

  
raise  
**RESTORE**  
1030 

Proof of Performance Test  
For East Tennessee State University  
July 27 - August 31, 2011

Pre and Post Data collection, Installation and Analysis Report  
executed by Air Movers, INC. engineering team - Bristol, TN.

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## ETSU Heat Pump Test Results

This test was conducted at East Tennessee State University between July 27, 2011, and August 31, 2011. ETSU selected one (2-ton) heat pump system at the Buccaneer Ridge apartment complex to utilize for the test. After verifying proper operation of the selected unit, the thermostat was set at 72° and a data logger was installed on the condensing unit. The compressor suction temperature, discharge temperature, and current draw were recorded at 45-second intervals for a period of one week prior to installation of the RESTORE1030™ (Refrigerant Treatment Optimizer) product to establish the baseline operating conditions. The RESTORE1030™ product was installed on August 3, 2011, and the temperatures and current draw were recorded from this date through August 10 as well as August 24 through August 31.

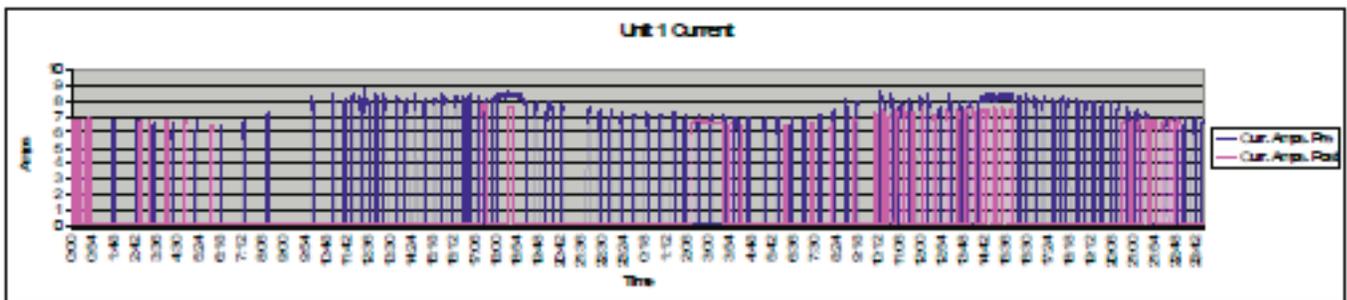
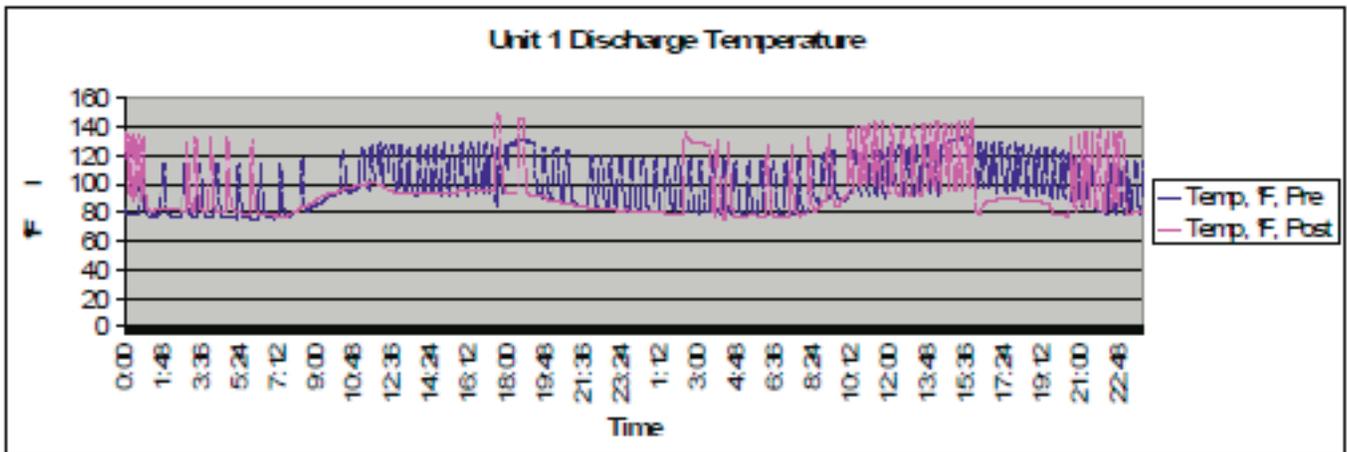
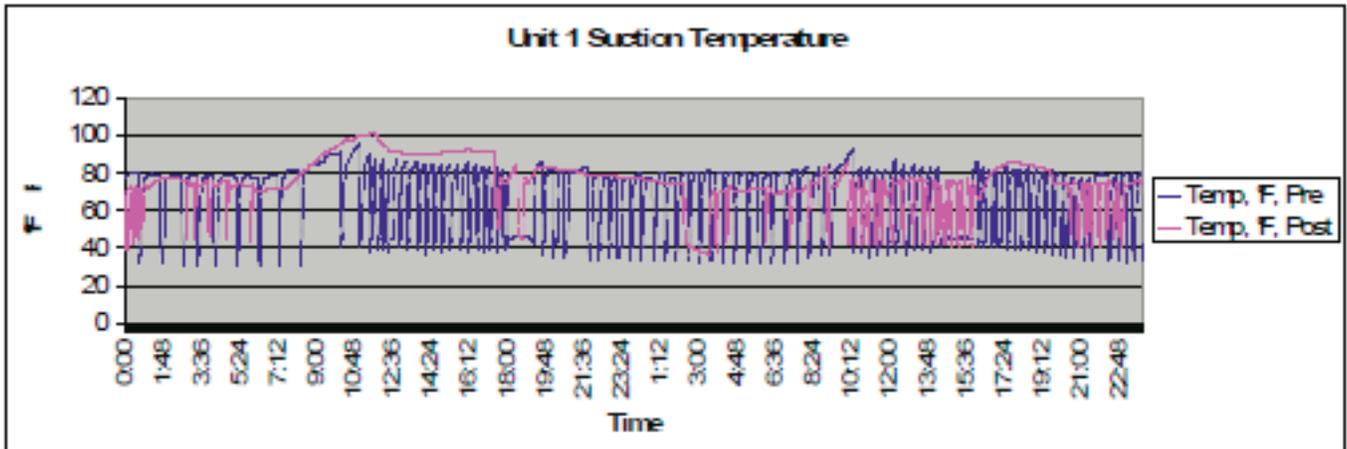
The heat pump selected by ETSU for testing was serving apartment C-209. The details of the specific system/unit used for this test is illustrated below:

