The Dog Days of Summer

By the time you read this much of the nation will be in what we in the South call the “Dog Days,” which is a period of the summer that is characterized by oppressive heat and humidity. These high-humidity ambient conditions can create unusually high latent loads, so many of our HVAC systems are unable to achieve comfortable indoor high moisture levels.

During the design process, a cooling load estimate should have been done to estimate the indoor sensible and latent load, then HVAC equipment selected to satisfy both of those loads. As you know “sensible” has to do with changing the temperature and “latent” has to do with changing the moisture. In commercial buildings the actual cooling load can be highly variable, the actual sensible cooling load goes down compared to the designed sensible cooling load. This contributes to reduced compressor run time and for the systems we are talking about, if the compressors are not loaded and running we are not dehumidifying. Another issue is that the latent cooling load is not accurately accounted for and there is not enough latent cooling capacity. This is generally caused by building infiltration.

For our discussion, let’s assume the HVAC equipment we are talking about is 5- to 20-ton unitary, fixed outdoor air versus demand ventilation, and thermostat controlling temperature with no humidity control. There are a lot of these systems out there.

Here is the real problem, we as service techs are expected to make these systems perform as advertised even though they may not be capable of doing that. Here are some tricks and tips that may provide some relief for these high-humidity complaints.

1. Minimize the intrusion of outdoor air. Make sure the doors are closing (many times I have seen humidity problems caused by automatic door closers not working or roll up dock doors not being closed). Keep a slight positive pressure in the structure, if possible.

2. Minimize running the fan during unoccupied periods.

3. Make sure unit panels are in place and that panels and ducting are sealed especially when they are in an unconditioned area.

4. Set outdoor air to the proper level, too much can dramatically increase your latent cooling load.

5. If possible adjust the indoor air flow to maximize the latent cooling capacity of the unit. To do this you will need to reference the manufactures performance data. Do not lower airflow below the prevailing code or specifying engineer’s requirement.

6. When you have more than one unit serving a single zone set one at a little lower temperature so it can act as a quasi-dehumidifier.

7. Make sure that “smart stats” are set up for maximum dehumidification. Things like reverse staging, minimum first stage time, and many other settings can affect the systems performance.

One way for sure to understand humidity and how it affects us is to read RSES Journal and the SAM Chapters available on the subject. My friend, Skip Krepcik CMS, RCT, wrote a wonderful series of psychrometric articles, too. Part 2 of a “three-parter” is on pg. 30 this month. Wait, I forgot my best tip: pray for dew points in the 50s.

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