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Boilers and Water Heaters Fill Vacancy for Efficient and Reliable Performance

D.C. hotel saves more than $100,000 annually

At a luxury Capitol Hill hotel in Washington, D.C., the water-heating system, which consisted of two 16,000-MBtu fire-tube boilers and two large indirect water heaters that ran off the boilers, dated to the Carter administration. Because they were nearly 40 years old, the boilers had to operate continuously to prevent leakage. Although the system was designed with 100-percent redundancy, it had no isolation valves, so the unit firing had to produce extra heat just to temper the cold water flowing through an off boiler. As a result, the system was operating at only 50 percent to 60 percent efficiency.

This equated to a fuel bill that was considerably over budget. Annual natural-gas consumption was approximately 270,000 therms. At a projected cost of $1.418 per therm, the hotel's annual natural-gas expenditure was approximately $383,000, of which 80 percent was attributed to the old boilers. Moreover, an additional $29,000 was spent on system maintenance each year.

Making matters worse, guests complained they had no hot water during critical periods of peak capacity. If such a situation continued, the long-term approval ratings of the five-star hotel would suffer.

When it elected to upgrade the heating and hot-water system, hotel management was seeking economic relief and high reliability. Additionally, it wanted the retrofit completed in under three months. The fast turnaround was necessary to maintain the reputation of the hotel, whose guests enjoy 838 upscale rooms and suites, as well as a fitness center, pool, and sauna.

Integrated Solution

AERCO worked with Rockville, Md.-based manufacturer's representative Sam DeSanto Company Inc. The team installed a highly reliable combination system comprised of nine Benchmark 3000 (BMK3000) high-efficiency condensing boilers for space heating and three SmartPlate DW113 double-wall tankless water heaters for domestic hot water (DHW) in less space than the old system.

Benchmark 3000 condensing boilers.

SmartPlate DW113 water heaters.

Efficiency

With 15:1 turndown, BMK3000 maximizes operating efficiency and seasonal fuel savings. From 200,000 Btuh to its full-fire input capacity of 3 million Btuh, the boiler precisely matches load to minimize cycling and eliminate temperature overshoot. Its advanced design results in increased operating efficiency as load decreases, meaning it saves the most energy during part-load operation, which characterizes the majority of the heating season.

Easy to install, the compact (less than 10 sq ft) SmartPlate offers single-point header connections for DHW, cold water, boiler-water inlet, boiler-water outlet, and electrical-power supply. SmartPlate DW113 heaters incorporate a plate-and-frame-style heat exchanger in a counterflow design.

SmartPlate heaters can utilize boiler water as little as 5°F above the desired DHW temperature to minimize radiation loss and maximize the efficiency of the BMK3000 units. SmartPlate supports up to 90-gpm loads to handle hot-water requirements.

Further improving efficiency is onAER predicative maintenance, which uses state-of-the-art computer tracking to monitor, record, and analyze the boilers and water heaters. Problems are pinpointed in real time for quick resolution, and data acquired helps the hotel analyze its cost savings.

Return on Investment

Within the first year of operation, the hotel saw an average 26-percent reduction in fuel bills, which equated to more than $73,000. Annual maintenance costs decreased by 65 percent, for additional estimated savings of approximately $30,000. With annual financial gains of more than $100,000 and greater reliability, hotel management expects to realize a full return on its investment in less than three years.

Information and photographs courtesy of AERCO International.