Cooling System Performance Score Test Procedure (CSPS)

Purpose

The purpose of this procedure is for an HVAC professional to score the performance of an installed forced-air cooling system. The resulting score represents a percent of the amount of cooling entering the occupied space, divided by the equipment manufacturer specified cooling capacity under test conditions.

Preparation

- ❑ Gather equipment nameplate data. Determine the equipment cooling capacity under test conditions.
- ❑ Record required system information on the Cooling System Performance Score Report.
- ❑ Start system with the controls calling for maximum cooling and corresponding fan speed. Allow system to operate for 15 minutes before testing system enthalpy.

Measure and Calculate System Enthalpy

- ❑ Insert enthalpy probes into three supply registers near the center of the system and into two return grilles near the center of the system. Allow probe enthalpy to stabilize.
- ❑ Measure and record supply register air enthalpy to the nearest 1/100th of a Btu/lb.
- ❑ Measure and record return grille air enthalpy to the nearest 1/100th of a Btu/lb.
- ❑ Record each enthalpy measurement and calculations on the *Cooling System Performance Score Report.*
- ❑ Calculate average supply register air enthalpy of the system entering the conditioned space by adding supply register air enthalpies together and dividing by the number of readings taken. **Example: 26.08 Btus/lb. + 26.08 Btus/lb. +26.08 Btu/lb. = 78.63 Btus/lb. Divided by 3 = 26.21 Btu/lb.**
- ❑ Calculate average return grille air enthalpy of the system entering the conditioned space by adding return grille air enthalpies together and dividing by the number of readings taken. **Example: 31.23 Btu/lb. + 31.07 Btus/lb. = 62.46 Btus/lb. Divided by 2 = 31.23 Btus/lb.**
- ❑ Calculate conditioned space enthalpy change by subtracting average return grille air enthalpy from average supply register air enthalpy. **Example: 31.23 Btus/lb.- 26.21 Btus/lb. = 5.02 Btus/lb.**

Measure and Calculate Airflow Entering the Conditioned Space

- ❑ Measure airflow entering the conditioned space from each supply register with a commercial balancing hood or airflow traverse using a correction factor in an appropriate test location.
- ❑ Record each airflow measurement and calculation on the *Cooling System Performance Score Report.*
- ❑ Calculate total airflow exiting the conditioned space by adding supply air register airflows together. **Example: 835 cfm + 518 cfm + 742 cfm + 491 cfm + 459 cfm + 280 cfm + 40 cfm = 3365 cfm total supply register airflow.**

Calculate the Cooling System Performance Score

- ❑ Record each calculation on the *Cooling System Performance Score Report*.
- ❑ Calculate the system delivered total or cooling Btu/hr by multiplying conditioned space enthalpy change (Steps 1-7) times total supply register airflow (Steps 8-10) times total Btus/hr multiplier of 4.5 (adjusted to current conditions). **Example: 5.02 Btus/lb. x 3365 cfm x 4.5 = 76,015 Btus/hr.**
- ❑ Calculate the Cooling System Performance Score by dividing system delivered Btu/hr (Step 12) by equipment rated Total Btus/hr (114,300 example) **Example: 70,015 system delivered Btus/hr divided by 114,300 equipment rated Total Btus/hr. = 67% Cooling System Performance Score.**

