Understanding the Importance of Having the Right-Sized System

In 1992, the U.S. Environmental Protection Agency (EPA) introduced ENERGY STAR as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. ENERGY STAR is a service mark for devices such as computers, appliances, and other building products that generally use 20%-30% less energy than the minimum required by federal standards.

Recently, we discovered that ENERGY STAR also promotes education to ultimately serve the energy reduction goals. A paper titled “Right-Sized Air Conditioners” with the EPA* and ENERGY STAR * logos came to our attention with an explanation of how system energy efficiency is improved in several ways by making sure systems more closely match space load requirements. The article supports our often claimed point about how the efficiency of air conditioning can be improved by reducing short cycling.

ENERGY STAR (and the EPA) suggests that the efficiency of dx (direct-expansion) air conditioning systems increase when they are allowed to run longer; when short cycling is reduced! According to the ENERGY STAR article; " the efficiency of air conditioners is low when they first start and increases gradually, reaching peak efficiency in about 10 minutes. When operating time increases from 5 to 9 minutes, efficiency improves 17 percent. " (Environmental Protection Agency, 2005)"

In addition, the paper supports the general understanding that when an A/C system runs longer it can also more effectively remove humidity. It has often been our contention that air conditioning systems would provide better latent performance (dehumidification) with longer runtimes (minimum of 10-15 minutes); the APR Control enhancement being critical to increasing runtimes. The article states; "In order for air conditioners to dehumidify or dry the air, they have to cycle long enough for moisture to condense on the coils and drain away. With oversized units, short-cycling reduces the amount of condensation that drains off the coils and even allows some moisture to evaporate back into the air. Air that is not properly dehumidified can be uncomfortable and promotes the growth of mold and mildew indoors." (Environmental Protection Agency, 2005)

The article makes the point that “it is common for contractors to install oversized air conditioners.” While the article discusses how contractors typically default design to a quick “rule of thumb” assessment, the article neglects to address an engineer’s design process. Often a mechanical engineer’s design can be off by measurable amounts based on misunderstanding inputs and heat (cooling load) sources within a facility, changes during design process impacting other aspects of the facility (lighting, for example), value engineering aspects of the construction and significant changes in space use at completion and occupancy. This can also be exacerbated by the fact that systems are typically designed for peak load conditions, however, peak load conditions typically only account for less than 10% of the year.

Air Conditioning systems more closely sized (or able to operate at lower capacity) will provide better comfort, durability and operational efficiency. Systems with the APR Control will also prove better able to perform latent cooling and reduce wear and tear of short cycling, resulting in the extended run time needed to not only provide better latent performance, but also extended life expectancy of equipment, and operation at peak efficiency.

"Right-Sized Air Conditioners." *Www.energystar.gov*. ENERGY STAR/US EPA, 2005. Web. 21 June 2017. <https://www.energystar.gov/ia/home_improvement/home_sealing/RightSized_AirCondFS_2005.pdf>.