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Ventilation TRENDS

May 2005

Insights In The Ventilation Industry

Volume 1, Issue 1

A Biannual Newsletter Published by CaptiveAire Systems Inc



CaptiveAire products voted "Best In Class" 2001, 2002, 2003 and 2004 by Foodservice Equipment & Supplies subscribers as tabulated by an independent research firm.

**Just Released:
New ND Series
Hood with ACPSP
Accessory**



The ND series hood with AC-PSP accessory, by CaptiveAire, is a compensation wall canopy ventilator rated for all types of equipment. It shall be capable of providing up to 90% make-up air in addition to tempered HVAC air through a dual air stream front perforated stainless steel plenum.

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Simultaneous Heating & Cooling of Kitchens - **The Balance Point Issue**

by Doug Horton - Independent Consultant
D.J. Horton & Associates

CONSIDER THE FOLLOWING scenario. It's November in Chicago and you've been asked to help diagnose the reason for high energy costs and kitchen discomfort in a large coffee shop restaurant that operates 24 hours a day. Here's what you find during your visit:

- Outdoor temperature is 35°F
- Kitchen thermostat is set for 70°F heating and 75°F cooling
- Kitchen is warm and temperature is higher than 75°F
- Cool air is being discharged into the kitchen through diffusers in the upper wall across from the exhaust hood
- The "galley kitchen" is long and narrow with a long hood across from a pass-through opening between the kitchen and dining room counter service area



What's the Problem?

Simply that the kitchen is warm enough from internal heat gains and heated makeup air to cause the temperature to rise above the thermostat setting and initiate HVAC cooling. The kitchen is being heated and cooled at the same time! Surely this is accidental, but it's clearly wasteful.

Balance Point Issue.

Understanding the "heating/cooling balance point" helps explain this dilemma. The "balance point" is the outdoor temperature above which a space needs to be cooled and below

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From The Founder

CaptiveAire is excited to share company and industry news with you. I hope you find the information stimulating and I encourage you to forward any questions you might have.

Commercial Kitchen Ventilation design requirements are changing dramatically because operators want cool, comfortable kitchens with very effective hood exhaust systems at a good price.

Research & extensive testing illuminates the importance of dynamic effects; low velocity, vertically discharged, dedicated make-up air and the understanding of the balance point. We now have well defined requirements for overhangs, exhaust-flow rates, end panels and the importance of low-velocity, dedicated, make-up air. The inadequate hood and make-up air designs of the past are rapidly disappearing from the market.

Today's exhaust-only hoods reduce cost and are aerodynamically designed to aid in capture and containment. New technologies are being introduced that support these requirements, including direct-drive fans with speed controllers, lower cost variable-frequency drives, energy management systems, perforated-supply plenums to deliver low-velocity, make-up air as well as direct-fired heaters that are highly efficient and the most cost-effective way to heat make-up air.

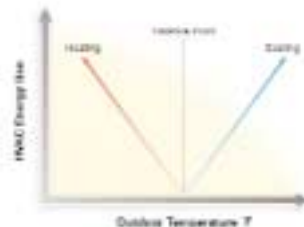
The Integrated System design approach eliminates dynamic effects and compatibility issues of the past. Operators should expect and demand effective ventilation systems that capture the effluent robustly, while maintaining cool and comfortable kitchens.

Thanks for your continuing support, and please feel free to contact me or your local CaptiveAire sales office with any questions.

Bob Luddy
 Bob Luddy
 Founder & President

The Balance Point Issue continued from cover

which it needs to be heated.” (figure 1.1) If there were no internal heat gains, the balance temperature would be halfway between the thermostat’s heating and cooling set points. However, there are many sources of heat, even in homes and small commercial buildings, so the balance point in typical residential and commercial structures is about 65°F. On the other hand, there are typically greater internal heat gains in commercial kitchens: radiation from appliances, spillage of convective heat from hoods, and heat from appliances, heat lamps and other consuming equipment that is not under exhaust hoods.

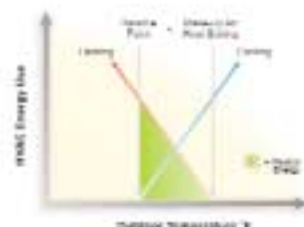


(fig 1.1) Balance temperature is halfway between the thermostat’s heating and cooling set points.

The balance point is usually much lower than 65°F in commercial kitchens - often in the 50’s, and not uncommonly in the 40’s or even 30’s. In the coffee shop case, the balance point is in the lower 30’s, which is not unusual for small kitchens with lots of appliances giving off a great deal of heat. Note also that applying heat to the kitchen lowers the effective balance point further, because the cooling will remain on even longer as the outdoor temperature decreases.

The Control Issue

Typically, HVAC units and related controls are furnished by mechanical contractors, while dedicated kitchen make-up units and their controls are furnished by kitchen ventilation suppliers. HVAC units are usually controlled by zone thermostats – separated into kitchen and dining areas in most cases. On the other hand, it’s typical practice to control make-up units by setting the discharge temperature. If the heat gained from equipment in a kitchen coupled with the outdoor temperature’s influence on the restaurant causes kitchen cooling to operate, there’s nothing “hard wired” to prevent make-up units from providing heat to the kitchen at the same time. Figure 1.2 shows a graph of energy use when the make-up heating set point is higher than the balance point. The triangular area is wasted heating energy.



(fig 1.2) Energy use when make-up heating set point is higher than balance point.

