



Air Conditioning Data Logging Results for Cinema No. 1 Paragon Grove 13 Theater Coconut Grove, Florida



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1. Background

This engagement was to record the indoor air temperature and relative humidity (RH) of Cinema No. 1, the operating current of the associated Package Unit providing air conditioning to Cinema No. 1 (designated RTU #1), and to adjust those values for the actual outdoor air temperature and cooling degree days (CDD) experienced during the test period. The objective was to determine what, if any, improvement in operating efficiency was reflected by RTU #1 power consumption (directly proportional to the measured running current) after treatment with Cold-Plus™.

The testing was conducted at the Paragon Grove 13 theater in Coconut Grove, Florida, on behalf of Energy Solutions Worldwide – a Cold-Plus™ distributor and green energy solutions provider – by whom Sustainable Performance Solutions LLC (SPS) was engaged, during the period April 7, 2014 to May 21, 2014. The Grove 13 is a (now) 15-screen movie theater featuring high-definition digital projection. It has been owned and operated since June 2010 by Paragon Entertainment Holdings, LLC.

Cinema No. 1 is 139-seat auditorium and RTU #1 is a Trane model TCD210E400BB, serial no. 110110669D, manufactured in January 2011 (date of actual installation is unknown). The unit is a downflow packaged standard efficiency cooling unit nominally rated for 210,000 Btuh (198,000 Btuh min. cooling capacity), or 17-1/2 tons, at 11.0 EER.

According to the supplier, Cold-Plus™ is a patent pending technology designed to – with a one-time application – improve the efficiency of HVAC and refrigeration systems by reversing the effects of oil fouling. The oil build-up on the internal metal surfaces is removed and the Cold-Plus™, which contains Polytetrafluoroethylene (PTFE), then permanently bonds to these surfaces to inhibit further fouling. Because it is a nanopolymer, it reduces friction and improves refrigerant flow, heat transfer, the pool boiling process, and extends equipment life. The product is non-hazardous (see MSDS, Attachment 1) and is compatible with all HVAC and refrigeration system components. There was a total of 24.5 oz. of Cold-Plus™ added to RTU #1, 16 oz. to Compressor 1 circuit and 8.5 oz. to Compressor 2 circuit.

SPS is a South Florida-based engineering firm whose practice is limited to energy and sustainability consulting, and whose usual and customary capabilities include data logging. SPS is an independent contractor and none of its compensation is contingent upon acceptance of any of the recommendations contained in its reports or upon the purchase or use of any other products or services.

2. Summary of Results

Fig. 1 shows the recorded outside air temperature for the general area during the test period and Fig. 2 shows the mean outside air temperature for that same period. The average mean temperature from April 7 to April 30 – the period prior to the Cold-Plus™ treatment – was 77.4° F. The average mean temperature from May 1 to May 21, the operating period after the Cold-Plus™ was added to the system, was 79.5° F., representing an increase of approximately 2.7%.

