

Kitchen Ventilation Controls

Variable-Volume Control Ventilation Saves Energy, Money

FACT SHEET

The average food service kitchen exchanges inside air for fresh outside air at least 20 times an hour. It sounds like an effective way to keep a kitchen comfortable and safe, but in most situations it's actually a huge drain on energy resources that provides no real health benefits to employees or guests.

Roughly 25 percent of a food service operation's energy costs go to conditioning the outside air brought in during these air exchanges, and, according to estimates from the American Gas Association, the U.S. food service industry wastes more than \$2 billion each year because of excessive ventilation.

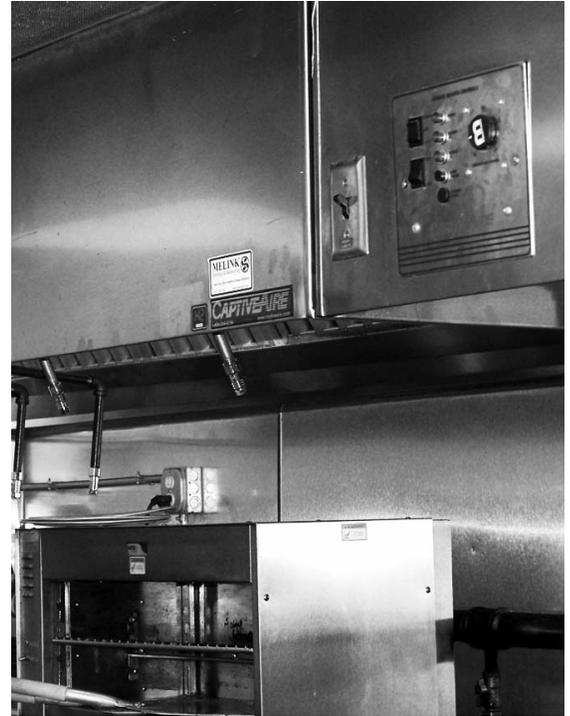
EXCESSIVE VENTILATION

Until a few years ago, most kitchen ventilation controls consisted of a manual on/off switch and a magnetic relay or motor starter for each fan. Exhaust and make-up fans either operated at 100 percent speed or not at all. The whirl of the exhaust fan was a common sound in the average commercial kitchen—even when cooking equipment was not in use. Manual two-speed systems that relied on cooks to switch from low- to high-speed and vice versa offered some energy savings but were seldom used efficiently.

VARIABLE VOLUME CONTROL

Today's state-of-the-art ventilation systems have changed all that. With microprocessor-based controls with sensors automatically regulating fan speed based on cooking load, time of day, kitchen comfort and indoor air quality, it's now possible to ensure excellent air quality while minimizing energy usage.

The new systems include a temperature sensor installed in the hood exhaust collar, optic sensors on the ends of the hood that



Kitchen exhaust ventilation may be the largest single opportunity for reducing energy costs in a food service operation.

detect the presence of smoke or cooking effluent and variable-frequency drives (VFD) that control the fan(s). The volumetric flow of the hood varies based on two key inputs: temperature and smoke/cooking effluent. The VFD controls the amount of exhaust (and make-up air) based on temperature—the lower the temperature the lower the flow. And, if the optic sensor is triggered by smoke or cooking effluent, the speed of the fan ramps up to 100 percent instantaneously.

Case studies have proven that these systems reduce average flow, typically measured in cubic feet per minute (CFM), by anywhere from 10 percent to 50 percent of a system's design volume and can lead to substantial energy savings.

For more information
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BENEFITS GO BEYOND ENERGY SAVINGS

Variable volume control can also mean:

A significantly quieter kitchen

Even relatively small decreases in speed can reduce the kitchen noise level. When the fans run at 80 percent speed, the air noise generated at the grease filters decreases more than 20 percent; when the fans run at 50 percent speed, air noise is virtually eliminated. The result: a more pleasant environment for employees and guests (when the hoods are located near customers).

Reduced HVAC equipment wear

Soft-starting the hood fans with a VFD extends belt life and reduces the outside air load on the kitchen air-conditioning units. This reduces compressor run time and extends the life of heating, ventilation and air conditioning systems. This also can apply to refrigeration units inside the kitchen. In addition, reducing the make-up airflow decreases the rate at which the filters become dirty and need to be cleaned or replaced.

Decreased grease entrapment

Excessive fan speeds send grease up the duct, into the fan and out to the building roof—and, sometimes, even into the atmosphere. Slowing down the exhaust fans and reducing the air duct velocity allows the grease to drain back to the hood and into grease cups, where it can be easily disposed of.

FOR MORE INFORMATION

Looking for ways to improve energy efficiency without sacrificing employee and customer comfort? Focus on Energy's Hospitality Team can help. To learn more about available resources and incentives on kitchen ventilation controls and other food service equipment, contact your Focus on Energy advisor at 800.762.7077 or visit our Web site, focusonenergy.com.

CASE STUDY—DEMAND CONTROL VENTILATION

Dos Gringos Mexican Restaurant in Beaver Dam recently underwent a kitchen renovation which included a new exhaust hood. Scott Eberle, owner of Dos Gringos, was concerned about the increasing costs of energy and how it was affecting his bottom line. "I knew that my exhaust hood used a significant amount of energy because it was always running at full speed even if my cooking equipment wasn't on." After doing some research and contacting Focus on Energy's hospitality team, Eberle was introduced to variable-volume ventilation controls for kitchen exhaust hoods.

The installation cut fan speed by 45 percent—for both exhaust and make-up fans—and led to a significant reduction in energy costs. "I'm saving almost \$4,000 yearly in energy costs—both because of the lower fan use and because I'm reducing the amount of heated or cooled air that's leaving the building. Plus, the work environment is a lot more pleasant and my grease filters are working more effectively," said Eberle. "Between the energy savings and the financial incentive I received from Focus on Energy, my payback period is minimal. This decision made a lot of sense for my restaurant."