing can quickly lead to condensate corrosion in copper-fin tube heaters.



Specifications

Domestic Water Pressure Drop	8 PSIG@max. rated flow
Ambient Operating Temperature	0°F to 131°F
Electrical Requirements	120/1/60 Hz 2 Amp
	220/1/50 Hz 2 Amp
Standby Amperage Draw	2 Amp
High Limit "Tripped" Amperage Draw	2 Amp
Max. Continuous Water Flow Rate	90 GPM
Max. Boiler Water Pressure & Temp	150 PSIG @ 220°F
Max. Domestic Water Operating Pressure	150 PSIG
Adjustable Temperature Control	up to 180°F
Adjustable High Limit Control	up to 200°F
Water Connection Inlets/Outlets	1.5" FNPT
	(Models SP23 & SP33 only)
	2" FNPT (All other models)
Weight (lbs.)	SP23 320 (dry), 340 (installed)
	SP33 340 (dry), 370 (installed)
	SP45 400 (dry), 440 (installed)
	SP69 450 (dry), 500 (installed)
	SP150 610 (dry), 710 (installed)

Available Options

Dry contacts for remote "High Limit Tripped Status" indication.

Specifications subject to change.
Consult website or contact AERCO.
C SSP-1 New doc12/09 5M SS 12/09



**HOT WATER SYSTEMS
AERCO INTERNATIONAL, INC**

159 Paris Avenue • Northvale, NJ 07647-0128
(201) 768-2400 • Fax: (201) 768-7789
www.aerco.com • E-mail: info@aerco.com