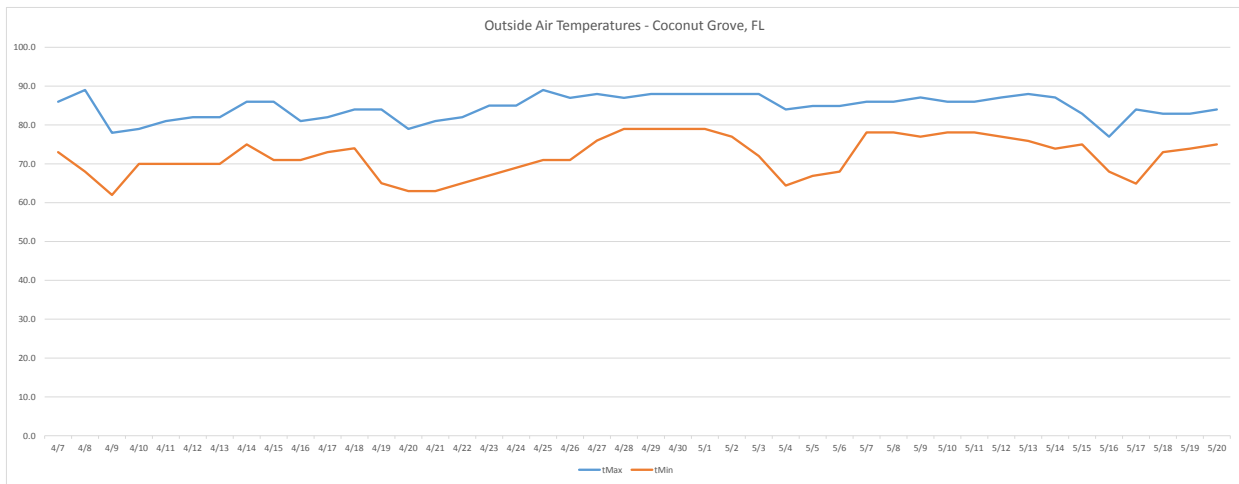


Fig. 1 – Outside air temperature

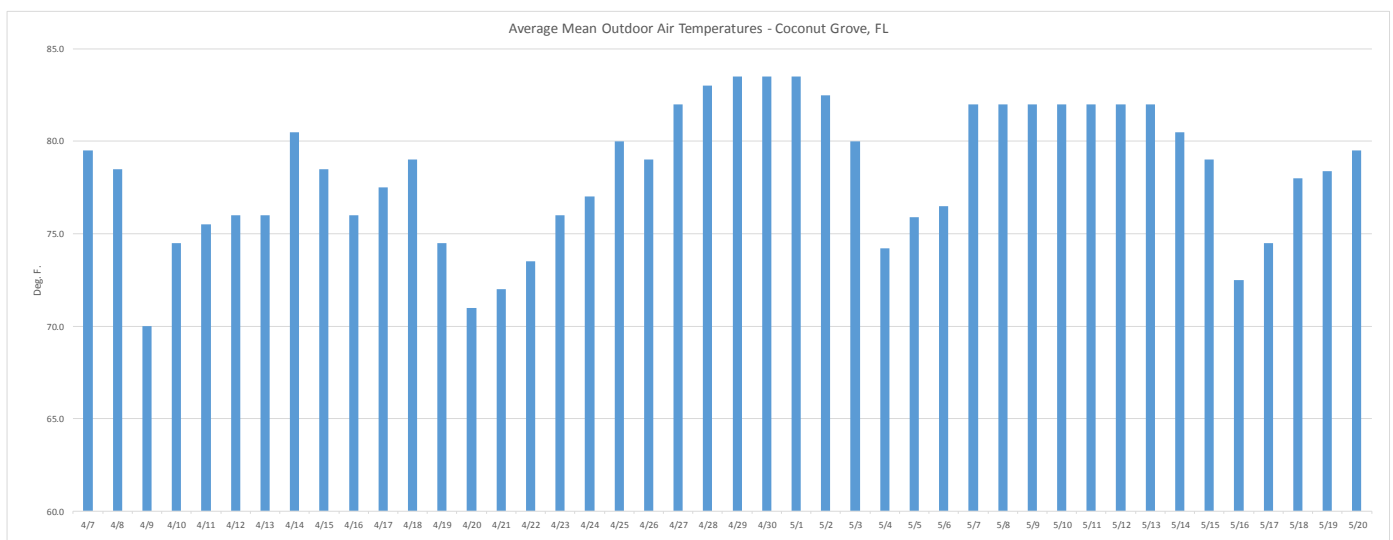


Fig. 2 – Mean outside air temperature

Fig. 3 is the calculated (based on 65° F.) cooling degree days (CDD) for the test period. There were approximately 3% more CDD after the treatment with Cold-Plus™ on April 30. This 2.7-3% value was used for the adjustment of power consumption between the pre-Cold-Plus™ and post-Cold-Plus™ treatment.