Designation	Manufacturer	Model	Serial	Apartment Served
Unit 1	Goodman	CPK24-1AB	9804448962	C-209

For the purpose of this test, data has been selected from days with similar outdoor conditions to provide the most accurate comparison possible. The pre-installation data from July 29 and July 30 and the post-installation data from August 25 and August 26 have been selected for this comparison. The charts below show the compressor suction temperature, compressor discharge temperature, and current draw for the unit on these dates.

## Outdoor Conditions

Date	High	Low
7/29/11	91°	68°
7/30/11	91.9°	70°
8/25/11	91°	66°
8/26/11	91.9°	69.1°



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## Analysis of Data

Unit 1 - C209	Average Suction Temp, °F	Average Discharge Temp, °F	Average Current Amps	Total Run Time, Hrs.	kWH @240V
Pre (7/29-7/30)	43.39	117.76	7.53	14.39	25.99
Post (8/25-8/26)	51.04	128.25	6.86	6.58	10.82
Difference	-7.66	-10.49	0.67	7.81	15.17
% Difference	-17.65%	-8.91%	8.90%	54.30%	58.37%

As indicated in the raw data above, a greater capacity for heat transfer is evidenced in the condensor temps post **RESTORE1030™** install. As well, overall compressor run-time to achieve the set temperature is reduced by more than half; equating to the reduction in KWH percentage of energy consumed.

The apartment served by Unit 1 was vacant for the duration of the test and all thermostatic settings fixed and environmental heat-load conditions static pre and post installation. This, in conjunction with the selection of test dates with nearly identical outdoor conditions, provides a very well controlled test environment. As the above analysis shows, the combined reduction in current draw and total run time results in a substantial energy savings.

## Summary

Based on the analysis of the data collected in this test, it is our opinion that **RESTORE1030™** exceeds the performance claims of the manufacturer, and we would highly recommend installation of this product as a means to substantially reduce the energy consumption of refrigerant/oil-based air conditioning systems.