

## FOUR SEASONS HOTEL PHILADELPHIA

September 30, 2010

Mr. Marvin Dixon  
 Director of Engineering  
 Four Seasons Hotel, Philadelphia  
 One Logan Square  
 Philadelphia, PA 19103



Walk-In Freezer

Dear Marvin,

Thank you for the opportunity to conduct a Proof of Performance with the installation of IceCOLD® into a walk-in freezer located in the main kitchen at The Four Seasons Hotel, Philadelphia.

Using a defined protocol methodology, we conducted the Proof of Performance on this installation to illustrate the savings the Four Seasons Hotel will garner as a result of introducing IceCOLD® in their refrigeration units.

The following report outlines the methodology, results of the Proof of Performance, efficiency improvement and ultimate savings obtained:

### METHODOLOGY

#### **Purpose:**

Establish a baseline for electricity cost, return and supply air temperatures, under normal operating conditions of a walk-in unit at Four Seasons Hotel in Philadelphia. Measure the difference between cost of operating unit before IceCOLD® and after IceCOLD® to determine efficiency improvement and expected energy savings.

Brands: Heatcraft/Bohn & Copeland

Use: Refrigeration

Refrigerant: R22

IceCOLD® Installed: 2 ounces

#### **Tools Utilized:**

U12 Data Logger (Onset Computer)

2 Temperature / Relative Humidity Sensors

1 AMP Probes

#### **Probe Placement:**

Channel 1: AMP Probe (lower amp reading) placed on the line side voltage on the evaporator

Channel 2: Temp/RH probe (lower temp reading) placed on the supply air from the evaporator)

Channel 3: Temp/RH probe (higher temp reading) placed on the return air on the evaporator

## FOUR SEASONS HOTEL PHILADELPHIA, cont.

### Units Measured:

Amperage: Current draw on the L1 (overall amp draw) compressor unit

Temperature/Relative Humidity: On the return and supply air on the evaporator unit

### Volume of IceCOLD® Installed:

Using a standard formula ratio of 1 ounce of IceCOLD® to 1 ton, 2 ounces were installed on Wednesday, September 1, 2010.

### Units Measured:

AMP: Amount of electricity needed to operate system

Temperature/Relative Humidity: affecting performance of system

The data logger collected the following data:

As this is a refrigeration unit (walk-in freezer), no cooling degree days were used in the calculations. Improvement is based on reduced electricity consumption and improved cold air into the unit. To ensure a comparative analysis, four days were chosen in the baseline period for comparison to the exact same days in the post period. Three of those days were Friday, Saturday and Sunday which are typically very busy in a hotel environment with one weekday (Tuesday) to provide a weekday analysis.

**Baseline:** July 20, July 30, July 24, July 25, 2010

Average amps =  $4.279 + 2.25 + 3.08 + 2.08 = 2.9$

Return Air average = 42F

Supply Air Average = 26.99 F

Delta = 15.1F

**Post Installation:** September 10, 11, 12, 14, 2010

Average amps =  $2.57421 + 1.991997 + 1.99904 + 1.764914 = 2.075$

Return Air Average =  $36.86 + 36.73 + 36.83 + 38.83 = 37.31$

Supply Air Average  $33.68 + 33.57 + 33.82 + 34.59 = 33.89$

Delta = 3.4 F

There was a decrease in amps from an average of 2.9 Amps to 2.075 Amps

Reduction of 28.44% Electricity Use

The post install difference in return and supply air temperature across the coils minus the baseline difference in return and supply air temperature:

$15.1F - 3.4F$  is -11.07 degrees cooler

Overall efficiency gain is therefore: **28.44% Improvement**

### PERFORMANCE IMPROVEMENT

Unit used 28% LESS power to keep the walk-in freezer cooler by reducing the return and supply air by 11.7 degrees. By reducing the delta between return and supply air the content inside the walk-in freezer is less exposed to extreme temperature changes. The compressor does not need to run as often or as long in order to meet and hold thermostat set point.

**28.4% Less electricity was required for cooling of the space post installation of IceCOLD®**