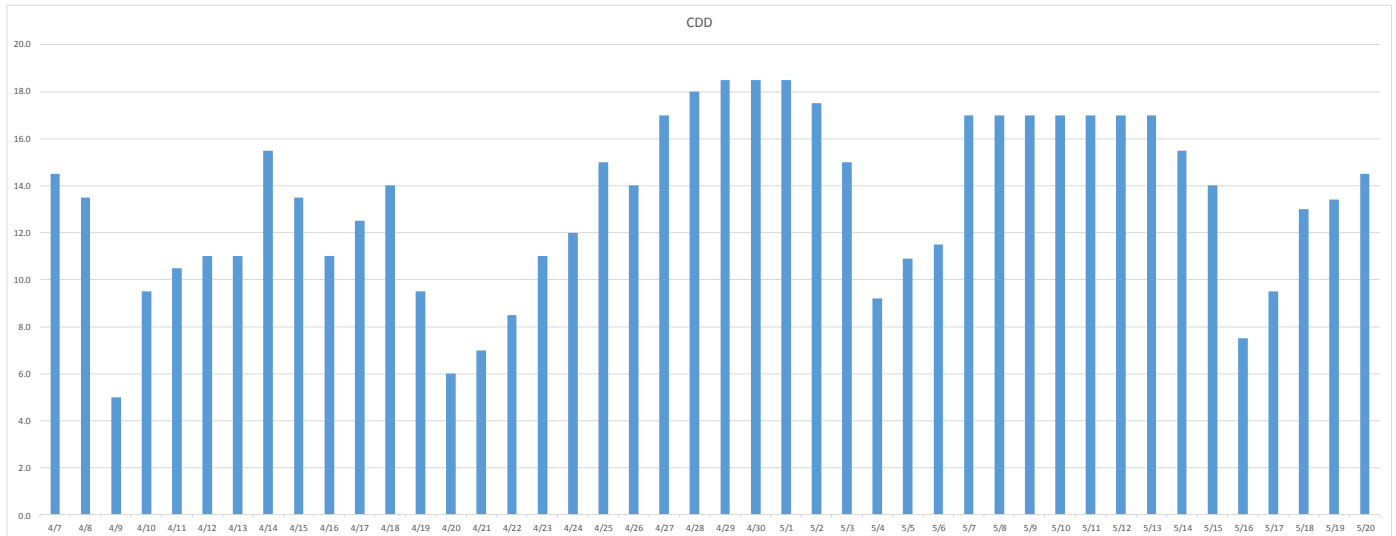


Fig. 3 – Cooling degree days

Fig. 4 shows the indoor temperature and RH of Cinema No. 1 during the test period. As can be seen, there was no noticeable change in the indoor comfort conditions after the treatment with Cold-Plus™ on April 30. Since occupancy data was not available, no correlation of the variation in RH can be made.

