

# The EcoSmart Refresh Cycle

An Effective Passive Dehumidification Solution

## Humidity Concerns

High humidity can wreak havoc at any property. Drywall absorbs moisture from the air, which can encourage the growth of mold and lead to paint or wallpaper beginning to crack or bubble. Over time, wood floors and furniture may develop rot, carpets can begin to harbor mold growth--and the presence of mildew or mold in a room creates stale-smelling, musty air that will greet the guest as soon as he or she opens the door.

If an HVAC system supports active dehumidification, EcoSmart thermostats may be outfitted with a Relative Humidity sensor that will engage in dehumidification until humidity has fallen below the RH% by a programmable increment. However, when an HVAC does not have an active dehumidification stage, EcoSmart thermostats can employ an effective passive dehumidification strategy called the **"Refresh Cycle."**



The following data was collected from a property that struggled with humidity-related problems. Although the in-room HVAC systems did not have an active dehumidification stage, system designers used the Refresh Cycle to demonstrate effective dehumidification. Please refer to Figure 1 below for a graphical representation of the collected data.

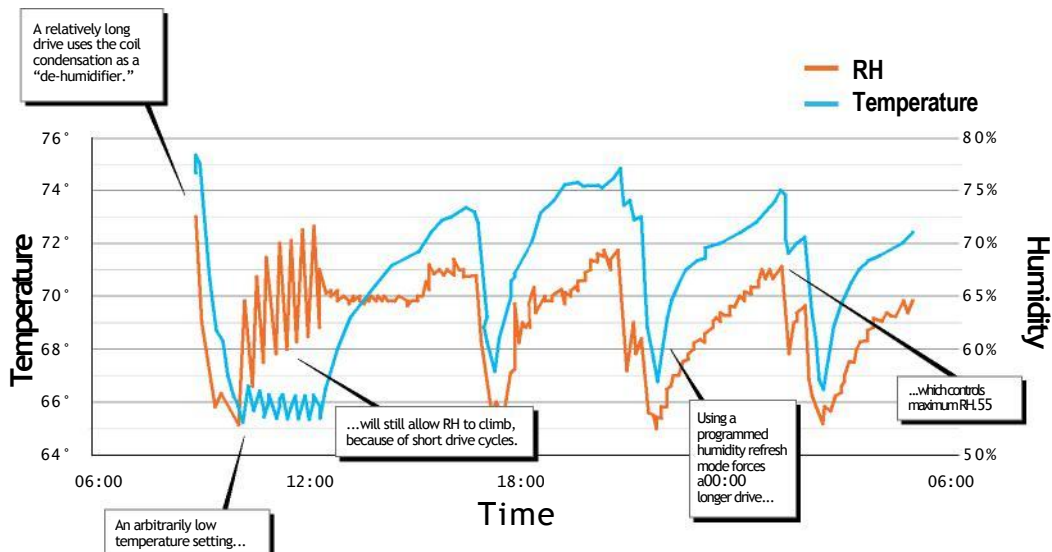


Figure 1

## The Occupied Room

During the data collection period, the room remained occupied from 9:00 a.m. until 12:30 p.m. At the beginning of this period, the HVAC system sustained a long cooling drive to bring the hot, humid room down to the setpoint temperature of 66°. The occupants selected a deliberately low setpoint to represent a common way people attempt to combat dehumidification: by drastically lowering the room temperature. During this long initial drive, the relative humidity dropped from approximately 73% at 9:00 a.m. to 53% by 10:00 a.m. At this point, the thermostat in the room began to maintain the setpoint temperature with a series of short cooling drives, but the relative humidity continued to climb steadily in a sawtooth pattern. In other words, the relative humidity dropped during each of the short drives--but quickly returned to even higher levels after the room reached the setpoint temperature and the HVAC system shut off. The drives were too short to force enough condensation on the cooling coil to achieve effective dehumidification.

## The Unoccupied Room

At approximately 12:30 PM, the occupants left the room. At this point, the temperature in the room drifted away from the setpoint just far enough to reduce system runtime and achieve maximum energy savings. During this unoccupied period, the thermostat activated a Refresh Cycle. The Refresh Cycle forced the HVAC system into a sustained cooling drive, which typically lasts for 10 to 15 minutes every 4 to 6 hours.

For the rest of the day, the room remained unoccupied. The thermostat allowed the temperature to drift significantly higher than the room setpoint and the HVAC unit continued to sit idle. During each Refresh Cycle, the HVAC system activated and drove the relative humidity below 55%. The sustained cooling drives effectively dehumidified the air. Though relative humidity climbed between refresh drives, it never reached the peak levels seen during the occupied period.

## The Refresh Cycle

By adjusting both the length and the frequency of the refresh cycle drives, the Refresh Cycle can keep relative humidity at manageable levels during periods of unoccupancy. It can be an effective dehumidification strategy for systems that do not have any provisions for active dehumidification--such as reheat elements. The Refresh Cycle comes at the cost of a small reduction in runtime savings during the unoccupied period, which varies based on the length and frequency of each Refresh Cycle. However, even at aggressive intervals such as 12 minutes every 4 hours, the Refresh Cycle forces an average of just 3 minutes of runtime per hour. Properties can still expect to see significant energy savings due to reductions of total system runtime--in addition to substantially lower humidity levels. By reducing one of the causes of mold and mildew, property owners can avoid financial damage to room furnishings and sustain a higher level of guest satisfaction.

For more information contact a National Energy Technologies representative today. Visit [www.NationalEnergyTech.com](http://www.NationalEnergyTech.com) or call 800-984-0332.