

Martha Brook - RE: Zoning Data

From: Richard Foster <rfoster@trolexcorp.com>
To: 'John Proctor' <john@proctoreng.com>, <Mshirakh@energy.state.ca.us>, <Mbrook@energy.state.ca.us>, <bwilcox@lmi.net>, <rick@chitwoodenergy.com>, <abram@proctoreng.com>, <adrian@proctoreng.com>, 'Tom Downey' <tom@proctoreng.com>
Date: 9/14/2011 11:00 AM
Subject: RE: Zoning Data
CC: 'Bill Horbaly of the Bonney Brigade' <billh@bonneyplumbing.com>, <mshelton@wrightsales.net>

My contractor has another job being installed this week. We discussed you all visiting a properly installed job. Would you still like to do so?

Dick Foster
 ZONEFIRST

From: John Proctor [mailto:john@proctoreng.com]
Sent: Friday, September 09, 2011 9:53 PM
To: 'Richard Foster'; Mshirakh@energy.state.ca.us; Mbrook@energy.state.ca.us; bwilcox@lmi.net; rick@chitwoodenergy.com; abram@proctoreng.com; adrian@proctoreng.com; 'Tom Downey'
Cc: 'Bill Horbaly of the Bonney Brigade'; mshelton@wrightsales.net
Subject: RE: Zoning Data

All

In actuality it is the loss of airflow to the house that results in the loss in capacity.

John

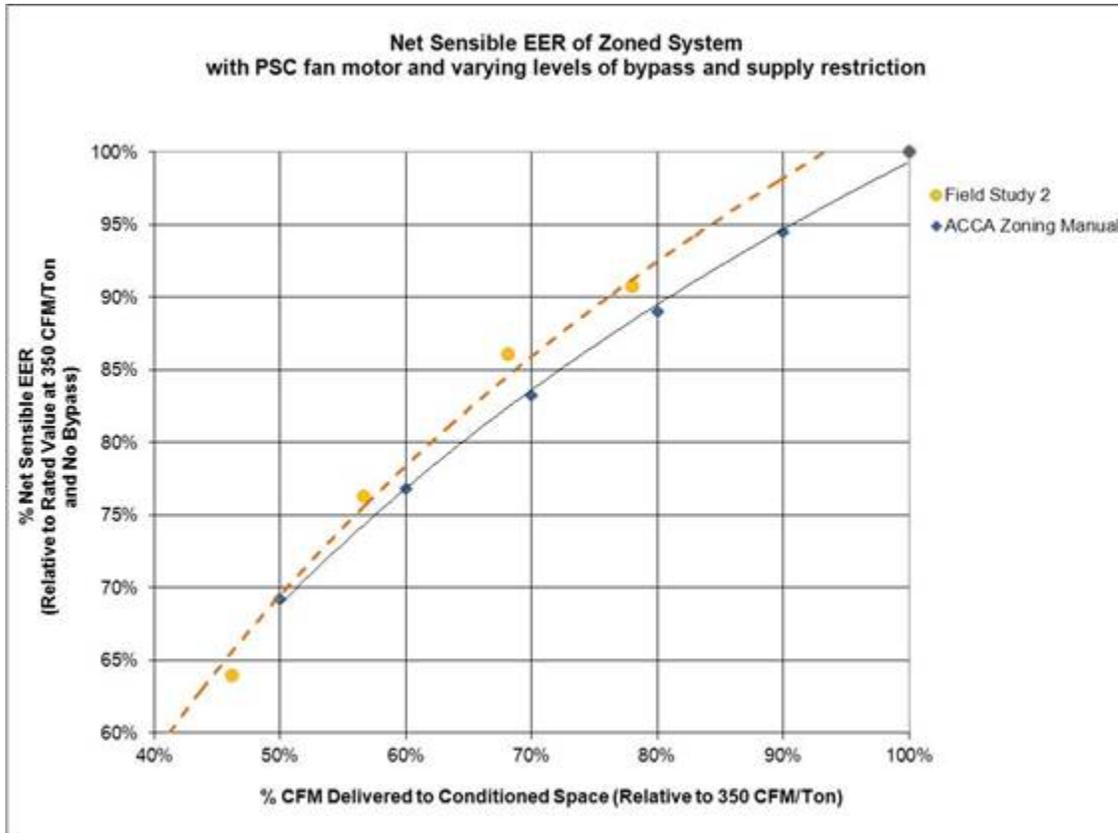
From: John Proctor [mailto:john@proctoreng.com]
Sent: Friday, September 09, 2011 6:20 PM
To: 'Richard Foster'; Mshirakh@energy.state.ca.us; Mbrook@energy.state.ca.us; bwilcox@lmi.net; rick@chitwoodenergy.com; 'John Proctor'; abram@proctoreng.com; adrian@proctoreng.com; 'Tom Downey'
Cc: 'Bill Horbaly of the Bonney Brigade'; mshelton@wrightsales.net
Subject: RE: Zoning Data