Solutions

Some alternatives to avoid simultaneously heating and cooling of the kitchen are:

- Interlock HVAC and make-up unit controls, which is probably the best solution, but not easily done because of different sources and possible incompatibility of controls.
- Set the make-up heating discharge temperature to below known or estimated kitchen zone balance point. Start with a make-up heat setting of about 50°F then monitor kitchen conditions and duct outlets or rooftop equipment to check for simultaneous make-up heating and HVAC cooling. Continue to lower the make-up heating temperature setting to ensure no simultaneous heating and cooling.

KVS Seminars

Learn essential information about kitchen ventilation with topics including lessons learned from CKV history, managing energy with ventilation systems and case studies that demonstrate optional ventilation design principles.

Featured Speakers include Doug Horton and Bob Luddy. Please visit our website for more information.

www.captiveaire.com

dates	
• May 10, 2011	Grand Rapids, MI
• May 11, 2011	Toronto, Canada
• May 12, 2011	Scott, ME
• May 14, 2011	Lansdowne, VA
• May 24, 2011	Tulsa, OK
• May 25, 2011	Bloomfield, NY
• May 26, 2011	Unionville, NY



Engineering Corner

Direct Fired Heating – The Standard for Make-Up Air

For over ten years, CaptiveAire has used Direct-Fired make-up air heaters in thousands of kitchens and industrial applications. Every CaptiveAire direct-fired heater is designed and tested to produce the highest level of efficiency, safety and comfort for years of operation. Direct-fired heating refers to heating equipment that burns gas directly in the fresh air stream resulting in the most efficient method of heat transfer. Direct-fired heaters generate the lowest cost per BTU of heating when compared to indirect-fired and electric strip heaters.

CaptiveAire's direct-fired units are a lower up front capital expense in comparison to other heat sources and also have a lower installation cost due to no exhaust flues, as required on indirect-fired units. Direct-fired heaters are well suited and widely accepted for applications such as commercial kitchens, factories, warehouses and paint booths.

Some Benefits Of Direct-Fired Heating

- *Direct-fired heating is a 92% efficient heating process. This will result in a very quick capital payback and heating savings for many years. This is in*

comparison to indirect-fired heating equipment which is typically 70% thermally efficient.

- *Direct-fired heating is environmentally clean.*
- *Direct-fired heater burners can operate on either natural or LP gas and achieve very high temperature rises. In fact, the CaptiveAire line of direct-fired heaters can heat the incoming air 125°F up to a maximum discharge temperature of 160°F*
- *Every CaptiveAire direct-fired heater incorporates intelligent flame monitoring equipment. This equipment ensures that the airflow through the burner and gas flow to the burner are optimized to produce the most efficient and clean process.*
- *CaptiveAire direct-fired heater burners are fully modulating and constantly adjusting to changing outdoor air temperature. Gas flow is automatically adjusted to compensate for changes in outdoor temperature.*
- *Direct-fired systems are a long lasting heat source and are easy to maintain for many years of operation.*

Based on the facts above, we hope you understand the benefits of using direct-fired heated make-up air. Direct-fired heating offers you and your customers' a long term, safe and economical heating solution. ■



New ND Series Hood

continued from cover

The AC-PSP consists of 12" supply air plenum and 6" AC plenum in one housing which delivers the AC duct work in the kitchen and this AC air does not interfere with the hoods capture and containment.

The air-conditioned portion of the plenum shall be insulated to prevent condensation. The make-up air plenum shall be located nearest the hood and the air-conditioned air stream shall not be permitted to mix until leaving the dual plenum.

Features and Benefits of the New ND Series Hood Include:

- A double wall insulated front to eliminate condensation and increase rigidity.
- An integral front baffle to direct grease laden vapors toward the exhaust filter bank.
- The front plenum shall provide make-up air through perforated stainless steel panels. Perforated diffuser plates shall be included in the design, to provide even air distribution and the plenum shall be insulated to prevent condensation.



Please visit our website for more detailed information on the AC-PSP and other CaptiveAire products.

www.CaptiveAire.com

CaptiveAire

New North Carolina Manufacturing Facility

Capitalizing on 29 years of experience, CaptiveAire built a new, highly-automated production plant for Kitchen Ventilation Products. Products manufactured include Energy Management Systems & Electrical Controls, UDS Systems, Gas & Electric Make-Up Air Systems, Power Roof Ventilators (Exhaust Fans) and Commercial Kitchen Hoods. The



View of plant from the turret punch's auto sheet loader

With the straight line assembly feature, product travel is optimized.

80,000 square foot plant features all products on assembly lines, a turret punch with an auto sheet loader, linear seam tracker hood welder and CNC press brakes and shears. CaptiveAire worked with CADE Construction to assemble the new plant, which is relocated near the same area as the former facility. The new location also offers space for offices, a conference room, a modern demo test kitchen and loading

docks for products once they are finalized in production. With the straight-line assembly feature, product travel is optimized thus allowing products to effectively move through the assembly



Hood production during the first weeks of transition

line at a more constant rate, creating less downtime so that production does not experience bottleneck effects. ■

Ventilation Trends is a biannual ventilation industry newsletter produced by CaptiveAire. This publication is dedicated to delivering thoughtful insights, resources, and education of processes, research, and products in the ventilation market.

For information, suggestions, or articles concerning this publication please contact us at —



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Insights In The Ventilation Industry

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27616