

## Problem:

Existing water source heat pump central system was on the verge of failure. A poor initial installation coupled with a lack of routine maintenance was becoming a big potential problem.

## Solution:

Packaged equipment from Heat Transfer Sales of the Carolinas. Install a pre-assembled water source heat pump central system with duplex boiler and duplex pump packages to allow for retrofit with minimum downtime.

## Project:

**Ocean Drive Beach & Golf Resort**

## Location:

**Myrtle Beach, SC**

## Products Utilized:

- **2 - Raypak Outdoor Atmospheric Boilers**
- **1 - TACO 4900 Series Dirt & Air Separator**
- **TACO KS Series Vertical Inline, Split-Coupled Pumps**
- **Griswold Uni-Flange Automatic Flow Control Valves**

## PREFABRICATED PACKAGED SYSTEM KEEPS EVERYONE COOL & COMFORTABLE AT THE OCEAN DRIVE BEACH & GOLF RESORT



Downtime means lots of lost revenue for the folks at Ocean Drive Beach & Golf Resort. This is why Mr. Harold Worley contacted Heat Transfer Sales of the Carolinas (HTS) about concerns over his mechanical equipment which was on the verge of catastrophic failure. The existing water source heat pump system was suffering from huge amounts of rust & corrosion. There were also numerous leaks in the PVC and copper piping system. Joe Britt from HTS assessed the situation and offered his advice. One thing that he noticed was that there was no bypass in the boiler loop causing the boiler to operate in a condensing mode since initial startup. The rest of the equipment was also failing due to improper maintenance

and the harsh beach environment.

The owner wanted as little downtime as possible, and high-quality/easy to maintain equipment. HTS proposed a Pump'nFlo pre-packaged boiler & pumping system. By prefabricating all the mechanical equipment on two skids, each skid could be hoisted on top of the building and exchanged with the old equipment for quick replacement of the entire system.

### PROJECT SPECIFICS

The first skid contained the building loop pumps which were two TACO KS vertical inline, split coupled pumps. These were selected so that the owner would have 100% standby capability and be able to service the pump internals without having to remove the heavy 30 HP motors. This skid also consisted of a TACO dirt & air separator, expansion tank, pre-wired pump starter panel, pump balancing valves, and panel mounted pressure gauges. The other skid consisted of two Raypak H-1758 boilers. The second boiler was also used for redundancy. The boilers were provided with pump controls and a boiler sequencer which was mounted and wired at HTS. (OVER)



### TECH TOPIC: BOILER CONDENSATION PROBLEMS IN WATER SOURCE HEAT PUMP SYSTEMS

A common problem associated with boilers in water source heat pump systems is premature failure due to condensing flue gases which destroy boiler internals. The culprit is not the boiler itself, but is instead a flow balancing issue. A water source heat pump loop typically operates at temperatures in the 65 - 85 degree F range. Most boilers require at least 140 degrees F return water temperature. A good copper finned tube boiler such as a Raypak can handle as low as 105 F degrees return water temperature. So with such low loop temperatures (65—85 F), what can be done to protect our boilers from condensing? (OVER)

## CASE STUDY

### Heat Transfer Sales of the Carolinas, Inc.

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Since 1971, HTS has been setting the standard for hydronic HVAC and engineered plumbing suppliers. HTS offers the HVAC experience and professionalism of degreed sales associates. Engineering graduates staff every sales office, helping you evaluate system requirements and select the best equipment for your job.

#### PUMP'NFLO Hydronic Packages Save Time, Labor, and SPACE!

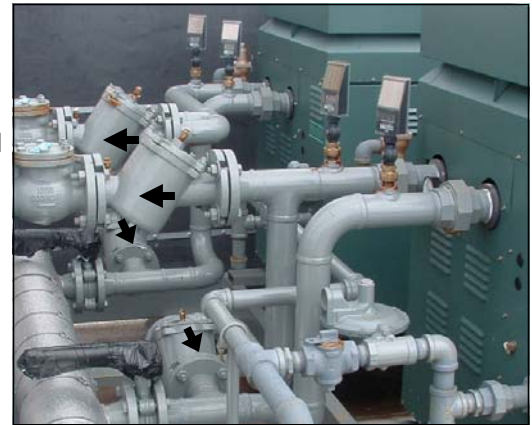
Why invest hours sourcing components for a hydronic system when you can buy one completely pre-packaged? HTS can custom fabricate packages giving you an entire hydronic system on one skid. Each Pump'nFlo package is designed and built to your specifications. All of the appropriate equipment is assembled on one easy to ship skid, with piping connections extended to the edge for quick on-site connection.



The driving force in forced circulation.

(Continued from P1.) The boiler package included full-size system header and branch piping with accessories including Weiss digital thermometers, butterfly valves, and Griswold automatic flow control valves. This time around, HTS piped in boiler bypasses and by utilizing the features of the Griswold valves, the proper flow rates were selected for the boiler bypass and system injection. These balanced flow rates will ensure that the boilers don't operate in a condensing mode and provide superior operation and longevity of the equipment. The boilers were also coated with Raypak's baked enamel finish which undergoes a 1000 hr. salt spray test. All of the piping, valves, and equipment on each skid were coated with an industrial epoxy paint.

Six weeks after system startup, HTS made a follow-up visit to meet with the owner. According to Mr. Harold Worley, "The entire system gives smoother, quieter, and more efficient operation." The advantages were clear. Ocean Drive Beach &



Griswold automatic flow valves shown with directional arrows. Raypak boilers can handle down to 105 F return water temp.

Golf Resort needed the optimal system, but lacked the downtime to allow for on site field construction. With HTS sizing, sourcing, and fabricating all of the system components, the owner could rest easier knowing HTS had all the details covered.

**"The entire system gives smoother, quieter, and more"**

### TECH TOPIC: BOILER CONDENSATION PROBLEMS IN WATER SOURCE HEAT PUMP SYSTEMS (CONTINUED)

(Continued from P1.) Solving the condensation problem starts with the piping design. A bypass is installed so that a portion of the boiler water is blended with the incoming loop water. Costly and complex 3-way valves with controllers and manual balance valves are traditionally installed at the bypass/boiler piping loop. The manual balance valves are often misunderstood by maintenance personnel and are easily adjusted from the correct settings. In an effort to "fix" and balance the system, this adjustment sends cooler temperature water to the boiler causing condensation and eventual boiler failure.

A simple solution to this problem is to eliminate the 3-way valve and its controls and replace the manual balance valves with Griswold automatic flow control valves. After determining the *main loop temperature rise* and the *boiler loop temperature rise*, the amount of boiler water (**GPM-1**) required to blend into the main loop is determined. The remaining flow through the boiler loop will then go through the bypass (**GPM-2**). Griswold automatic flow control valves rated for **GPM-1** and **GPM-2** are then selected. This will ensure that there is a consistent amount of flow into the boiler loop & bypass producing an adequate return water temperature to prevent boiler condensation. Following these steps will not only prevent boiler condensation, but also extend the life of the boiler.