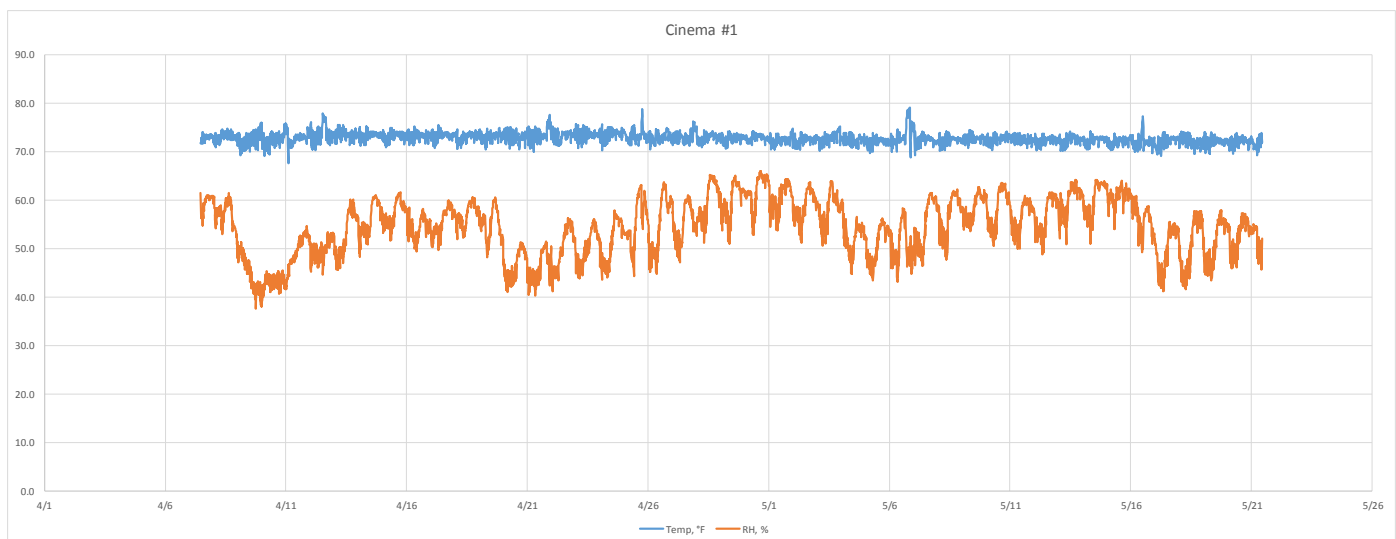


Fig. 4 – Indoor temperature and RH

Fig. 5 is the recorded running current (amps) of RTU #1 during the test period. Note that the actual values prior to the addition of the Cold-Plus™ to the system (4/7-4/30) have been adjusted based on the higher outside air temperatures and CDD during the period in which the equipment was operating with the Cold-Plus™ (5/1-5/21). Since no occupancy data was available, adjustment could only be made based on outside temperature and/or CDD. Note that the apparently transient value on 5/15 is unexplained and is assumed to be an anomaly. The average running amps (**including both run and off times**) for the pre-treatment period was approximately 14.9 A. After adjusting for outside temperature and CDD, that value becomes 15.3 A. The average running amps for the post-treatment period was 13.3 A.

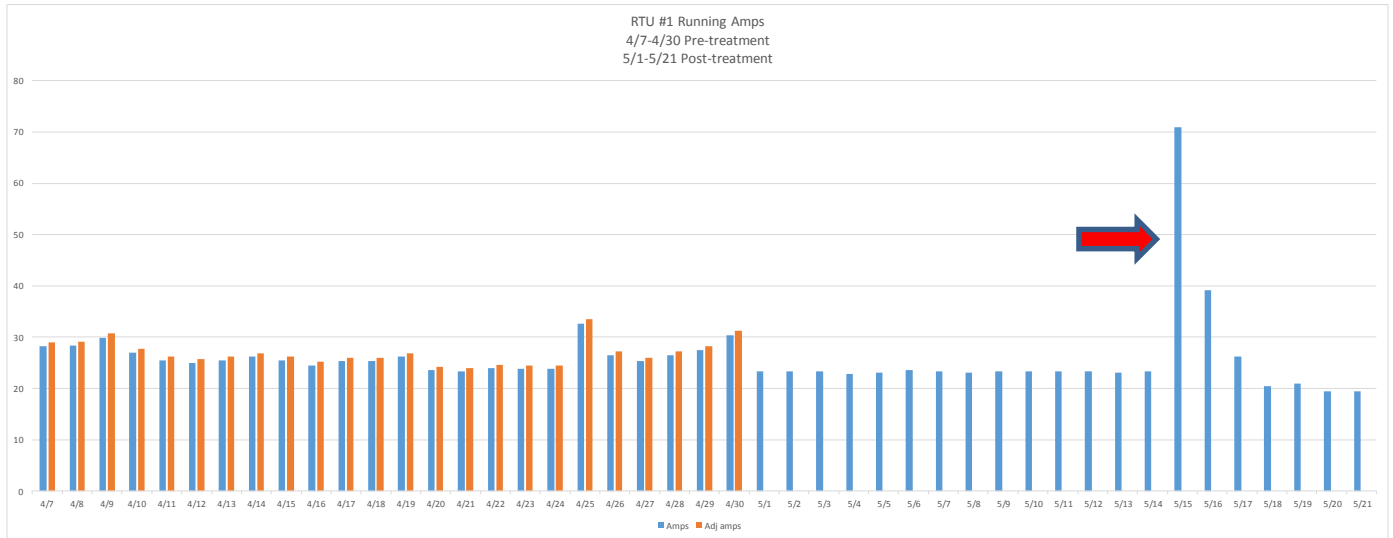


Fig. 5 – Running amps

3. Conclusion

Based on the data shown in Section 2, it appears that the Cold-Plus™ reduced the average power consumption in RTU #1 by approximately 13% during the post-treatment test period, without affecting indoor comfort conditions in Cinema No. 1. It should be noted that, since only outside temperature and CDD were used for adjusting the pre-treatment period, with no correlation to actual occupancy and time of use of the space, the results may reflect a somewhat higher improvement than was actually realized.

Disclaimer: Many factors, including but not limited to the age, location and application of the equipment, can also influence the results obtained with this type of product. Readers of this report are solely responsible for assessing the relevance of these results and SPS will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on information in this report.