Dear Mr. Foster

Thank you for the data from the installation in Sacramento. Looking at the data, I make the following observations:

- 1) The system was a three zone system. Test 1 all zones open, Test 2 largest zone closed, Test 3 largest and second largest zone closed.
- 2) We do not have data on how much air was bypassed, but based on the supply temperatures it appears that about 21% was bypassed in Test 2 and 36% was bypassed in Test 3. If this is true, there must be additional methods besides a bypass duct for air flow control.
- 3) Assuming however that 64% of the air was being delivered to the house in Test 3 and that the return air from the house was at 78 in all tests, the sensible capacity has dropped to 81% of the Test 1 capacity. This is in line with the measurements we have made and the Carrier ASHRAE paper. as shown in the

graph below.



- 4) The supplied measurements indicate a 5% drop in power. Assuming this to be accurate, the efficiency in Test 3 is 86% of Test 1.
- 5) I also observe that the low side pressure has dropped from 70 psig to 60 psig. This is an evaporator coil temperature drop from 41F to 34F. That change is responsible for the loss in capacity.

Thank you again for your information.

John Proctor, P.E.

From: Richard Foster [mailto:rfoster@trolexcorp.com]

Sent: Friday, September 09, 2011 2:17 PM

To: Mshirakh@energy.state.ca.us; Mbrook@energy.state.ca.us; bwilcox@lmi.net; rick@chitwoodenergy.com; john@proctoreng.com

Cc: 'Bill Horbaly of the Bonney Brigade'; mshelton@wrightsales.net

Subject: Zoning Data

I am following up on our meeting last month regarding a home in the Sacramento area, with zoning, where the efficiency of the unit is not sacrificed due to the by-pass. Attached are the basic readings that the HVAC Installer was able to measure as the zone dampers open and closed, and air was by-passed through a damper. The minimal change in refrigerant pressures shows the airflow thru the HVAC is minimally changed but not enough to significantly affect the performance, efficiency and CFM. The actual power consumption actually dropped which shows better energy efficiency. Other tests we have show no change or minimal changes in current/ampere draws of indoor and outdoor units. The by-pass did lower the delivered air temp but please also know that the outdoor temp during the test was in

the low 70s, not your normal hot weather day for A/C in Northern California. Again not enough significantly impact performance.

I also attached another test result of a heat pump in an HVAC School lab showing similar results on a small heat pump. I would like reiterate my comments that the HVAC Manufacturers are moving towards two stage and eventually modulating A/C and heat pumps. Zoning will become a integral part of these system as we work towards the energy efficient model of only providing heating or cooling to the zones of the home that need it. Therefore the HVAC Unit will modulate or staging down to the capacity needed. I go back to the light switch principle, you don't have just one light switch for the whole house, do you? But we only have one thermostat. It makes sense to KEEP Zoning in the all future energy legislation. By-Pass is used to maintain airflow through the unit, when all the air can't get into a single zone and is recovered back into the return. Slightly lower coil temperatures provide additional cooling and there is no significant increase in electrical consumption when done properly. This is the difference between jobs being done correctly and incorrectly.

Below is the contractor who installed this system and provided the data for this home. He has agreed to arrange a visit to any wishing to view this system. He is also seeking other homes for similar tests and viewing.

Bill Horbaly
 HVAC Operations Manager
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*You've got an
 elite team working
 for you!*

If I can answer any questions, please feel free to contact me as well.

Sincerely,
 Dick Foster

Richard Foster, President

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